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Design and Development of Vehicle Interior to Modernize the Social Environment

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ABSTRACT:

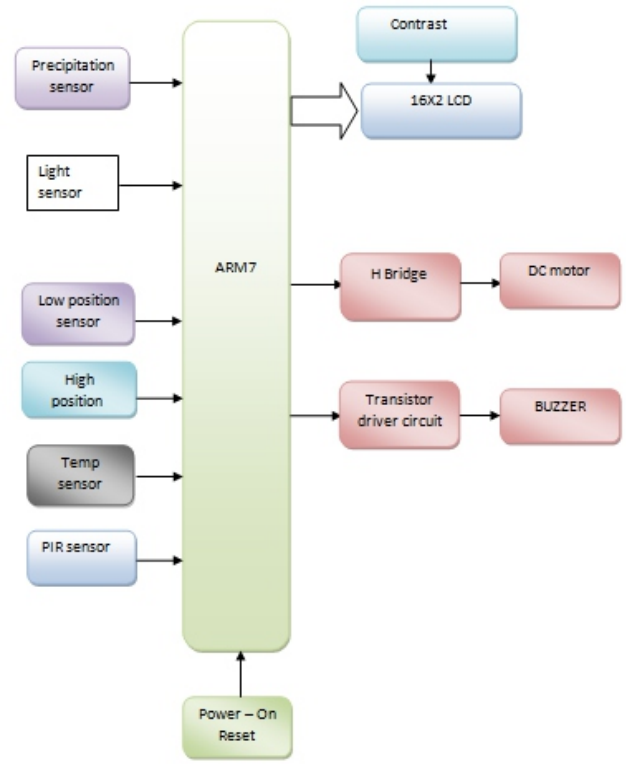
In order to mitigate overheated interior of a vehicle parked in the hot summer sun and thereby to make the entering into the vehicle more comfortable, microcontroller managed module for automatic ventilation of vehicle interior is made. The module is implemented using a microcontroller as a central logical unit and a series of sensors which provide sufficient data to ensure functional, but also efficient, reliable and safe ventilation.

The ventilation process is performed by opening vehicle windows slightly, which enables air to circulate.Microcontroller controls the position of the windows autonomously and independently of the driver's presence, following predefined algorithm that uses sensors data obtained from the vehicle's surroundings.

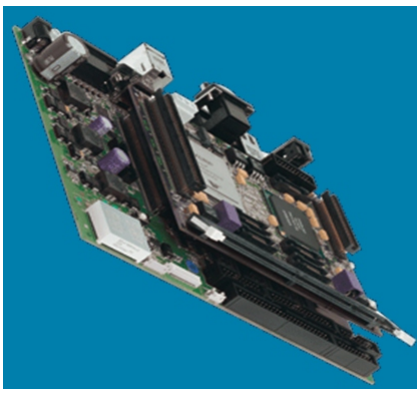
Besides temperature, the most important factors to ensure quality implementation of ventilation are detected movements around the vehicle, the presence of precipitation and other. This paper shows the components, their purpose and capabilities, advantages and disadvantages, as well as potential implementations and upgrades.

The test results give insight into utilization options of this module and its usefulness.This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

BLOCK DIAGRAM:



ARM PROCESSOR:



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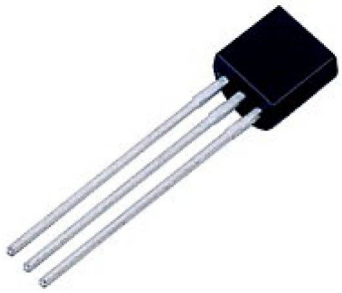
ARM7TDMI Processor Core:

•Current low-end ARM core for applications like digital mobile phones
•TDMI
oT: Thumb, 16-bit compressed instruction set
oD: on-chip Debug support, enabling the processor to halt in response to a debug request
oM: enhanced Multiplier, yield a full 64-bit result, high performance
oI: Embedded ICE hardware
•Von Neumann architecture

TEMPERATURE SENSOR:



A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. For example, a mercury-in-glass thermometer converts the measured temperature into expansion and contraction of a liquid which can be read on a calibrated glass tube. A thermocouple converts temperature to an output voltage which can be read by a voltmeter. For accuracy, most sensors are calibrated against known standards.

