

# GSM-Based System for School Children Transportation Safety Enhancement

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**Abstract-** Millions of children need to commute between homes to school every day. Safer transportation of school children has been a critical issue as it is often observed that, kids find themselves locked in the school bus at the bus stop after going to school, they miss the bus, or ride the wrong bus with no way to track them. This project intends to find yet another solution to solve this problem by developing a bus safety system that will control the entry and exit of students from the buses through an energy efficient methodology. The proposed system will control the entry and exit of students to and from the bus using RFID (Radio Frequency Identification) and GSM technologies to ensure the entering and exiting of all students to and from the school bus in a safer manner. The process does not require any additional action by the student and drivers. The system will do all the process and allow the student to be tracked while entering and leaving the bus and If all the students were wearing seat belts mean, it will allow bus driver to start the bus for safety precaution. If the bus journey is successful from the source to destination, it will send an SMS to the management to inform its departure and arrival.

Keywords – Bus Safety System, RFID (Radio Frequency Identification), GSM&GPS modem

## INTRODUCTION

School buses transfer millions of children daily in various countries around the world. While there many issues that might disturb the parents regarding the travel safety of school going children, the paper intends to look into introducing access safety in respect of school buses through bus tracking system that will help the school children"s transportation in a secure and safer way. The supervision of the regularity of students during their entry and exit from the bus is difficult to be controlled by drivers, which led to endangering child safety.which has increased significantly in recent years.

This has often led to the death of many students on account of suffocation due to the lack of attention of derivers. This project, through entry and exit recordings, aims to create a suitable environment by following certain set of criteria of security and safety for school bus that will have a positive impact on the student and their family. The paper proposed a bus safety system which was designed to control the entering/exiting of students from the bus. This system does several tasks, including identifying personal information (Eg. Name) of each student using RFID tag, which will exchange the data with the RFID reader via radio waves and

displaying each student name into LCD display. This will let the driver to know the number of students inside the bus and the students who departed from the bus. Moreover, the system has an emergency system that will alert in case if there is a child inside the bus after the bus stops at the destination by sending an SMS to the school management via GSM modem. In addition, if the bus depart and arrive successful from the source to destination, it will inform the management through an SMS about its successful departure and arrival. The key novel feature of the proposed methodology is the use of energy efficient systems to support the tasks. Though not within strictly in the scope, the same data can be used to assess the time of departure and arrival, number of students travels each day.

## II. PROPOSED SYSTEM FRAMEWORK

The system block diagram of the proposed system is shown in the following figure (Figure 1). The major steps involved in the system development are explained the render

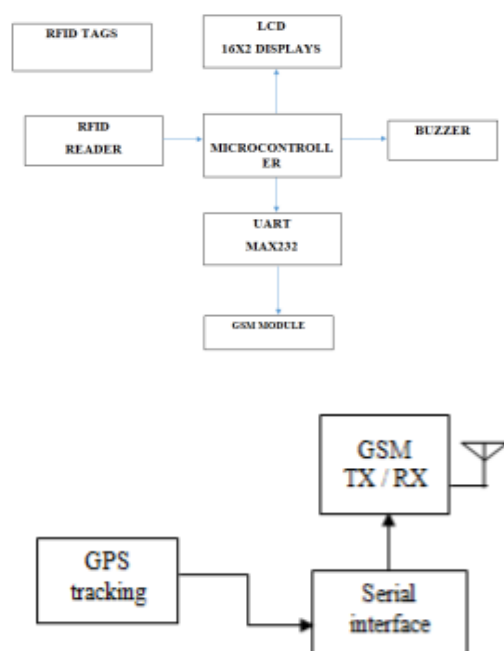


Fig1: Block diagram of proposed system

## III. RFID Reader

The function of the RFID reader is integrated with RFID tags. It contains the reader module, which works as both the transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to create a carrier frequency, a modulator that impacts on data commands, and amplifier to enhance the signal enough to awaken the signal. On the other side, the receiver has a demodulator to extract the restored data and it contains an amplifier to strengthen the processed signal. The microcontroller forms a control unit that stores data and then sends it to the network. They have three series set ID3, ID12, and ID20 and these all are LA series. The experiment uses ID20LA innovation as it is the biggest kind of ID. It can be read any RFID card within range, and any microcontroller can easily read it.

