

GSM based wireless Notice board with Text to Speech Facility

Vikas Kathiyara

Electronics & Communication, Vadodara Institute of Engineering, Vikaskathiyara@gmail.com

Abstract

Inquiry and information updates are a prime factor at public places. Sometimes this information goes unnoticed which does not help people to get timely news and hence updating information is of no use. Also, conventional method waste lot of time. In this paper, I am proposing a method to wirelessly update the notice board but with a text to speech facility which will be an alarm for the incoming message and also one can hear it the same way without looking into it. Here the TTS module 1231 is interfaced with micro-controller for the desired result.

Keywords- P89V51RD2, GSM Modem SIM300, TTS module 1231, 16*2 LCD display, Loudspeaker

I. INTRODUCTION

The need to make India a digital country by minimizing the paper use has given a push to the creation of this paper. Using the current technology modules and interfacing each has brought to the conclusion of this paper. Information updating and ensuring the flow of information to each and every individual is a major issue at public places. Hence even using the technology does not solve the motto. When notices are put up or updated, people are unaware of the notices. Hence the problem still remain the same. So using an extra module of text to speech helps to some extend to hear the same notice at the same time of display.

II. Design Layout

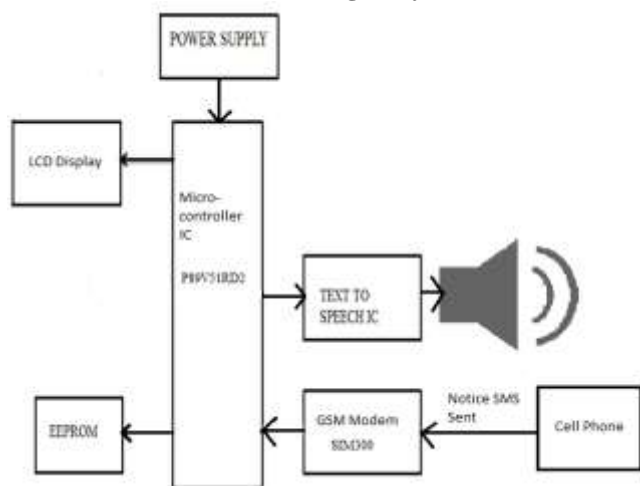


Fig 1. Block Diagram

The block Diagram of the GSM Based wireless Notice Board with text to speech facility is as shown in figure 1. The Heart of the system is Micro-controller Atmega16 which has various application in the system. Atmega16 is interfaced with GSM Modem, EEPROM, LCD Display and finally Text to Speech IC. Here, micro-controller will be responsible for several process side by side. It would be interfaced with LCD, TTS module and GSM modem. EEPROM is an optional part which may or may not be used; however, the need depends on size of the notice. The cell phone will be starting point of the application. The notices sent from the cell phone will be interpreted by the GSM modem used. The notice will be sent simultaneously to the LCD display and TTS module. Hence as the same time the message will be displayed and heard by the public.

III. Essential components

The main components of this paper are P89V51RD2 micro-controller, GSM Module, TTS Module 1231, 16*2 LCD display, loudspeaker and Power supply.

3.1. P89V51RD2 micro-controller.

The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus dramatically reducing the EMI. The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible. The P89V51RD2 is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running.[1]

3.2. GSM modem SIM300

GSM modem is interface serially which works as plug and play. It can be used to send SMS, make and receive calls and can do other GSM operations by controlling it through simple AT commands from micro-controller. It comes with a Standard RS232 interface which can easily interface the modem with micro-controller. The modem comes with exceptional configurations like power regulations, external antenna and SIM holder. As shown in fig2, the important features that are useful in this paper are like standard AT commands, having onboard wire antenna for better reception, consumption of low power with 0.25 A during normal operations and around 1A during transmission and onboard 3V lithium battery holder with appropriate circuitry for providing backup for the module internal RTC.[2]



Fig 2. GSM modem SIM300

3.3 TTS module 1231

An electronics device that can speak any text data feed in English language. There is no limitations to word as it can speak based on fundamentals of Phonemes of English. [3]

A phoneme is a basic unit of a language's phonology, which is combined with other phonemes to form meaningful units, morphemes. The phoneme can be described as "The smallest contrastive linguistic unit which may bring about a change of meaning" In this way the difference in meaning between the English words kill and kiss is a result of the exchange of the phoneme for the phoneme /s/. Two words that differ in meaning through a contrast of a single phoneme form a minimal pair. [4]

