# Bar-Code Based Bus Ticketing System

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**ABSTRACT**: This paper is based on ticketing and identification of the students in the college transport. This project suggests a user friendly automated ticketing system which will automatically deduct the students fare according to the distance travelled as well as detect the student's identification. This could be only possible by use of bar-code ID tickets and can be used to make the transaction and travelling very precise. Paper suggests building of a bar-code ID system that can identify students in college transport as well as does all accounting purpose related to travelling expenses. The system is completely automated so it reduces the human effort.  The cards being reusable, they are much more convenient compared to the paper based ticketing system. Any unwanted events can be avoided as all the person carrying bar-code ID tickets are monitored every time they travel.

**KEYWORDS:** Bar code reader, System model and specification, PIC 16F873

## I.INTRODUCTION

This paper we introduce is a new technology that can be used in the college buses or many other cases. Current system for this type of usage needs face to face identification, so it requires more human effort and time. There will be a chance of malpractice. In order to avoid that kind of draw backs we introduced this system.This paper suggests building of a bar-code ID system that can identify students in college transport as well as does all accounting purpose related to traveling expenses. Bar-code ID tickets can be used to make the transaction and traveling very precise. There will be an advantage over the RF ID scanning method, RF ID reader or scanner system needs additional or a separate card for providing entry to the bus, but in this case, it can use the student's college ID cards. B y scanning the college ID card's barcode by our barcode reader the Microcontroller will check whether the corresponding student has paid the bus fee or not. The other applications of this system are due to the portability of the system. it can be used for reading the relative price of product and identification of heavy devices and in chemical laboratories for the identification of solutions.

## II.SYSTEM MODEL AND SPECIFICATION

Bar code is a standard 1D code as a series of varying width vertical lines (called bars) and spaces. Bars and spaces together are named "elements". There are different combinations of the bars and spaces which represents different characters. When a barcode scanner is passed over the barcode, the light source from the scanner is absorbed by the dark bars and not reflected, but it is reflected by the light spaces. A photocell detector in the scanner receives the reflected light and convert the light into an electrical signal .As the wand  is passed over the barcode(in the above illustration), the scanner creates a low electrical signal from the spaces(reflected light).

There are three basic types of bar code readers: fixed, portable batch, and portable RF. Fixed readers remain attached to their cost computer and terminal and transmit one data item data time as the data is scanned. Portable batch readers are battery operators and store data in to memory for later batch transfer to a cost computer. Some advanced portable readers can operate in non- portable mode too, often eliminating the need for a separate fixed reader.

The basic operation of a scanner is to scan a barcode symbol and provide an electrical output that corresponds to the bars and spaces of a barcode. A decoder is usually a separate box which takes the digitised bar space patterns, decodes them tothe correct data, and transmits the data to the computer over wires or wireless, immediately  or on a batch basics.
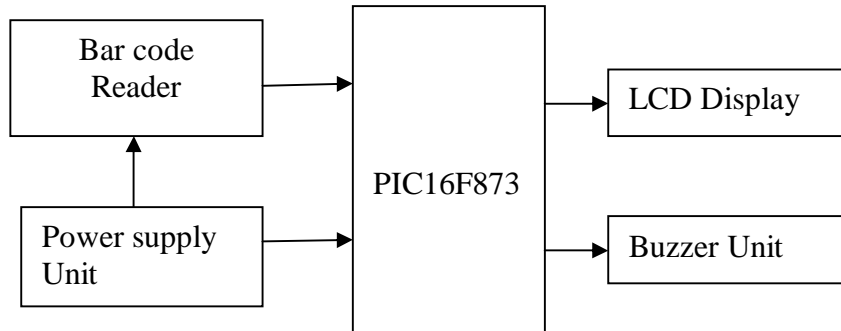
Fig 2.1 Block diagram of the system