## IV. GSM Module

SIM900 GSM modem is used in this implementation as it allows sending SMS to the management of the school via internet. This modem is a type of modem that accepts SIM card, and operates through a subscription to a mobile operator. It works like a mobile phone for sending and receiving SMS or MMS through radio waves. It is slim and compact, the main advantage of choosing this particular modem is, it has low power consumption. This modem has a GPRS feature that allows transmitting the data via the internet in different methods such as SMS, GPRS, or CSD. GSM modems connectivity was tested using TMAS GSM-GPRS modem test program with AT commands that are responsible for sending and receiving SMS calling.

## V. Power supply:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronics circuits and other devices. A power supply can be broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as “Regulated D.C Power Supply”

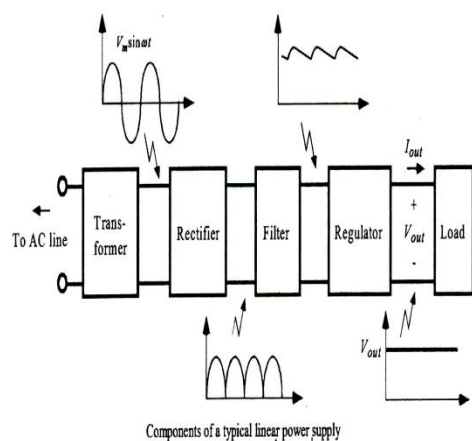


Fig 2: Block Diagram of Power Supply

## VI. 16x2 LCD

16x2 LCD as it is economical, and easily programmable. 16x2 LCD means that it is able to display 16 characters per line on two lines. This LCD has two registers. Liquid Crystal Display (LCD) is an optical device consisting crystals arranged on a thin surface. LCD has certain features such as; its size is much less than the regular screen, light and easy to transport, does not need high voltage of electricity like in the regular screens, comfortable for the eyes compared to regular screen, their shape is

much better than normal screen, and its quality is higher than normal screens in terms of colors.

## VII. RFID Tag (Card)

RFID tag stores unique digital identity codes that can be scanned from a distance and as well as to capture the signals and send them to the reader. RFID comes in different forms such as a label card, which can have a barcode printed on it. RFID tags are used in many industries, where it can be used to track goods by suspending it in the automobile during production or it can be injected into animals that allow identifying the animals. In addition, it can be attached to clothing or even implanted in people to determine the identity of the person. RFID tags can be active, passive, or semi-passive. The experiment has used a 40 bit unique ID, it cannot be reprogrammed, blank, flexible, and white in color. RFID tag has two types active tag and passive tag. But in this project using passive tag because it is shortly reading. then active tag are contain an internal battery do not require power from reader. Passive contain internal battery and thus depends RFID reader for operating power and certainly have a low power range limited upto few meters.

## VII. GPS

Is a space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth, where there is an unobstructed line of sight to four or more GPS satellites. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

The GPS program provides critical capabilities to military, civil and



commercial users around the world. In addition, GPS is the backbone for modernizing the global air traffic system.

The GPS project was developed in 1973 to overcome the limitations of previous navigation systems,<sup>[1]</sup> integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. GPS was created and realized by the U.S. Department of Defense (DoD) and was originally run with 24 satellites. It became fully operational in 1994.

Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX).<sup>[2]</sup> Announcements from the Vice President and the White House in 1998 initiated these changes. In 2000, U.S. Congress authorized the modernization effort, referred to as GPS III.

In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was in use by only the Russian military, until it was made fully available to civilians in 2007.

## IX.RESULTS

**System Working Principle** The working principle of the bus safety system is that since each student carries a card that contains a unique number with his/her name, so once the students start entering the bus, the RFID reader will capture their names and display them into a screen placed in front of the driver. Then after the bus stopped and students got off from the bus, the driver will scan his card to make sure, if there are still students inside the bus. If there are, the system will display

their names into the screen and then it will send SMS to the school management to take the right decision. The system will also send the message to the management to inform them the safe departure and arrival of the bus to the destination.

