

# ADVANCE TOLL COLLECTION SYSTEM BY USING RFID AND ZIGBEE

<sup>1</sup>Mr.Nileshkumar Mansingrao Sawant, <sup>2</sup>Mr.V.NAGA MAHESH

<sup>1</sup>M.Tech Student, <sup>2</sup>Astt.Prof.

<sup>1</sup>ECE - Embedded System,

<sup>1</sup>SCIENT INSTITUTE OF TECHNOLOGY, Ibrahimpatnam, Ranga Reddy Dist., Hyderabad, India.

**Abstract**— Now the highway transportation process has become more and more important in modern road network and the collect toll by manual has become outdated due to its limitations. Every citizen has unique identity for next generation ID. In the toll collection system using next generation ID card will simplify toll collection system and also the system will be friendlier managed.

When using the next generation ID card as identification tag at toll collection system, we should access real time transmission of information between terminal and control center which is based on the networking technology.

Zigbee technology has many important features to support the system.

Thus the design uses the next generation ID card as identification purpose and Zigbee as information collection purpose. The combination of Zigbee technology and the next generation ID card will satisfy the safety, convenience and time requirements of advance toll collection system.

**Index Terms**— RFID, ZIGBEE.

## I. INTRODUCTION

In the era of technology development most of the regular systems are modified as automated system. Due to automated system minimum human interference is required and this provides the facility so that the time and with the revolution in computer technology efficiency increases and energy also saves. The new way of intelligence transportation systems (ITS) has been introduced. These results in the binging of (Electronic Toll Collection) ETC system to facilitate the traffic jam and delay etc. and could more improve the efficiency of road operation.

In this project, RFID and Zigbee technology is used for advance toll collection system. At toll gate, instead of paying the cash for toll we have to show the RFID card at the toll booth. The system will read the tag on the card by using the card reader and it is compared with the data stored in microcontroller. For the registered user, the database consist the vehicle owners name, vehicle no, and the balance amount on his card. After comparing data automatically the amount will be deducted from the vehicle owner's balance. And by using GSM technology message has been sent to the vehicle owner that this much amount is deducted from his account and the information about remaining balance.

At the same time the message is displayed at on the screen of toll booth cabin. Then the toll gate will be open and car is allowed to pass. If the card didn't consist sufficient balance then buzzer will be on, and gate will not open unless the vehicle owner will pay the toll amount in cash. He will recharge the card at his Bank or toll booth itself.

## II. HARDWARE DESIGN

This Project has two sections Transmitter and Receiver.

In first section 8051 and in second section PIC microcontroller is used.

### The main blocks of project are,

#### 1.Transmitter-

Microcontroller, Power Supply, RFID reader Zigbee module and 16 X 2 LCD display.

#### 2.Receiver-

PIC Microcontroller, Power Supply, Zigbee module GSM and DC motor.

Following figures shows the block diagram of proposed project figure II.a and figure II.b

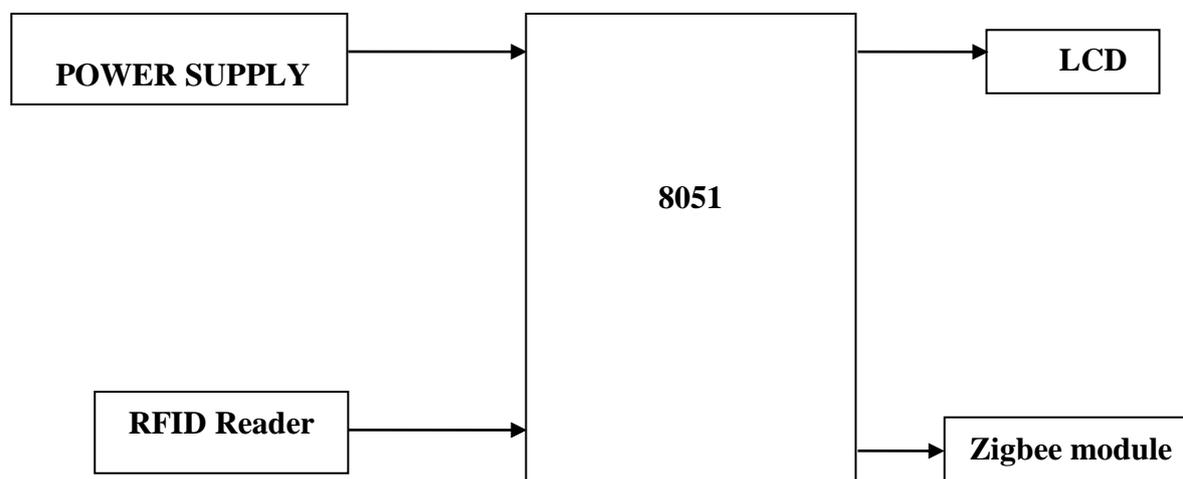


Fig II. a- Transmitter section Block Diagram .