Figure 2.1 shows the block diagram of the device. The bar code reader reads the data from the ID card and it is given to the PIC16F873 which check whether the student has paid the bus fee or not. The LCD displays the data of students who have not paid the bus fee. Also, the buzzer is operated when a student who has not paid the bus fee enters the bus.
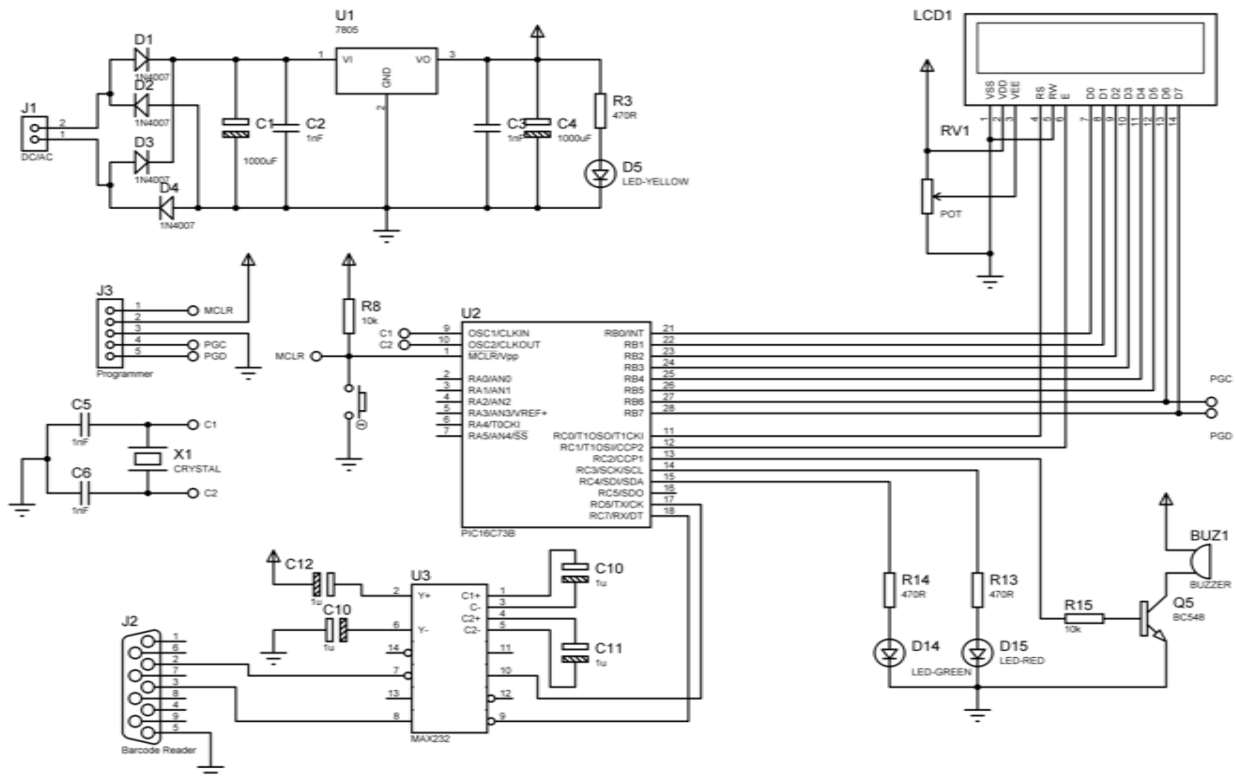
### III.SYSTEM STRUCTURE



Fig 3.1 circuit diagram

This system consist a power supply unit for providing a constant 5V supply to the PIC16F873. Barcode reader reads the barcode in the student's ID card and the corresponding electrical signal to the PIC16F873. Program is done in

the PIC16F873 which check whether the student has paid the bus fee or not. The LCD displays the data of students who have not paid the bus fee. Also, it will ensure the corresponding output to the buzzer circuit.
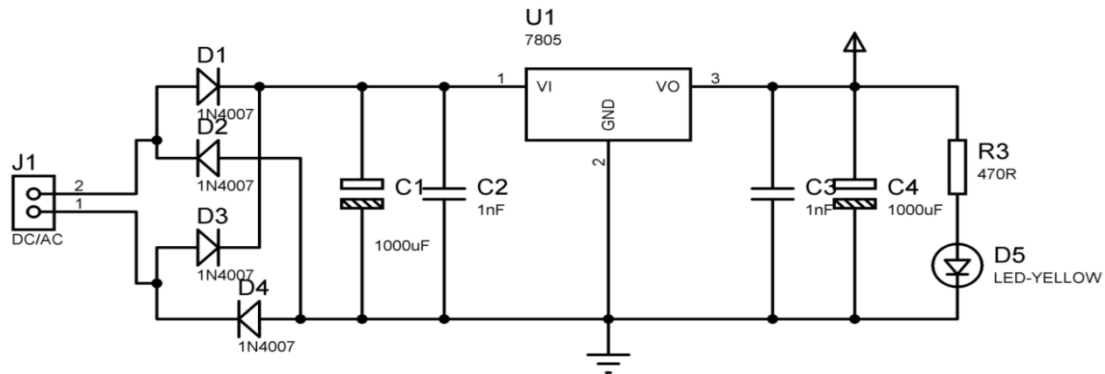
## IV.HARDWARE REQUIREMENTS



