

ELECTRONIC AUTO TIME RECORDER FOR GOVERNMENT VEHICLES

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Abstract: Most of the government vehicles in many organizations are used improperly, they are manipulated because of poor supervision, in many Government departments, vehicle drivers are breaking the rules & the vehicles are used for personal reasons. To avoid this for some extent, an automatic time recorder is essential at the compounds of government properties where vehicles are parking. In general at these places entry time & exit time of each vehicle is recorded in a register manually, but this can be manipulated very easily, therefore instead of maintaining time recorder manually, it is proposed to maintain an automatic electronic time recorder, which can not be tampered easily. In this regard here an automatic in & out timings recorder is designed with computer, there by the system can identify the vehicle automatically, & records the data of incoming and out going vehicles with accurate timings & dates. If required the data can be stored in a secret file, such that only an authorized official can have vigilance over all the vehicles of a particular department. The entrance & exit gate of a particular department parking lot is monitored continuously through a data acquisition system. The received data from vehicle is decoded through controllers & fed to the computer through serial port. All the vehicles must be installed with their corresponding data transmitting units, whenever the vehicle is passed through entrance or exit, vehicle data is acquired automatically through wireless communication system designed with optical sensors. In this method, entry & exit timings with date of each vehicle along with its number will be recorded automatically. This information is quite useful for the further analysis. For the demo purpose, the system is designed with two model vehicles equipped with their data transmitting cards.

1.INTRODUCTION

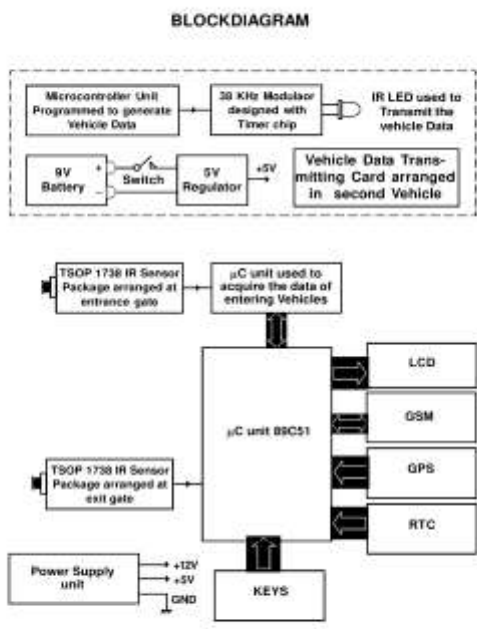
The equipment described in this project work is very useful for government organizations where concern administrator should maintain a proper time recorder for their vehicles. Not only government departments, any private sectors like IT & companies can adopt this system. The main purpose of this system is to avoid malpractice, in this regard each & every vehicle movements like entry time & exit time must be recorded with date. The system is designed as automatic, there by human involvement is not required for maintaining the time register. The data will be stored in to the computer automatically. To prove the

concept practically, the prototype module is constructed with two toy cars & each car is equipped with its data transmitting module. The data transmitting module is designed with microcontroller; its output is modulated and transmitted through infrared LED. Whenever the vehicle is passing through the entrance or exit gates, the vehicle data will be acquired through infrared sensor package. Here two sensor packages are used and they are arranged at the entrance & exit places. The outputs of the sensors are decoded through microcontroller chips, & this decoded data is fed to the computer through its parallel port. Now the program for the PC is prepared in 'C' language & according to the program, the system recognizes the vehicle & its movements are recorded in a particular file automatically. The entire system can be demonstrated over a wooden plank, in which the required outlines are marked for identifying the entrance & exit gates, roads, parking places, etc. The sensors & other circuitry are arranged over this plank at suitable places, there by creates the parking lot environment. The IR sensor packages are arranged at entrance & exit markings, this arrangement is essential to simulate parking lot.

