

Audio System using GSM Module for Announcement

Tvisha Trivedi¹, Anjali Narad², Shweta Verma³, Navin Purohit⁴, Prof. D. D. Shrivastava⁵

^{1,2,3,4} Student, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, Maharashtra, India

⁵ Faculty, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, Maharashtra, India

Abstract - Today, we are seeing an increasing need to stay connected. With expanding economic and technological scenario, the need of having a fast-track production has also increased. The industries explore and employ several techniques to stay ahead in the production line to fulfill the demand of their consumers. This requires an extremely good communication and co-ordination in the process pipeline. To facilitate this, a communication system should be deployed to enhance communication amongst the different sectors of the industrial workstation. The systems today offer monitoring and communication facilities of the work place or in general use a public address system to make general announcements which can be accessed from one fixed location. This paper presents a technique to remotely make announcements using GSM. The proposed system aims to connect the owner or an authorized person from any part of the world to the workstation, thereby ensuring that distance is not an issue for communication.

Key Words: Public Address System, GSM, SIM 800, Arduino

1. INTRODUCTION

The mobile communication technology has become extremely important in our modern day lifestyle. The popularity of the technology is owing to the fact that it ensures communication is always ubiquitous. People's need to stay connected has ever increased personally and professionally. A simple communication in form of technology developed in distant corner of world can serve lot many efforts of the industry or communication in form of knowledge about the trends and demands of the consumers reaching in time can earn profits to the industry. The success of anything lies on how effectively we communicate.

Talking of average industries the scenario in work station currently involves monitoring and communicating facilities. The communication is generally using a public address system accessible from the control room only. This system inherits a delay in case of emergency or even when an urgent communication is to be made.

We have seen many cases of public addressing systems that require the physical presence of the user to announce. This might not be possible in many cases like emergencies and rudimentary actions like repetitively speaking over the microphone, most of which either requires the

presence of the human of recording of human voice. So due to the need to stay connected we need more efficient systems that can announce over a large range and do not require physical presence all the time. The use of GSM can bring about that change.

The GSM based announcement system is to design unit that can communicate wirelessly over a large dimension. The GSM modem is installed with a CCTV and a speaker at the required place. When the user wants to address something, he or she would call on the SIM fitted on the GSM. The SIM receives a call from the mobile phone and the call data is extracted by Microcontroller from the GSM modem and the call is connected. Now the user can communicate or make an announcement. This proposed system can be employed in many applications like educational institutions, organizations, traffic management, railways announcements, advertisements, large industries, etc. Being a user friendly, long range and fast product means conveying information are major strengths of this application. Another feature of this system is that only a registered number can call this unit. Unauthorized numbers are not answered by the system

2. LITERATURE SURVEY

2.1.1 GSM: Global System for Mobile Communication:

GSM is the world's first cellular system to specify digital modulation and network level architectures and services. [3]. The GSM Modem can accept any SIM card and act just like a mobile phone with its own unique phone number. GSM networks operate in 900MHz or 1800MHz bands while most 3G networks operate in 2100MHz frequency band. [2]

2.1.2 GSM Services and Features:

GSM services follow ISDN guidelines and are classified as either tele-services or data services. Teleservices include standard mobile telephony and mobile-originated or base-originated traffic; Data services include computer-to-computer communication and packet-switched traffic. User services may be divided into three major categories:

1. Telephone Service
2. Bearer services or data services
3. Supplementary ISDN services

GSM provides mainly two features:

1. SIM (Subscriber Identity Module)
2. On-the-Air Privacy [3]

2.1.3 SIM800:

SIM800 is a complete Quad-band GSM/GPRS solution in a SMT type which can be embedded in the customer applications. It works on frequencies GSM 850MHz; EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM800 features GPRS multi-slot class 12/ class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. SIM800 can meet almost all the space prerequisite in users' applications, such as M2M, smart phone, PDA and other mobile devices. SIM800 is designed with power saving technique so that the current consumption is as low as 1.2mA in sleep mode. SIM800 integrates TCP/IP protocol and extended TCP/IP AT commands which are very useful for data transfer applications. [5] SIM800 support Quad-band 850/900/1800/1900MHz, it can transmit Voice, SMS and data information with low power consumption. With tiny size of 24*24*3mm, it can fit into slim and compact demands of customer design. Featuring Bluetooth and Embedded AT, it allows total cost savings and fast time-to-market for customer applications. [6]