Fig 4.1 Power supply unit

**Power supply unit**: Figure 4.1 shows the power supply unit of our system. Power supplies built into microcontroller based PCB board are reasonably safe, even when used outside PC. They have good overload and overheat protection built in. The power supply unit consists of, voltage regulator IC 7805, bridge rectifier, capacitors, LEDs. Power supply is rectified by bridge rectifier and the rectified voltage is filtered using a shunt capacitor filter which includes the capacitor C1 and C2. After filtering process, the voltage is regulated to 5V using a voltage regulator IC7805. For indicating the availability of the supply a yellow LED is included. This regulated 5V is provided for the PIC for its power and for the bar code reader.
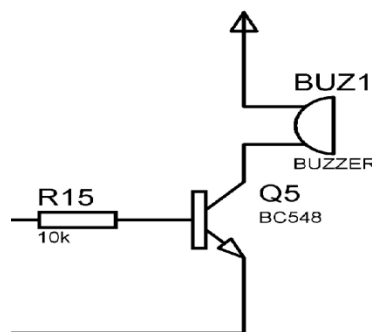


Fig 4.2 circuit diagram of buzzer unit

**Buzzer circuit**: figure 4.2 shows the circuit diagram of the buzzer unit. A buzzer is used to provide audible indication. Microcontroller cannot drive buzzer directly. Because of this we have to use a buzzer driver circuit, which is shown in the figure. In this circuit a NPN transistor is used as a buzzer driver. Output from the microcontroller is applied to the base terminal of the transistor. Here we are using the buzzer circuit for indicating whether the students have paid the bus fee or not.

**Crystal oscillator**: A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency. This frequency is commonly used to keep track of time (as in quartz wrist watches), to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers.

**PIC microcontroller**: The microcontroller is the heart and brain of our system. This system is run by PIC16F873, 8 bit microcontroller by microchip ltd. PIC is a family of Harvard architecture microcontrollers made by microchip. Technology is derived from the PIC1640.originally developed by general instrument's micro electronics division. The name PIC initially refers to "Peripheral Interface Controller". PIC are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of applications  notes, availability of low cost or free development tools, a serial programming capability. the microcontroller selected is the microchip PIC16F873 because of its ease of use, and has many digital inputs and outputs and 8 channels of ADCs.the PIC 16F873 is available in 28 pin DIP and have flash program memory capability of 8K words, RAM of 368 bytes and 256 bytes of EEPROM.they work in clock speed range of 0Hz to 20MHZ. the operation is fully static. They have 3 I/O ports named as port A, port B and port C. Among this, port A is 6 bit wide and all other ports are 8 bit wide. Most of the peripheral I/O function is multiplied with port c pins.

**Use of PIC microcontroller**: The PIC Microcontroller used for this project is PIC 16F877A. It consists of 35 single-word instructions. It consists of in built 10-bit Analog-to-Digital converter channels, up to 8-channel Analog-to-Digital Converter (A/D).It has 3 timers namely, Timer 0, Timer 1, Timer 2. There are 5 ports consisting of 33 input/output lines.

**PORTS USED**
• Port B: Connected to LCD data lines (8 lines).
• Port C: Connected to the LCD control lines RS,E pins(11 &12).and  TX& RX pins (17&18) Connected to the MAX232. Pins (13, 14&15) are connected to the buzzer unit.