In recent years, the development of automatic time recorders for various applications has experienced increased interest. Many private & public sectors are looking for advanced version time recorders for maintaining their employees attendance, in this regard lot many types of smart cards are developed. This development has led many researchers to start developing more rational and adaptable time recorders for different applications. Therefore here is a module designed for maintaining a proper time recorder for the vehicles. The prototype module is constructed with four 89C2051 microcontroller chips, these devices belongs to atmel family offers many features. Economy point of view they are very cheap when compared with other controller chips. Each chip is programmed independently to carry out predefined functions. Microcontrollers can be defined as microcomputers, because each chip contains very large scale integration with many digital circuits that perform arithmetic, logic, communication, and control functions. When this controller is integrated with other

components over a printed circuit board (PCB), the package designed for a specific application can be referred as a microcomputer on single board. The controllers used here are very small in size & can be programmed easily. Today there is no such instrument that functions without Microcontrollers, not only instrument any electronic or electrical equipments like robots, machines, home appliances, telecommunication equipment, wireless systems, automobiles, navy equipments, air force equipments, etc. the list is end less. Therefore these controllers gained lot of popularity & are used widely for many applications. Here in this project work, these controllers are used for simple tasks. The function of the controller which is installed in a small toy car is to transmit the data of that particular car through an optical sensor. Similarly the controller which is used in the data receiving module is aimed to acquire received data from IR sensor package, decode the data, store the data, & transmit the data through its transmitting pin. All these functions are performed based on the software running on them.

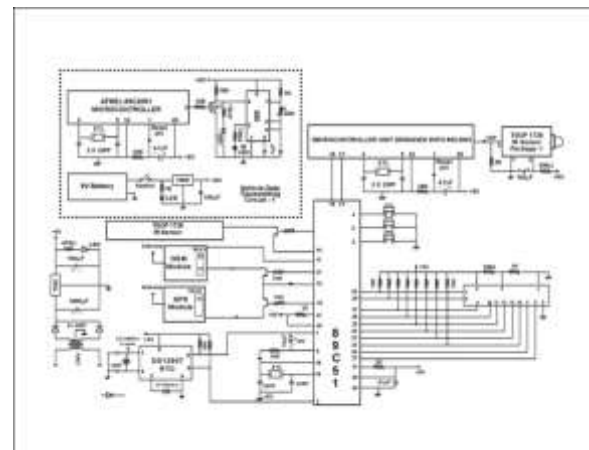
2.BLOCK DIAGRAM



3.CIRCUIT DIAGRAM

The detailed circuit description of the project work “Electronic time recorder for Govt. vehicles” is explained in section wise. For better understanding the total circuit diagram is divided into various sections and each section explanation is provided in this

chapter. The total circuit diagram is shown in previous chapter.



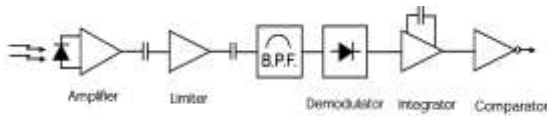
VEHICLE DATA TRANSMITTER

The communication system is designed with infrared sensors, the digital data produced by the transmitter is modulated at 38 KHz, and the same is transmitted through IR LED. The data receiving part of the project work is designed with TSOP 1738, this is a sensor package.

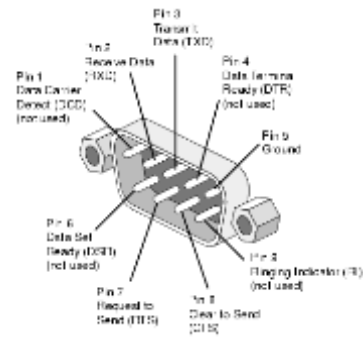
The data transmitter card designed with 89C2051 Microcontroller generates the digital information that contains vehicle number and it is transmitted through optical sensor. Infrared LED is used as optical sensor and the digital data produced by the Microcontroller is transmitted through modulated frequency of 38 KHz produced by the 555 timer IC. The optical sensor transmits the information in uni-direction like a laser beam. The data receiving circuit designed with another 89C2051 Microcontroller unit, receives the information through another optical sensor. TSOP 1738 is used as data receiver, which receives the data and demodulates the signal. This information is fed to Microcontroller; the digital information varies from car to car.

IR SIGNAL MODULATOR

In this block 555 timer IC is used to modulate infrared light, modulation is necessary to make infrared signal stand out above the noise. The modulation technique makes the IR light source to blink in a particular frequency, so that it can ignore everything else.



Block diagram of IR receiver



4.RS 232 SERIAL PORT INTERFACE DEVICE

In communications, RS-232 is a standard for serial binary data signals connecting between a DTE (Data terminal equipment) and a DCE (Data Circuit-terminating Equipment). It is commonly used in computer serial ports. In RS-232, data is sent as a time-series of bits. Both synchronous and asynchronous transmissions are supported by the standard. In addition to the data circuits, the standard defines a number of control circuits used to manage the connection between the DTE and DCE. Each data or control circuit only operates in one direction that is signaling from a DTE to the attached DCE or the reverse. Since transmit data and receive data are separate circuits, the interface can operate in a full duplex manner, supporting concurrent data flow in both directions. The standard does not define character framing within the data stream, or character encoding. The following is the information intended to help the designer's sort through the various features available in RS-232 interface products. The main feature described is the Auto shutdown, RS-232 compatible versus compliant operation, ESD protection, and data rates including Mega baud operation.

