

FULLY AUTOMATION DRIVERLESS ELECTRIC TRAIN (RING RAIL SYSTEM)

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ABSTRACT

In this Paper, a prototype of the small metro capable of showing the station on the LCD display with various other facilities is designed. This metro is run on the DC gear motor. Metro train is auto stop on 3 different stations and reverses automatically with Voice Announcement facility. The DC motor is attached with the gear inside to reduce the speed of the vehicle. In this paper we try to give the same prototype for this type of trains. We are using microcontroller 8051 as CPU. The motion of the train is controlled by the DC Motor, for displaying message in the train we are using Intelligent LCD Display of two lines. The train is designed for three stations, named as Aligarh, Ghaziabad & New Delhi. FID card is mounted at each station. When RFID reader mounted on train detects RFID card, train will be get stopped. The Stoppage time is of 3 Sec. There is a LCD display for showing various messages in the train for passengers. Before stopping at station the train blows the buzzer. It also includes an emergency brake system due to which the train stops as soon as the brakes are applied and resumes journey when the emergency situation.

Keywords : RFID, Microcontroller 8051, Intelligent LCD Display

I SYSTEM APPROACH

Ideally, a literature survey should be done in a systematic manner. A well-defined search method would yield a number of articles as result. The abstracts from these articles would be read, and the resulting articles (after discarding irrelevant material) would form the core of the survey. Such an approach would be reminiscent of the systematic review process. The systematic review was developed for the life sciences, but has recently been adapted to other branches of science such as computer science. It is concluded that a systematic approach based on index terms of articles would not suffice, and that therefore another method has to be used. The initial ad hoc search for articles that yielded the five articles forming the basis for the study of index terms had obviously produced valid results. That search was performed by entering random words thought to be in titles of relevant articles.