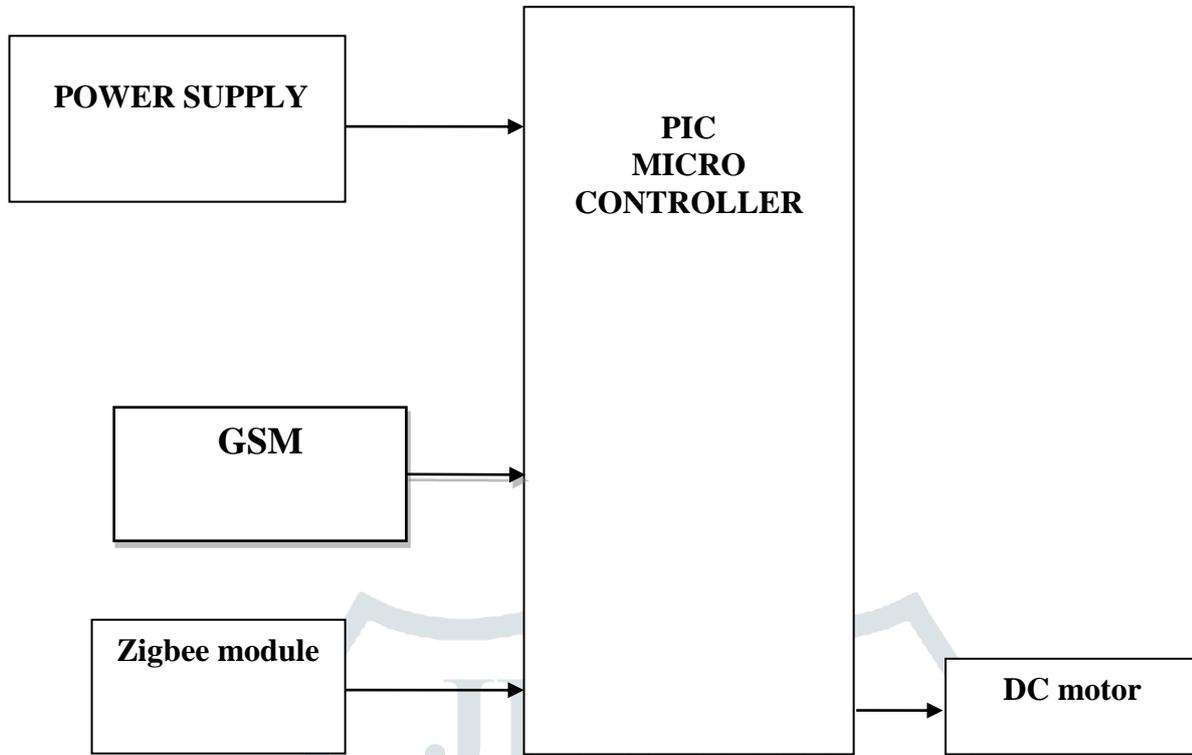


Fig II. b- Receiver section Block Diagram .

**III. HARDWARE IMPLEMENTATION:**

Following figure shows the circuit diagram for hardware implementation.