LM35:

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°Cat room temperature and ±3⁄4°C over a full −55 to +150°Ctemperature range.Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

It can be used with single power supplies, or with plus and minus supplies. As it draws only 60µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a −55° to +150°C temperature range, while the LM35C is rated for a −40° to +110°C range (−10°with improved accuracy).

The LM35 series is available packaged in hermetic TO-46 transistor packages, while theLM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.C L5 temperatureCan be calibrated directly to the Celsius scale.

2. Linear scale factor + 10mV / ° C
3. The accuracy of 0.5 ° C. at room temperature (25 ° C).
4. Range of temperature between -55 ° C to 150 ° C.
5. Work on the voltage 4 volts to 30 volts.
6. Operating current less than 60µA.
7. Low output impedance 0.1 Ω for 1 mA load

LM35 works by changing the temperature into voltage. Ideal voltage coming out of the LM35 has a ratio of 100 ° C is equal to 1 volt. This sensor has a self-heating (self heating) of less than 0.1 ° C, can be operated using a single power supply. Although the voltage sensor can reach 30 volts but given to sensor is at 5 volts, so it can be used with single power supply with the provision that the LM35 only require a current of 60 µA this means that LM35 has the ability to produce heat (self-heating) ofthe sensor which can cause a low reading error is less than 0.5 ° C at a temperature of25 ° C.

LIQUID CRYSTAL DISPLAY:

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1.The declining prices of LCDs.
2.The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3.Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.

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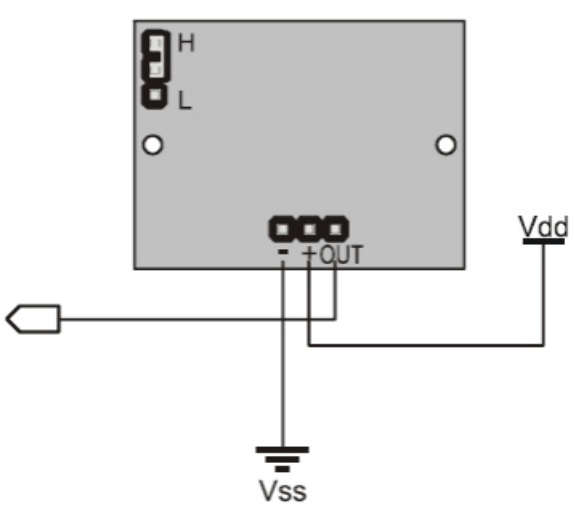
4.Ease of programming for characters and graphics.

These components are "specialized" for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.

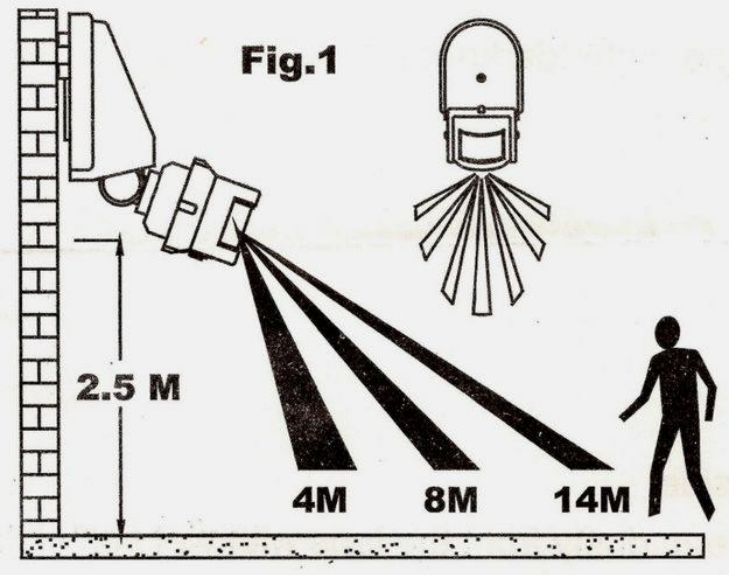
PIR SENSOR:

A PIR sensor, or Passive sensor, is a type of detector that is capable of detecting infrared light emitting from objects within its field of view. PIR sensors differ from other infrared sensors because they are only able to receive infrared waves rather than being able to emit and receive them. Because all objects emit infrared (electromagnetic waves that travel with heat), PIR sensors are able to detect objects that are in front of them. In fact, PIR sensors can see many things that humans cannot. PIR sensors are used for a number of applications, such as night vision, motion detection, and laser range finding.