II. BASIC BLOCK DIAGRAM OF SYSTEM

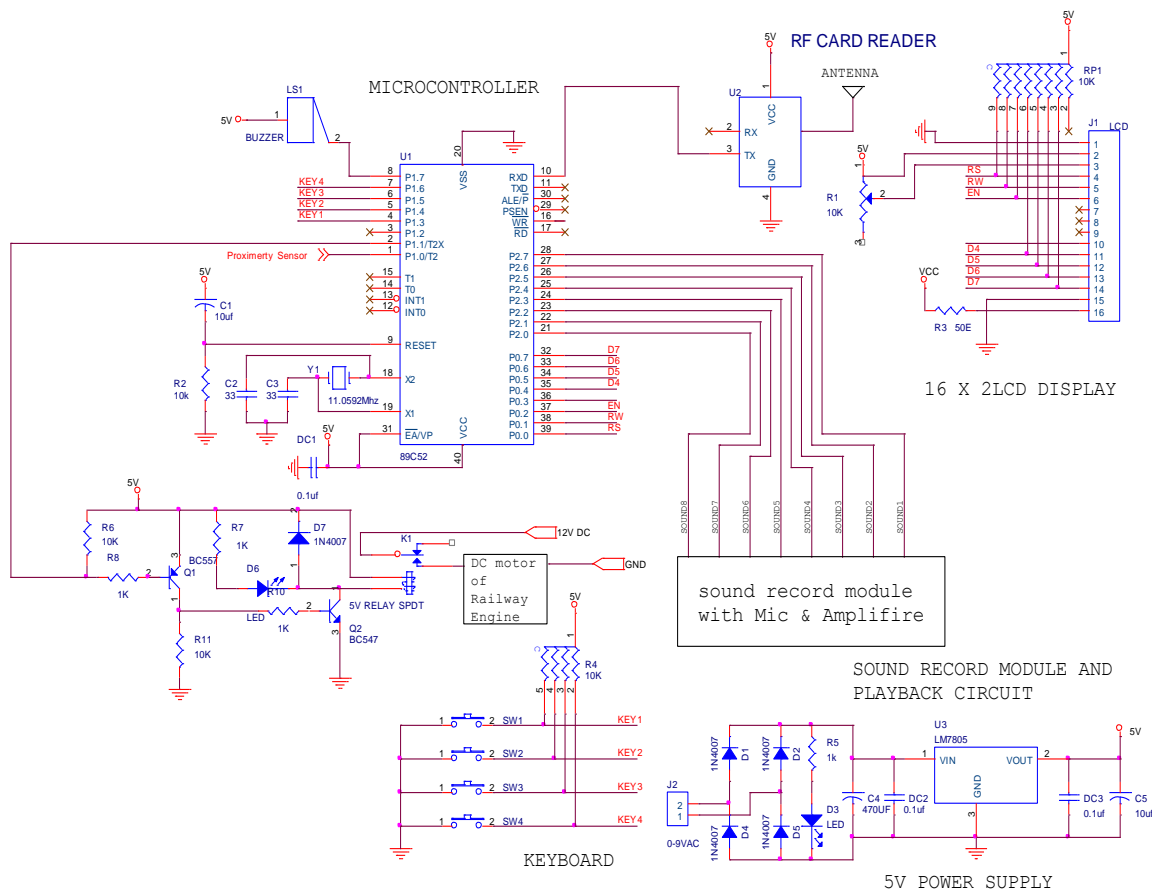


Figure-1 Line Diagram

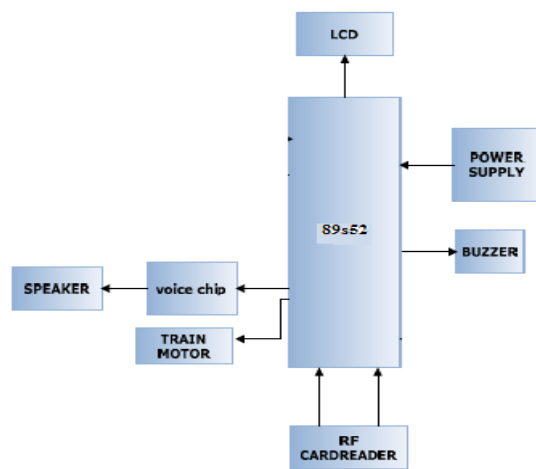


Figure-2 Basic Block Diagram of System

III. DESCRIPTION OF EACH OF BLOCK

Power Supply (Battery)

An electrical battery is a combination of one or more electrochemical cells, used to convert stored chemical energy into electrical energy. The battery has become a common power source for many household and industrial applications.

Batteries may be used once and discarded, or recharged for years as in standby power applications. Miniature cells are used to power devices such as hearing aids and wristwatches; larger batteries provide standby power for telephone exchanges or computer data centers.

Bit Microcontroller with 8K byte flash (89s52)

The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8Kbytes 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 80C51 and 80C52 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

Features

- Compatible with MCS-51™ Products
- 8K Bytes of In-System Reprogrammable Flash Memory
- Fully Static Operation: 0 Hz to 24 MHz
- Three-Level Program Memory Lock
- 256 x 8-Bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-Bit Timer/Counters
- Eight Interrupt Sources
- Programmable Serial Channel
- Low Power Idle and Power Down Modes

Piezoelectric Buzzers(without circuit)

The PS series are high-performance buzzers that employ piezoelectric elements and are designed for easy incorporation into various circuits. They feature extremely low power consumption in comparison to electromagnetic units. Because these buzzers are designed for external excitation, the same part can serve as both a musical tone oscillator and a buzzer. They can be used with automated inserters. Moisture-resistant models are also available. The lead wire type (PS1550L40N) with both-sided adhesive tape installed easily is prepared.

11 Minutes Audio Record & Play

Offers true solid state storage capability and requires no software or microcontroller support. It provides high quality recording and playback with **11 minutes** audio at 8 Khz Sampling rate with 16 bit resolution. Using on board jumpers, total duration can be divided in individual triggers of 1,2,4& 8 segments which can be triggered by onboard switches or external low trigger like microcontroller pins.