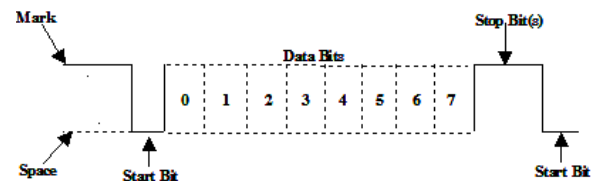
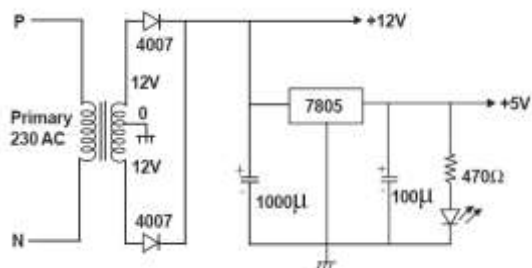
Serial communication is basically the transmission or reception of data one bit at a time. Today's computers generally address data in bytes or some multiple thereof. A byte contains 8 bits. A bit is basically either a logical 1 or zero. Every character on this page is actually expressed internally as one byte. The serial port is used to convert each byte to a stream of ones and zeroes as well as to convert streams of ones and zeroes to bytes. The serial port contains an electronic chip called a Universal Asynchronous Receiver/Transmitter (UART) that actually does the conversion.

The serial port has many pins. We will discuss the transmit and receive pin first. Electrically speaking, whenever the serial port sends a logical one (1) a negative voltage is effected on the transmit pin. Whenever the serial port sends a logical zero (0) a positive voltage is affected. When no data is being sent, the serial port's transmit pin's voltage is negative (1) and is said to be in a MARK state. Note that the serial port can also be forced to keep the transmit pin at a positive voltage (0) and is said to be the SPACE or BREAK state. (The terms MARK and SPACE are also used to simply denote a negative voltage (1) or a positive voltage (0) at the transmit pin respectively).

When transmitting a byte, the UART (serial port) first sends a START BIT which is a positive voltage (0), followed by the data (general 8 bits, but could be 5, 6, 7, or 8 bits) followed by one or two STOP BITS which is a negative (1) voltage. The sequence is repeated for each byte sent. The following Figure shows a diagram of, what a byte transmission would look like.



RS 232 SERIAL PORT

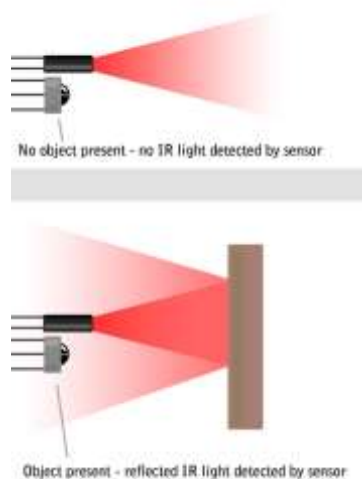


6.IR SENSORS

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of

5.SERIAL PORT DESCRIPTION

measuring the heat being emitted by an object and detecting motion.



DETECTION OF LIGHT BY IR SENSOR

7.89C2051 MICRO CONTROLLER

The AT89C2051 is a low-voltage, high-performance CMOS 8-bit microcomputer with 2K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C2051 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.



8. CONCLUSION

Maintaining the electronic time recorder for the Govt. vehicles through efficient soft technologies is the new trends in technology. These kinds of systems are quite useful for many organizations; the same system with

necessary modifications can be used as attendance recording system in industries. In this regard each & every employee should have an electronic ID card; this card is similar to the data transmitting card that is equipped with the car. The concept falls under the subject of smart card based technology, the smart card intended to use as wireless ID card will be the more advanced version technology. If this kind of technology is implemented in industries, a perfect attendance record can be maintained with accurate timings. Presently the system is designed such that the computer must be located near the parking lot, this is little inconvenient to the organizer. There fore we decided to develop a wireless system, this will be our future work. In this regard, the up to date data received from the sensors can be transmitted through a wire les net work, there by computer can be kept at convenient place, preferably at concern office.

9. REFERENCES

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