2.1.4 Arduino:

Arduino is an extensible programmable hardware platform designed for artists, coders, designers, tinkerers and the makers of things. The arduino development environment is a program based on the processing development environment that you use to write, edit, compile, and upload your arduino source code to the interface board. It contains arduino-specific commands that are easier to use and easier to understand, and built right into every sketch ever written. [7] Arduino projects use .pde files and .c files. They are actualized using a compiler. A compiler is a program that takes a code file and turns it into a series of instructions that a computer will run as a program. The compiler optimizes machine instructions for the computer to run very quickly [8]. Most of the arduino code is performed using Arduino C language, which is a mixture of high level programming languages like C, C++, and in special cases JAVA.

2.1.5 ATmega 328:

The Atmel ATmega328 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing robust instructions in a single clock cycle, the ATmega328 achieves throughputs close to 1MIPS per MHz. This entitles the system that is designed to optimize the device for power consumption versus processing speed. [9]

The microcontroller used here contains a boot loader, a little lump of code residing on the microcontroller that allows it to be easily programmed with a simple serial

connection rather than ornery, external hardware. As long as the boot loader has been programmed onto the microcontroller antecedently, we can use that chip in whatever device we choose, and still write code for it using the rest of the arduino platform. [7]

3. IMPLEMENTATION

The project requires the system to detect the user phone number, acknowledge the registered number and reject other numbers calling the GSM. This circuit uses ATmega 328 IC for running the code used to implement its function as said above, the GSM SIM800 module, Amplifier circuit consisting of LM386 IC, and Speakers for making the announcement.

The SIM 800 is fitted with a SIM card. The code is stored in ATMEGA 328 IC and implemented by it. The code's function is to check the number calling on the device, checking whether the number calling on it is registered number or not. If it's not the registered number then the call is not picked up or rejected. However, if the call is from the registered number then the call is automatically picked up. The caller can now talk on their mobile handset or calling device and the voice is amplified by an amplifier and sent to the speaker, which produces a high decibel sound which can now be announced to the public. The intensity of sound depends on the amplifier used. After the call is over the circuit goes back to normal state and waits for another call. The code is implemented every time a call is made.

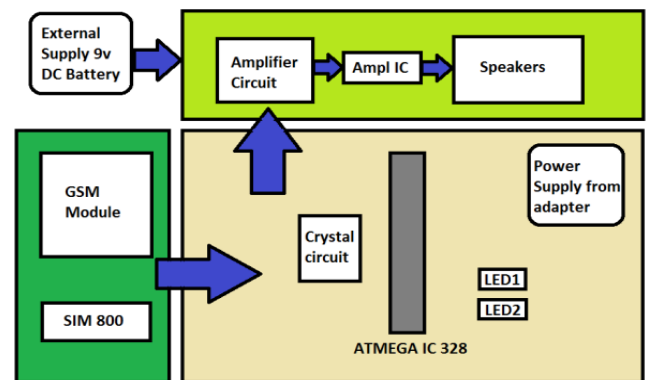


Fig -1: Block Diagram

The Block Diagram above shows a brief outlook of the project circuit and how it will be implemented. It consists of the components which have been discussed above.

4. ADVANTAGES AND DISADVANTAGES

The advantages of this circuit are that it can be used for long distance communication, does not require physical presence of a user or personnel to operate the module since it automatically picks up the calls, can be used instantly at choice, has a particular number feature which

allows to prevent unwanted calls from random numbers, and is cheap, small and portable. The disadvantages of this circuit are that it depends on GSM communication i.e. if there is no signal at that particular place then it will not be able to pick up the calls. Also if the user decides to change his or her number then the code has to be changed accordingly to identify the new number.

5. RESULT AND CONCLUSION

Implementation of the following can be done by using the above equipment. Taking all the factors required for the implementation a working module can be prepared with suitable programming and connections. However measures are to be taken regarding security and working of the project. The GSM module is connected to a speaker with amplifier to announce the subject. This project has a lot of scope for improvement and upgrade. The module can be further advanced with using various other components such as LCD module to provide visual messages and announcements, Bluetooth connect to transfer data over a short range, Connect a microphone to enable two-way communication between announcer and listener. The project can be used in large scale industries, in public places where announcements are to be made like Railway Stations and Bus Stands, and in declaring emergencies at places struck with natural or man-made disasters.

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