**Bar code reader**: They are Selfish Primary User Emulation (SPUE) and Malicious Primary User Emulation (MPUE) attack. These types of attacks emulate signals with the characteristics of incumbent primary users to fool other secondary users.
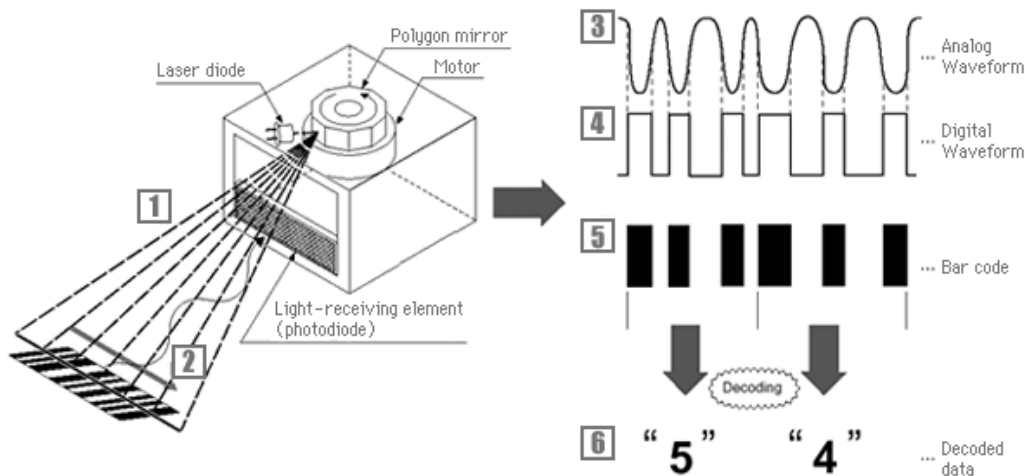


Fig 4.3 Bar code reader-principle

Figure 4.3 shows the schematic diagram of a bar code reader. This consists of L293D IC, and two resistors. Two channels of L293D are used to drive the clockwise and anticlockwise rotation of the motor. One of the rheostats is used to control the brightness of the laser. The other rheostat is connected in series with the LDR (Light Dependent Resistance), which is used to sense the intensity of the reflected laser light. When the intensity of the reflected laser light is high, resistance of LDR is low and hence the voltage drop across the rheostat is high and when the reflected intensity is low, Control Circuitry resistance of LDR is high and hence the voltage drop across the rheostat is low.

## V. RESULT AND DISCUSSION

This project suggests a user friendly automated ticketing system which will automatically deduct the students fare according to the distance traveled as well as detect the student's identification. It makes the transaction and traveling very precise. The system is completely automated so it reduces the human effort.  The cards being reusable, they are much more convenient compared to the paper based ticketing system. Any unwanted events can be avoided as the entire person carrying bar-code ID tickets.
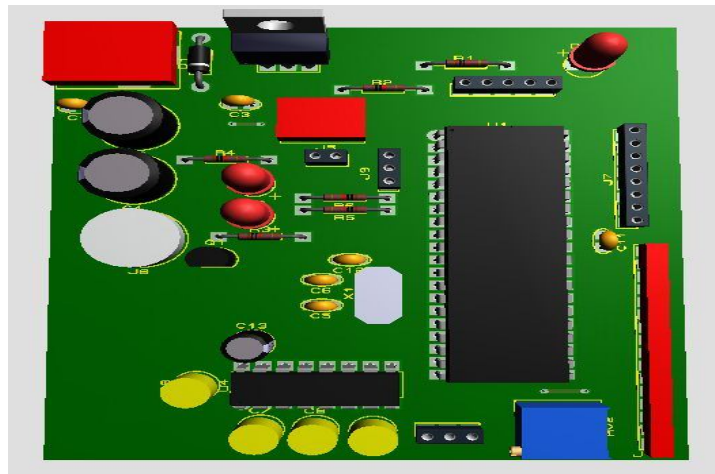


Fig 5.1 pictorial design in proteus software

## VI.CONCLUSION

Paper suggests building of a bar-code ID system that can identify students in college transport as well as does all accounting purpose related to travelling expenses. The system is completely automated so it reduces the human effort.  The cards being reusable, they are much more convenient compared to the paper based ticketing system. Any unwanted events can be avoided as all the person carrying bar-code ID tickets are monitored every time they travel. By this method we can improve system accuracy, reduce the human effort.

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