



“Wireless Tire Pressure Monitoring System”

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ABSTRACT

Tire pressure monitoring system basically its monitors the pressure of the tire of vehicle. Safety on roads is always a major issue in our roads. This TPMS system one of such safety device which can provide us safety by reducing the possibility of the accidents. The proposed TPMS is a device which can calculate the pressure of the tires of vehicle, observable to the driver.

This unit includes pressure sensors, controller, transformer and Bluetooth module. TPMS has proven to be able to be an alternatively tool for the automotive sector to keep maintaining the tire and to improve the driving comfort and safety.

Keywords: TPMS, Micro controller, transformer and bucktooth module.

1. INTRODUCTION

The tire pressure monitoring system (TPMS) is an electronic system which can design to watch the pneumatic pressure in the tires of the vehicle. Our TPMS measure the real time tire pressure information to the the driving force or simply a low pressure warning light or beep. When the car is driven in the most moderate conditions, there is greater longevity of the tires while simultaneously provides a smoother and safer drive. In the currently used products, they aren't available for the wear and tear of tires. However, through more research and technological interventions, we're looking forward to this product displaying.

- Tire pressure is measured and displayed constantly.
- The wheel alignment that will help in parking and keeping the tires in an optimum condition during parking.
- The temperature sensor that indicates the wear and tear of the tire, along with the frictional changes applied to it.

1.1 LITERATURE REVIEW

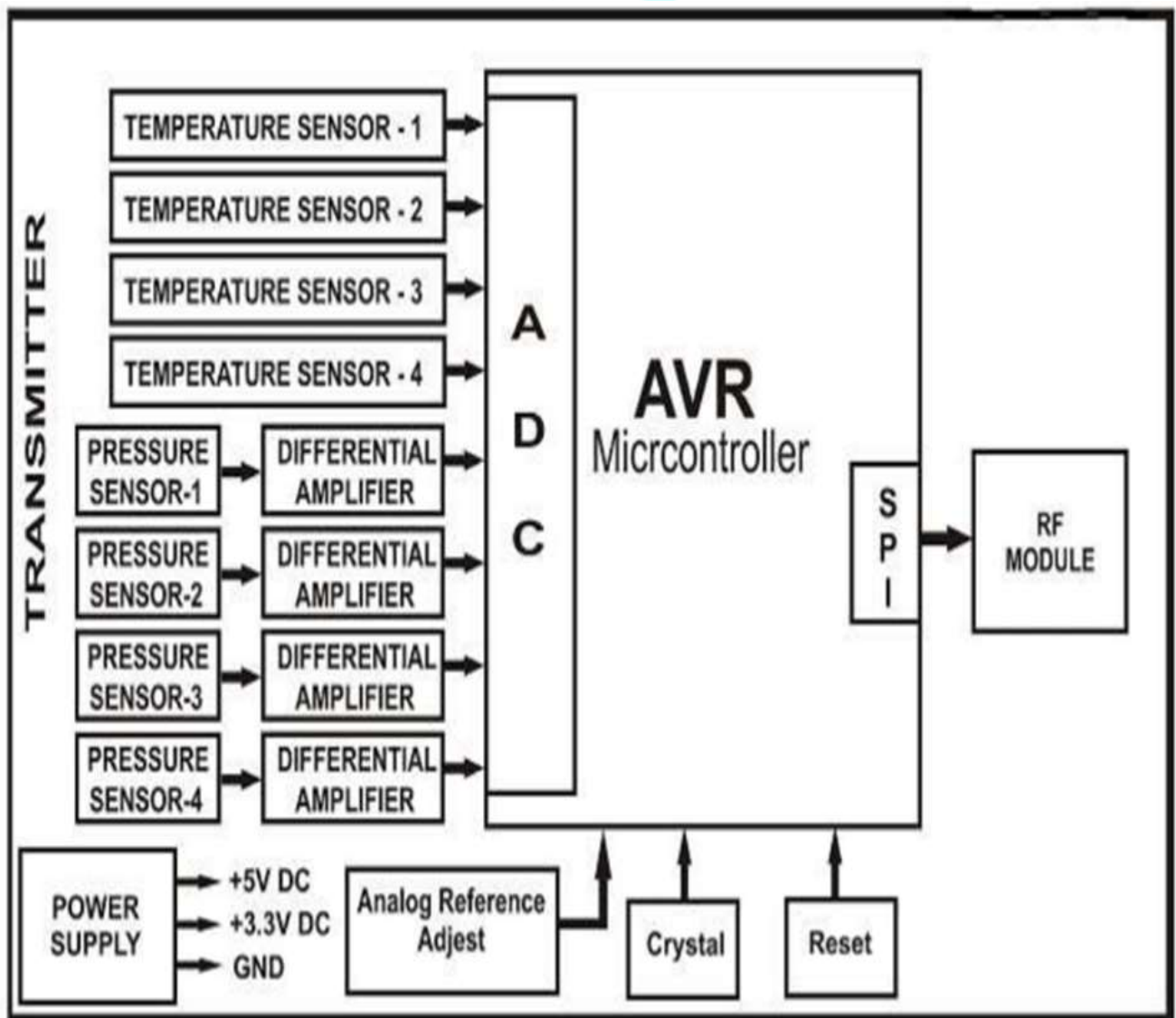
Tire pressure measuring is done by monitoring the rotation speeds of the individual wheels is referred to as indirect TPMS by Loya Chandresh Kumar, rather than measuring Tire pressures by using physical pressure gauges. The TPMS is extremely small in size and very low on weight. The first generation of TPMS is based on a simple principle according to which the diameter of the underinflated Tire is comparatively low International Journal of Pure and Applied Mathematics Volume 118 No. 20 2018, 895-900 ISSN: 1311-8080 (printed version); ISSN: 1314-3395 (on-line version) URL: HTTP://WWW.ijpam.EU Special Issue ijpam.EU 895 when diameter of correctly inflated Tires are considered. The receiver which works on just 5V, gets the data from the transmitting unit and decodes the coded information and then sends to the micro controller using hardware serial ports. Then the micro controller compares this received data to that which was received before.