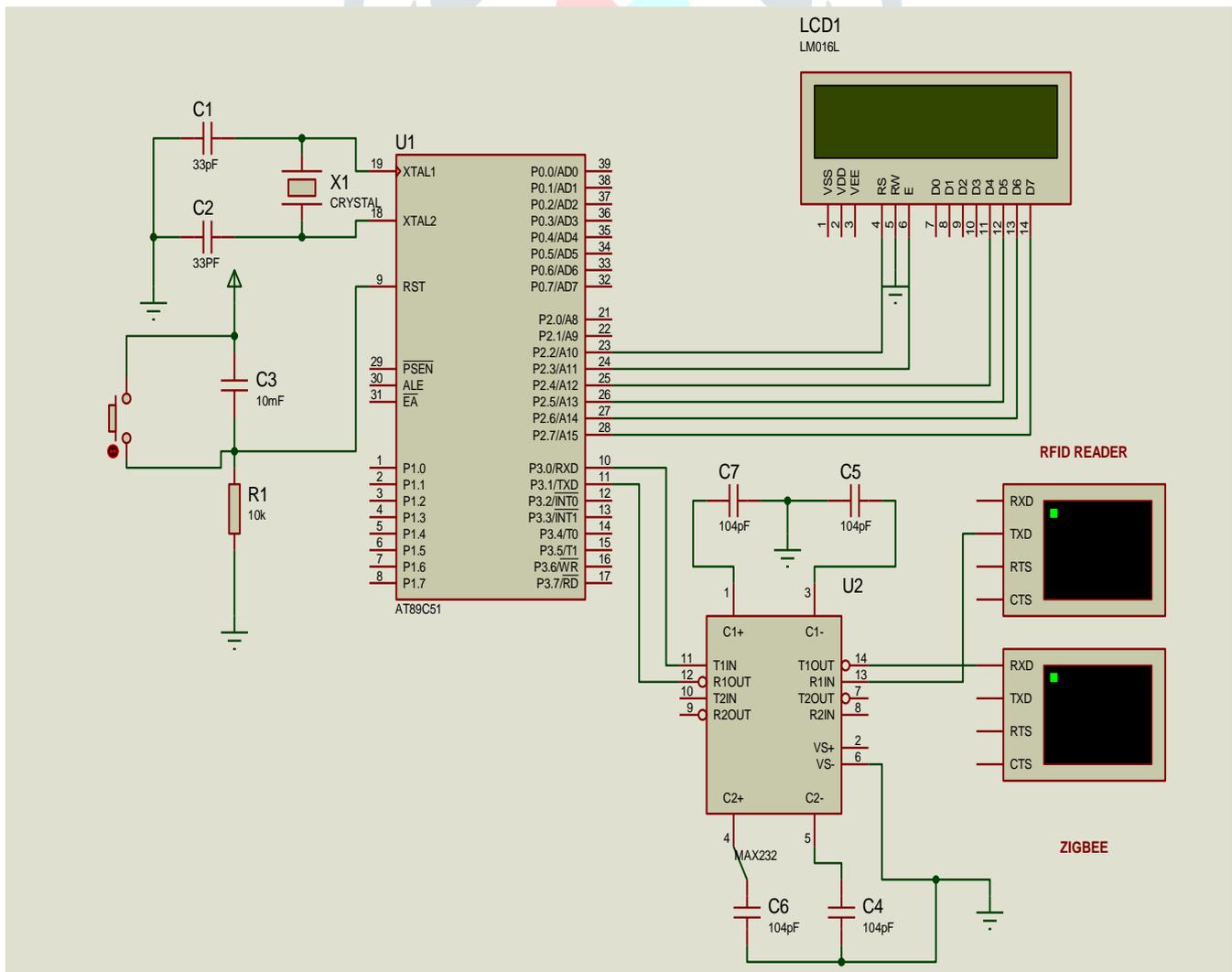


Fig III a.- Transmitter Section Circuit Diagram for hardware implementation.