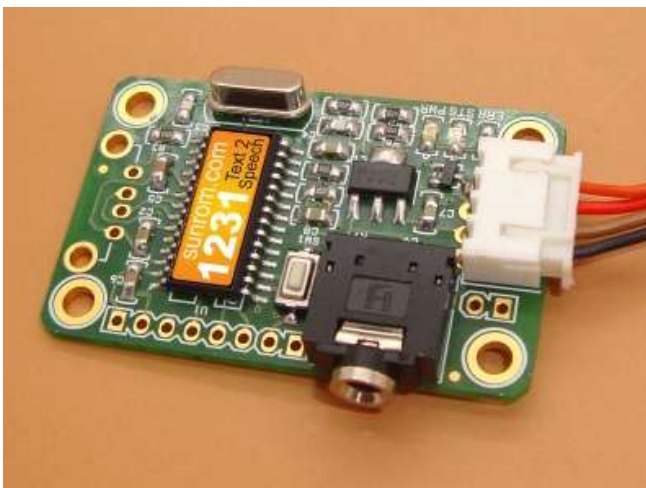


Fig 3 TTS Module 1231

3.4 16*2 LCD Display

A 16*2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16*2 displays 16 characters per line and there are 2 such lines. Each character displayed in 5*7 pixels matrix. This LCD has 2 register, namely, Command and data. The command register stores the command instructions given to The LCD. A command is an instruction given to LCD to do pre-defined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

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Fig 4 16*2 LCD display

3.5 Loudspeaker

Currently, the audio output is heard from a simple 3.5 MM headphone jack. The output impedance required would be 8ohm from the TTS module. For public hearing, one would like a high level dB output from the loudspeaker.

3.6 Software used

Many software's have been used for programming and interfacing of the microcontroller to GSM modem SIM300 as well as LCD display. They are as follows:

- 1.) AT Commands
- 2.) Keil for P89V51RD2

3.6.1 AT Commands:

AT commands are instructions used to control a modem. AT is the abbreviation of Attention. Every command line starts with "AT" or "at". That's why modem commands are called AT commands. Many of the commands that are used to control wired dial-up modems, such as ATD (Dial), ATA (Answer), ATH (Hook control) and ATO (Return to online data state), are also supported by GSM/GPRS modems and mobile phones. Besides this common AT command set, GSM/GPRS modems and mobile phones support an AT command set that is specific to the GSM technology, which includes SMS-related commands like AT+CMGS (Send SMS message), AT+CMSS (Send SMS message from storage), AT+CMGL (List SMS messages) and AT+CMGR (Read SMS messages).[5]

3.6.2 Keil for P89V51RD2

The Keil products from ARM include C/C++ compilers, debuggers, integrated environments, RTOS, simulation models, and evaluation boards for ARM®, Cortex™-M, Cortex-R, 8051, C166, and 251 processor families.

This web site provides information about the embedded development tools, product updates, downloads, application notes, example code, and technical support available from Keil. [6]

3.8 Flow diagram

The message sent from the cell phone will be check by the controller to check the message coming is from authentic user as the security check is important. Only a valid user can send use the facility. If the user is valid the message will be replaced by the old message only if it is newer otherwise the same old message will be continuing to display. If the message is higher in priority the new message will start blinking with a speech as well.

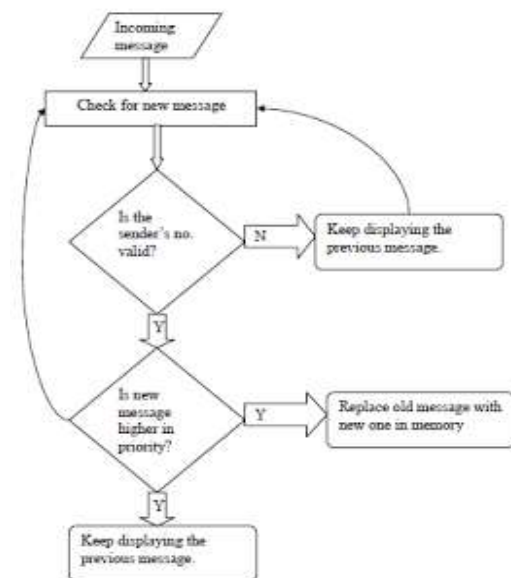


Figure 6 Flow diagram

3.7 Final Prototype

The final outcome of the paper is as shown in the figure 5. The System works by interfacing all the necessary components with each other. Here currently, EEPROM is not used as the memory on chip is enough for storing up to 5 SMS based notice. However, after 5 SMS based notices one has to power off the device for storing the notices again. The SMS will be sent from the cell phone to a desired number that would be inserted in the GSM modem SIM300. The message which works as a notice will be interpreted by the microcontroller and it would blink a LED on board as an ALERT and the final notice will be displayed on the LCD display with a speaking facility and simultaneously listener will be able to listen all the message that came as a notice.



Figure 5 Final Prototype

3.9 Conclusion

The technical paper helps an unknown person about the important informations that might be or might not be related to him/her. The idea are very much useful in public places like Academic (school/ colleges), railway station, garden etc.

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