Then system checks the source of the data from the already stored other data in the MCU. This is an important process taking place during the monitoring. The sensor data get transmitted to a central receiver unit with a specific serial ID and displayed in an LCD driver. The transmission as well the reception of data was done over ISM band at a frequency of 433.92MHz. The transmitted data was arranged in a header of preamble, sensor ID and pressure data. The display driver used was made by using a microchip PIC16F877A micro controller and an LCD. The data encoding method used in this project is based on PWM format with TE (basic pulse element) time of 400 s

2 MATERIALS AND METHOD

2.1 Block diagram of system

Functional Block Diagram of the Transmitter Unit



2.2 ARDUINO NANO

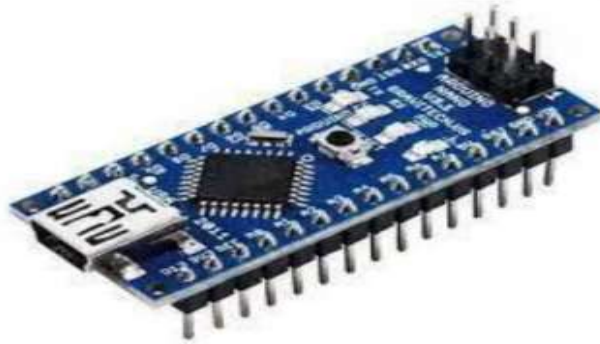


Fig 3.1. Arduino nano

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the micro controller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing. The Arduino Nano is a small Arduino board based on ATmega328P or ATmega628 Micro controller. The connectivity is the same as the Arduino UNO board.

The Nano board is defined as a sustainable, small, consistent, and flexible micro controller board. It is small in size compared to the UNO board. The Arduino 17 Nano is organized using the Arduino (IDE), which can run on various platforms. Here, IDE stands for Integrated Development Environment. The devices required to start our projects using the Arduino Nano board are Arduino IDE and mini USB. The Arduino IDE software must be installed on our respected laptop or desktop. The mini-USB transfers the code from the computer to the Arduino Nano board. The technical specifications of the Arduino Nano board are:

- o The operating voltage of the Nano board varies from 5V to 12V.

- o The total pins in Nano are 22 Input/Output pins.
- o There are 14 digital pins and 8 analog pins.
- o There are 6 PWM (Pulse Width Modulation) pins among the 14 digital pins. The 6 PWM pins in Arduino Nano are used to convert the digital signals into the analog signals. The conversion takes place by varying the width of the pulse.
- o The crystal oscillator present in Arduino Nano comes with a frequency of 16MHz.
- o The Arduino Nano is used in various applications such as Robotics, Control System, Instrumentation, Automation, and Embedded Systems.

- o The projects created using Arduino Nano are QR Code Scanner, DIY Arduino Pedometer, etc.
- o connect Arduino Nano to the WiFi.
- o The functionality of Nano is similar to the Arduino UNO.
- o The flexibility and eco-friendly nature of Nano make it a unique choice to create electronic devices.

