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Railway Ticket Scanner System

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Abstract: Data on the ticket will be read using barcode reader which is interfaced with microcontroller. It will send this data to the ticket checker using Zigbee technology. The ticket checker will come to know the exact number of passengers aboard on the train. SMS alert system for the passengers is provided using GSM System .The code for microcontroller is developed using embedded in C language .also, visual basics in C++ is used for serial communication between microcontroller and zigbee modem.LPC2148 microcontroller is used for interfacing. Therefore, keil and flash magic software's are used for coding.

Keywords: Barcode Scanner, Zigbee, Microcontroller, GSM kit.

I. INTRODUCTION

The project titled 'RAILWAY TICKET SCANNER SYSTEM' is introduced for bringing out modernization using the latest technologies developed using embedded systems, communication in railways method of checking tickets. This new system would take hardly take time for checking the number of passengers aboard on train and will reduce the ticket checkers effort. The use of GSM is an additional boon for passenger.

II.SYSTEM DESCRIPTION

The system will work accordingly: - Distance and time are the major considerations for the system and distribution of ticket. The major blocks of our system are barcode reader, zigbee, ARM (LPC 2148) and GSM kit. Barcode reader acts as an input to the system from where we can scan the barcode, the output of which will act as an input to the ARM. The GPIO pins are interfaced with the zigbee, which sends the respective unique barcode to the central station with the help of GSM kit.GSM (Global System for Mobile) have special inbuilt AT commands which allows user to directly interface with 5v microcontrollers (LPC 2148).This GSM TTL modem has internal TCP/IP stack to enable user to connect with internet through GPRS feature. With the help of this GSM Modem an automatic message/SMS will be sent to the respective waiting list ticket holders and automatically the main station database will be updated. The modem can be interfaced with a microcontroller using USART(Universal Synchronous Asynchronous Receiver and Transmitter) feature(serial communication). At the receiver side the same functioning happens with the reverse flow. We can better understand the system working by the following consideration:-

The passengers will scan their tickets through the barcode scanner which will be there in the respective boogie and accordingly the ticket distribution systems located at various stations will be updated. Suppose ,if Ticket number 4 is absent out of 5, then the Microcontroller 1 will send the absent number via sender zigbee and the receiver zigbee will receive the absent ticket number 4 to Microcontroller 2 which will send absent number via gsm to station GSM. All the waiting passengers will then get message on their mobile through GSM.

III. HARDWARE DESCRIPTION

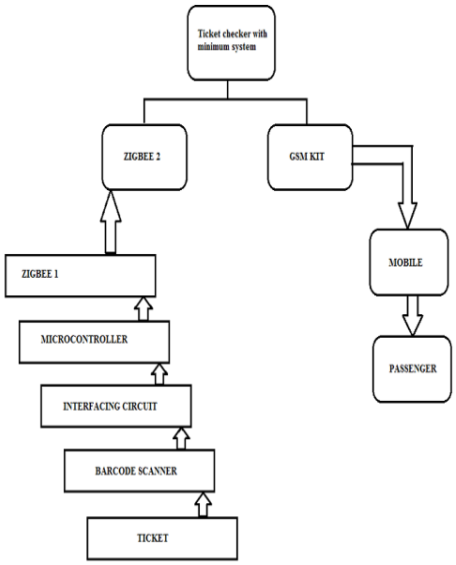

Fig 1-Proposed Block diagram

The ARM architecture has become the most pervasive 32-bit architecture in the world, with wide range of ICs available from various IC manufacturers. ARM7 is one of the widely used micro-controller family in embedded system application.

ARM is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture developed by British company ARM Holdings.

LPC2148 is the widely used IC from ARM-7 family. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer. It has 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory ,128 bit wide

interface/accelerator enables high speed 60 MHz operation, one or two (LPC2141/2 **vs.** LPC2144/6/8) 10-bit A/D converters provide a total of 6/14analog inputs, with conversion times as low as 2.44 us per channel. Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog, on-chip integrated oscillator operates with an external crystal in range from 1 MHz to30 MHz and with an external oscillator up to 50 MHz . LPC2148 works on 3.3 V power supply. LPC 2148 has inbuilt ISP which means we can program it within the system using serial communication on COM0. It has also COM1 for serial communication. MAX 232/233 IC must be used for voltage logic conversion.

3.1Barcode Scanner

3.1.1Barcode Reader:-

A barcode is an optical machine-readable representation of data , which shows certain data on certain products like unique ID. Purpose of using barcode is to automatically identify the products from its unique barcode label printed on it.

This barcode reader is combination of hand held unit(LED array source & CCD capture) and decoder circuit which takes raw data of barcode and outputs serial data at a rate of 9600 bps with RS232 level output suitable for interfacing with microcontrollers or PC serial port.

3.2Interfacing With Microcontroller

If you wish to use the barcode with any microcontroller which is operating on 5V then you need following circuit. First we will power the barcode from 9 pin D type connector on its pin#9 by giving +5V externally and connect ground from pin#5 to rest of circuit. Then we will take the RS232 level TXD signal from pin#2 which has +12V level output and convert it to 5V level TTL signal using BC547 transistor. Also the transistor inverts the signal just like a MAX232. Then you can write code in microcontroller to listing to incoming data and process it accordingly. For using with PC to view incoming data you can use hyper terminal software. You can expect following types of serial data output on barcode label. For e.g.MAGICZ,XY123Z,89S529.

3.3ZIGBEE MODEM

ZigBee Alliance

3.4GSM MODULE

GSM (Global System for Mobile) / GPRS (General Packet Radio Service) TTL –Modem is SIM900 Quad-band GSM / GPRS device, works on frequencies 850 MHZ, 900 MHZ, 1800 MHZ and 1900 MHZ. It is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with 3V3 and 5V DC TTL interfacing circuitry, which allows User to directly interface with 5V Microcontrollers (PIC, AVR, Arduino, 8051, etc.) as well as 3V3 Microcontrollers (ARM, ARM Cortex XX, etc.). The baud rate can be configurable for 9600bps through AT (Attention) commands.

This GSM/GPRS TTL Modem has internal TCP/IP stack to enable User to connect with internet through GPRS feature. It is suitable for SMS as well as DATA transfer application in mobile phone to mobile phone interface. The modem can be interfaced with a Microcontroller using USART (Universal Synchronous Asynchronous Receiver and Transmitter) feature (serial communication).

IV.SOFTWARE DESCRIPTION/PACKAGES

- Keil Version
- Flash Magic
- Visual Basics in C++

V.CONCLUSION

- Thus, using latest technologies in embedded system we can easily automize ticket checking system in railways.
- Also, a total digitized ticket checking system is formed which help to prevent blackmarketing of tickets.

VI.FUTURE SCOPE OF PROJECT

- We can add image processing tools for better identification of passengers.
- This project might be used for other public transport system
- As barcode technique is now become very popular technique of identifying the product it is easy to access the personal data of passenger.

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