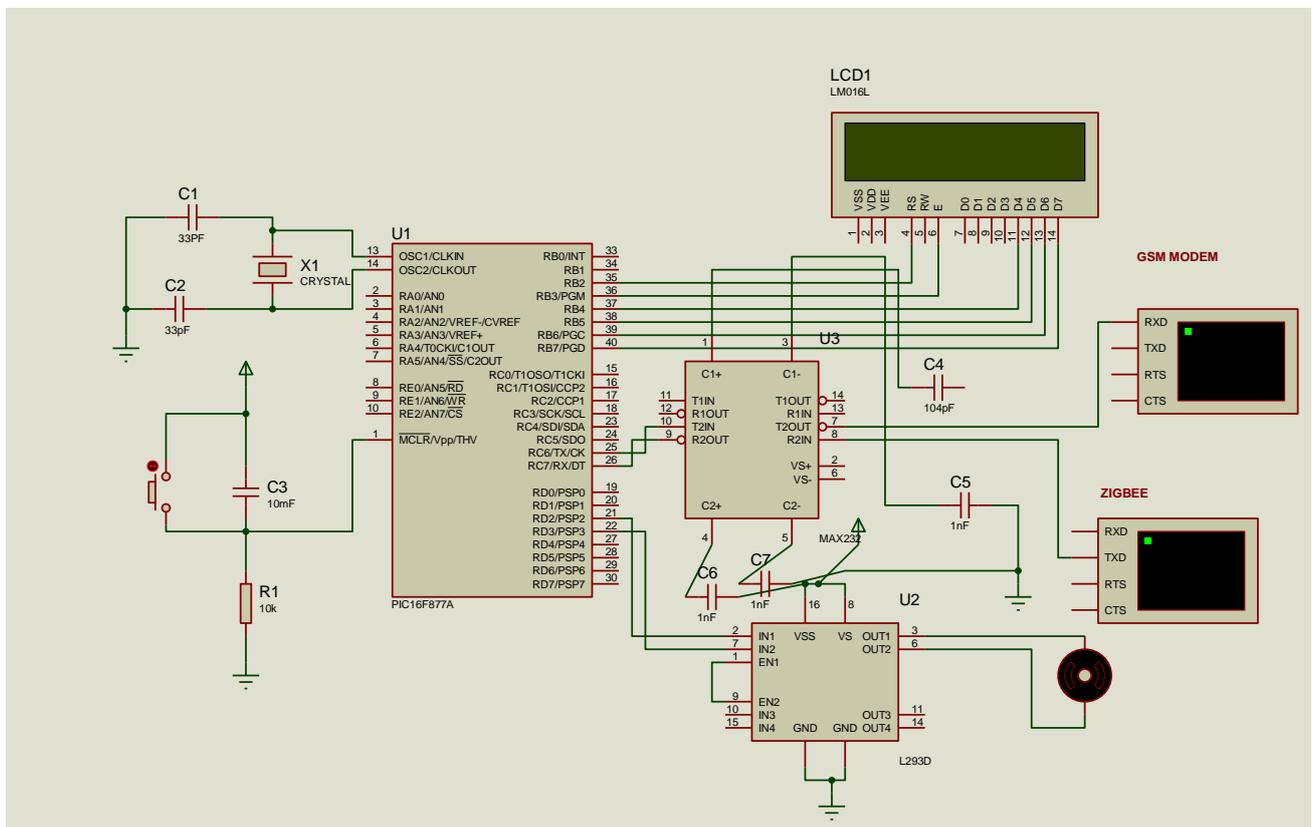
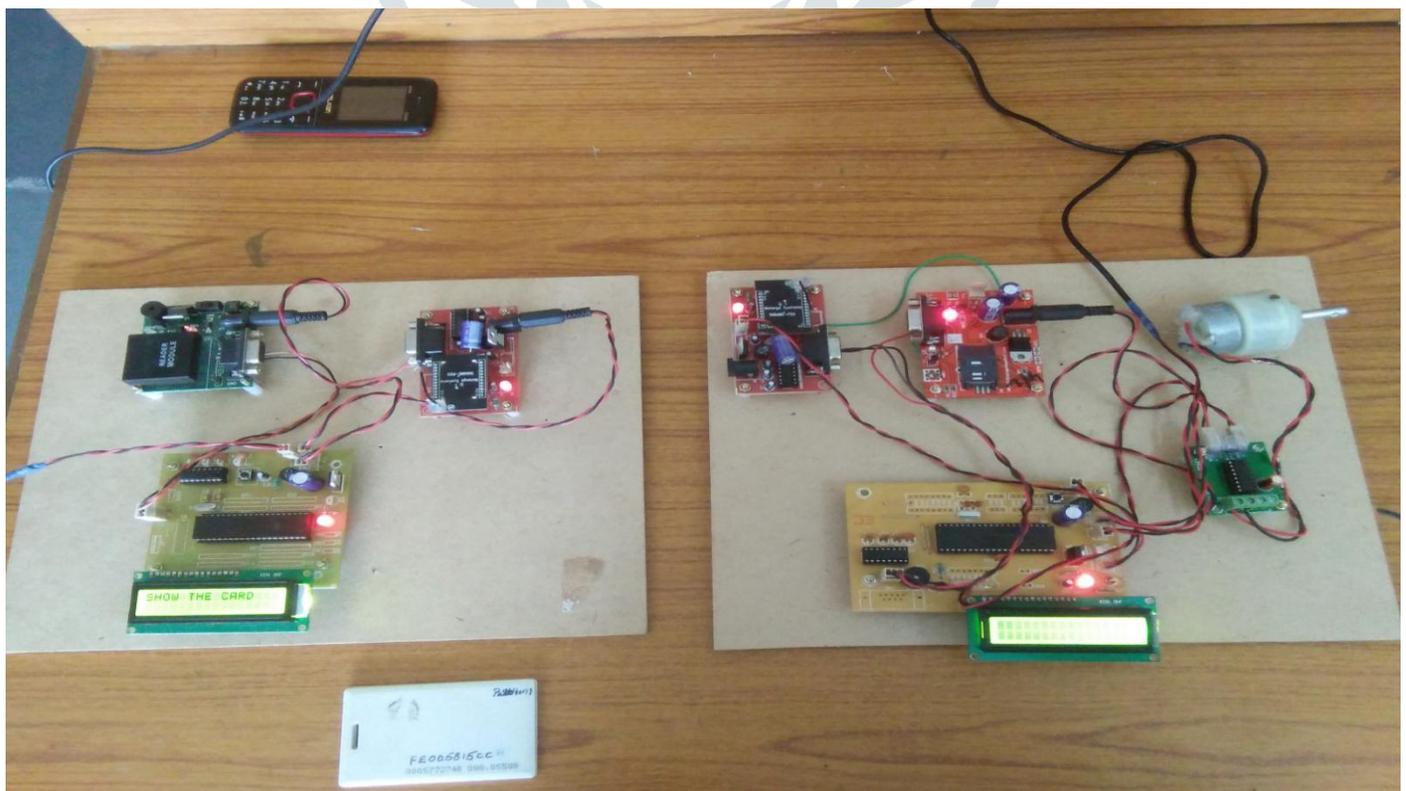