2.4 Bluetooth Module



HC-05 has red LED which indicates connection status, whether the Bluetooth is connected or not. Before connecting to HC-05 module this red LED blinks continuously in a periodic manner. When it gets connected to any other Bluetooth device, its blinking slows down to two seconds. This module works on 3.3V. We can connect 5V supply voltage as well since the module has on board 5 to 3.3 V regulator. As HC-05 Bluetooth module has 3.3V level for RX/TX and micro controller can detect 3.3 V level, so, no need to shift transmit level of HC-05 module. But we need to shift the transmit voltage level from micro controller to RX of HC-05 module. The data transfer rate of HC-05 module can vary up to 1Mbps is in the range of 10 meters.

2.5 Temperature Sensor DS18B20



The DS18B20 is one type of temperature sensor and it supplies 9-bit to 12-bit readings of temperature. These values show the temperature of a particular device. The communication of this sensor can be done through a one-wire bus protocol which uses one data line to communicate with an inner microprocessor. Additionally, this sensor gets the power supply directly from the data line so that the need for an external power supply can be eliminated. The applications of the DS18B20 temperature sensor include industrial systems, consumer products, systems which are sensitive thermally, thermostatic controls, and thermometers.

2.6 Transformer

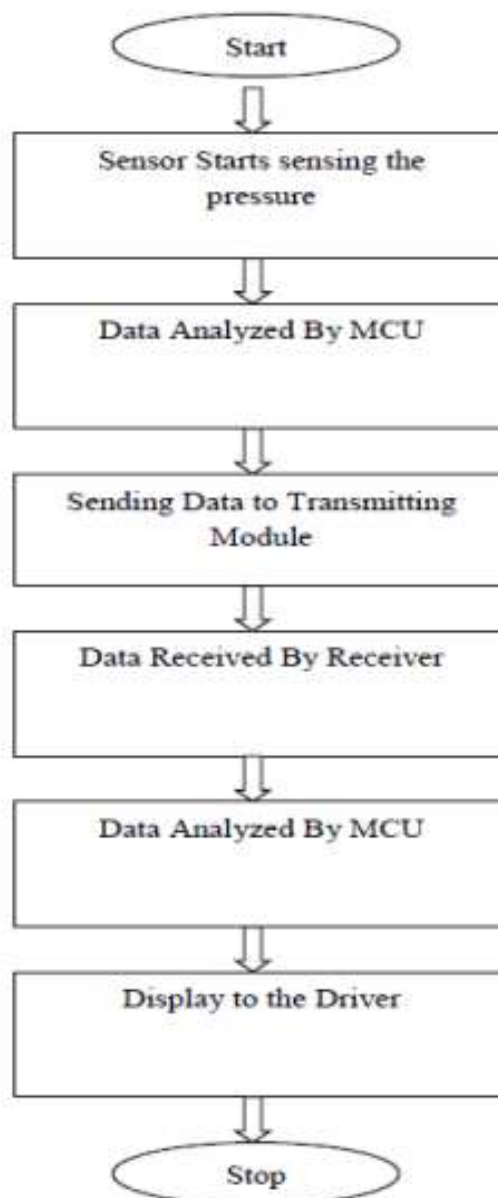


12-0-12 2Amp Center Tapped Step Down Transformer is a general-purpose chassis mounting mains transformer. Transformer has 230V primary winding and center tapped secondary winding. The transformer has flying colored insulated connecting leads (Approx 100 mm long). The Transformer act as step down transformer reducing AC - 230V to AC - 12V. The Transformer gives outputs of 12V, 12V and 0V. The Transformer's construction is written below with details of Solid Core and Winding.

The transformer is a static electrical device that transfers energy by inductive coupling between its winding circuits. A varying current in the primary winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic flux through the secondary winding. This varying magnetic flux induces a varying electromotive force (E.M.F) or voltage in the secondary winding. The transformer has cores made of high permeability silicon steel. The steel has a permeability many times that of free space and

the core thus serves to greatly reduce the magnetizing current and confine the flux to a path which closely couples the winding.

3.FLOWCHART



RESULT

Graphics display shows the reading of pressure and temperature of the four tires one by one within a 12ms.



Tire Pressure	Tire Temperature
83kpa	29°C

4.CONCLUSION

In this project we built the device which can measure the pressure and temperature of the tire of vehicle. This project contains the real time monitoring of the tire pressures also provide required data to the display. This device reduce the accidents on the roads and increase the life cycle of the tires.

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