The Passive Infrared Sensor (PIR) sensor module is used for motion detection. It can be used as motion detector for security systems or robotics. It works form 3.3V to 5V DC and gives TTL output which can be directly given to microcontroller or to relay through a transistor.

It consists of pyroelectric sensor and fresnel lens that detects motion by measuring change in the infrared levels emitted by the objects. It can detect motion up to 20ft. This module is very sensitive to change in infrared levels subjected by human movement.

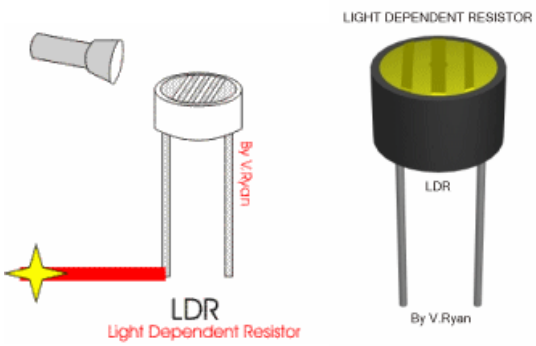


Features:

•Supply: 3.3V Dc to 5V DC
•Detection range: 6meters
•Output: 5V TTL
•Adjustable sensitivity levels (High or Low)
•Settling time: 60 seconds
•Size: Length 32mm, Width 24mm, Height 26mm

LIGHT DEPENDENT RESISTOR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically. The animation opposite shows that when the torch is turned on, the resistance of the LDR falls, allowing current to pass through it.



Circuit Wizard software has been used to display, the range of values of a ORP12, LDR . When a light level of 1000 lux (bright light) is directed towards it, the resistance is 400R (ohms).

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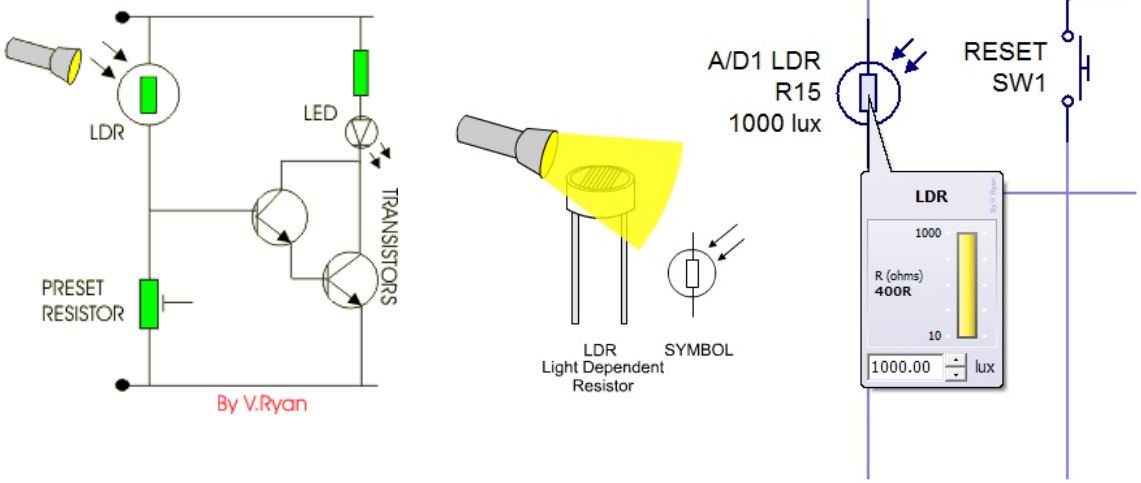
When a light level of 10 lux (very low light level) is directed towards it, the resistance has risen dramatically to 10.43M (10430000 ohms).



LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1,000,000 ohms, but when they are illuminated with light, the resistance drops dramatically.Thus in this project, LDR plays an important role in controlling the electrical appliances based on the intensity of light i.e., if the intensity of light is more (during daytime) the loads will be in off condition. And if the intensity of light is less (during nights), the loads will be switched on.

Advantages:

•Highly sensitive
•Fit and Forget system
•Low cost and reliable circuit
•Complete elimination of manpower

Applications:

•In vehicles
•Public Transportation
•military Applications

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