Fig III b.-Receiver Section Circuit Diagram for hardware implementation.

**IV. WORKING OF PROJECT:**

In this paper, the development of the automated toll gate system based on microcontrollers and wireless communication at experimental scale with at toll booth is presented. The aim of the implementation was to demonstrate that the automatic toll gate can be used to reduce time wasting and avoiding the corruption use. In my project we the two parts one is transmitter and other one is receiver at transmitter we the 8051 microcontroller is interfaced with RFID and zigbee. RFID read the data from the card what the code we received from the card that data is compared with the database means here we develop the data about the vehicle. And check the amount. Here we shown two cards one is for the light vehicle and other one for the heavy vehicle. If we passed to the receiver if the card is ok the gate will be open otherwise gate will not open and gives buzzer sound. At the receiver end we PIC controller and with inter facing with GSM and ZIGBEE. Here ZIGBEE will receive the data from the transmitter. And information we can send to vehicle owner regarding of balance through GSM.

**V. PROJECT PHOTOGRAPH:**



## VI. EXPERIMENTAL RESULT OF PROJECT:



## VII. CONCLUSION AND FUTURE SCOPE:

**CONCLUSION-**

An Advance toll collection using RFID and ZigBee technology provides compatibility with other system in IT'S and overcomes the limitations of DSRC-based ETC system. This paper described the automated ETC system. The communication range of ZigBee transceiver is high and hence more efficient and cost effective. It is advantages over GPS, and Infrared LED based ETC system. The application of RFID and ZiBbee based AETC in national expressway network toll collection will be the major issues of future work. It also provides the feedback to the customer from GSM module through message. For effectiveness this view can be judged and verified after designing and implementing the system in our research area which is future plan.

**FUTURE SCOPE:**

The proposed work gives a unique way to protect vehicles along with an automatic toll collection that helps to regulate the process in an easy way. In an outlook, automated vehicle tracking and monitoring may be done with a GPS system for tracing the vehicle speed and giving automated warning when a vehicle reaches the speed limit and deducting the penalty directly if the object ignores the warning. Identifying the stolen car using GPS and controlling the car from remote using server can also be added. In addition to registering a bank account, a prepaid card can be allotted to each vehicle and object for those who don't wish to register their bank accounts, so that the amount will be deducted from the card which should be recharged when there is not enough balance in the card. Displaying the sign boards on the roadside in the LCD may also be implemented.

## VIII. REFERENCES:

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