Features:

1. 11 minutes of recording duration selectable in total 1,2,4,8 segments
2. Single chip, high quality voice recording and playback solution
3. User friendly, easy to use operation
4. Non - Volatile - flash memory technology, no battery backup required
5. Audio output to drive a speaker or audio out for public address system
6. Can record voice with the help of on-board microphone or via any audio input like PC

DC Motor

The direct current (DC) motor is one of the first machines devised to convert electrical power into mechanical power. Permanent magnet (PM) direct current converts electrical energy into mechanical energy through the interaction of two magnetic fields. One field is produced by a permanent magnet assembly; the other field is produced by an electrical current flowing in the motor windings. These two fields result in a torque which tends to rotate the rotor. As the rotor turns, the current in the windings is commutated to produce a continuous torque output. That output is given to ADC which will farther generate the signal The stationary electromagnetic field of the motor can also be wire-wound like the armature (called a wound-field motor) or can be made up of permanent magnets (called a permanent magnet motor). In either style (wound-field or permanent magnet) the commutator acts as half of a mechanical switch and rotates with the armature as it turns. The commutator is composed of conductive segments (called bars), usually made of copper, which represent the termination of individual coils of wire distributed around the armature. The second half of the mechanical switch is completed by the brushes. These brushes typically remain stationary with the motor's housing but ride (or brush) on the rotating commutator. As electrical energy is passed through the brushes and consequently through the armature a tensional force is generated as a reaction between the motor's field and the armature causing the motor's armature to turn. As the armature turns, the brushes switch to adjacent bars on the commutator. This switching action transfers the electrical energy to an adjacent winding on the armature which in turn perpetuates the tensional motion of the armature.

Crystal Oscillator

An electronic circuit that is used to generate an electrical signal of precise frequency by utilizing the vibrating crystal's mechanical resonance made of piezoelectric material. There are different types of piezoelectric resonators,

but typically, quartz crystal is used in these types of oscillators. Hence, the oscillator electronic circuits are named as crystal oscillators.

LCD Display:

The electronics industry has used liquid crystal display (LCD) technology for years, in many products ranging from calculators to laptop screens. Now, LCD monitors or **flat-panel displays**, are quickly replacing traditional cathode ray tube (CRT) computer monitors. LCDs use less space than traditional monitors.

What is LCD?

LCD creates images on a flat surface by shining light through a combination of liquid crystals and polarized glass. The technology differs from CRT because a CRT uses a beam of electrons projected through a large glass tube to create images.

IR Proximity Sensor:

Proximity Sensor are used to detect objects and obstacles in front of sensor. Sensor keeps transmitting modulated infrared light and when any object comes near, it is detected by the sensor by monitoring the reflected light from the object. It can be used in robots for obstacle avoidance, for automatic doors, for parking aid devices or for security alarm systems, or contact less tachometer by measuring RPM of rotation objects like fan blades. Digital low output on detecting objects in front.

RFID Card Reader:

RFID is short for Radio Frequency Identification. Generally a RFID system consists of 2 parts. A Reader, and one or more Transponders, also known as Tags. RFID systems evolved from barcode labels as a means to automatically identify and track products and people. In every RFID system the transponder Tags contain information. This information can be as little as a single binary bit , or be a large array of bits representing such things as an identity code, personal medical information, or literally any type of information that can be stored in digital binary format.

IV. ADVANTAGES AND APPLICATIONS

Advantages

- Automatic stop at station
- Safety parameters considered using proximity sensor& emergency push buttons.
- Person can stop train in between if he missed it.
- With the help of Voice announcement one can get information about arrival of train.
- Automated system requiring less manpower.
- It uses a voice chip which records and plays the desired voice.
- Reusability of the recorded message.
- RFID Tags and readers are contact less and do not have range limitations unlike RF receivers and transmitters.

- Databases need not be maintained.

Applications

- It can be used for reducing the human work
- This System sense train Automatically and trun on the voice clip
System will also get identified with the help of the rfid

V CONCLUSION

This project increases our ability to work as a group and it helps us in future life. But we face several problems because of unavailability of quality goods, technical support and inexperienceThe project we have undertaken has helped us gain a better perspective on variousaspects related to our course of study as well as practical knowledge of electronic equipments and communication. We became familiar with software analysis, designing,implementation, testing and maintenance concerned with our project

RESULT

This electric train would be eliminating the requirement of human power and thus providing efficiency and accuracy. This project will provided with voice announcement, automatic stop as well as start timing & emergency push button. It will help to manage the train to move forward after sensing the parameters and also records and plays the desired voice.

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