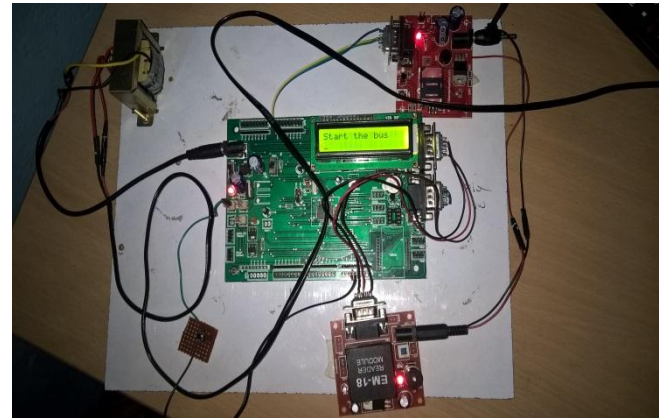


Fig3:..Start the bus.

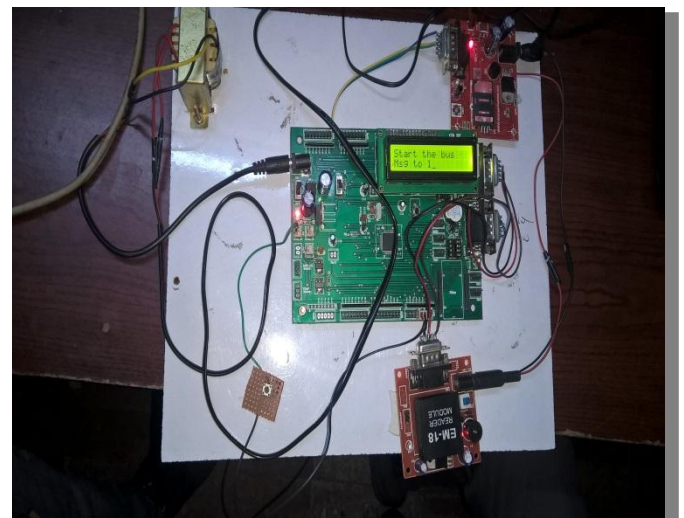


Fig4:..Start tha bus Message to 1 when 1and2 entered into Bus

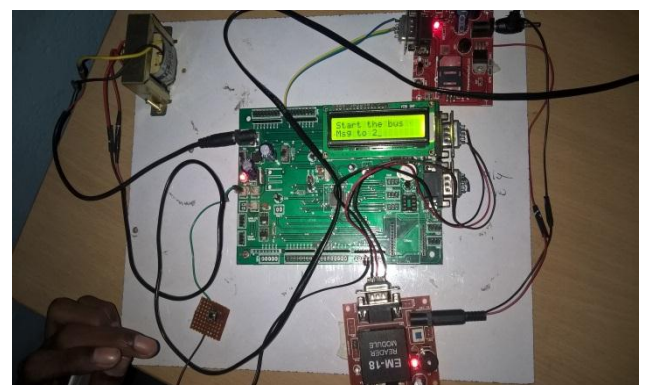


Fig5:..Start the bus message to 2 when 1 and 3 entered into bus.

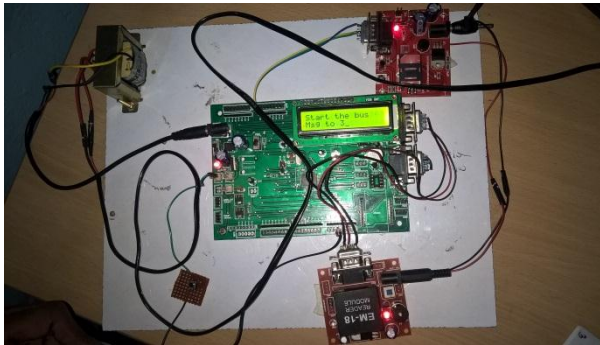


Fig6:..Start the bus Message to 3 when 1 and 2 entered into bus.

## X.CONCLUSION

In this paper, we proposed a flexible, low cost GSM-Based System FOR School Children Transportation Safety Enhancement This project is designed with ARM7TDMI processor. In this project we are using different modules such as LPC2148, GPS,GSM, 16X2 LCD. This paper presents a system to monitor the school children. The children consists of GPS module to find out the exact location and the information can be obtained as a message by using a GSM module.

The system consists of two main units, student unit and a parent unit. The student unit the system is used to identify the child every time. This information is communicated to the parent unit by using GSM with alert message accordingly. GPS is the acronym for Global Positioning System. It is employed to find the position, velocity and time of user is located on the earth. This information is provided by the GPS receiver with the help of the data it receiver from satellites.

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