Password Protected Multiuser Electronic Noticing System Using Gsm And Solenoid Lock

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Abstract- *The paper clarifies about an electronic system which will work in a smart way. The proposed system is a notice display system which is GSM based and powered by an ARM7 controller. The system carries out communication and data transfer via GSM in order to facilitate sending messages from a distance, less or more. Moreover, to ensure security of the messages, the system is fully password protected.*

GSM sends SMS notice. The password is stored in EEPROM. If password entered along with the notice matches with the one stored in EEPROM, the message will be validated and shown on LCD (20x4). If password doesn't match, buzzer will beep to notify this.

A switch is installed along with the system to toggle between the LCD and the Solenoid Lock which is used to guard the physical components of the system.

Keywords- ARM 7, LCD, SWITCH, RELAY, GSM, NOTICE BOARD, and EEPROM.

I. INTRODUCTION

Messaging, as we all know is a very effective way to convey general or useful information in our day-to-day lives. Irrespective of distance and time, short messages can be sent and received by anyone in the world. We'll be using this method to convey short messages to an electronic system which will receive the message sent from a mobile phone, process it and display it on a screen. The system will have password protection in order to avoid any unauthorized changes in the message while displaying it on the screen.

This electronic system would prove important where there is a need to display received message without any latency. This will also overcome the conventional method of conveying notices or messages in an organization or institution.

Furthermore, as an additional security measure, the physical components of the system are protected in an electronic solenoid based lock, which will actuate in the similar way how a message is displayed. At a time, one can only operate the lock or display messages on the LCD.

II. PRESENT TECHNOLOGY

Looking at the traditional and conventional method of conveying information in the institutes, organizations or any operational body, notices in the form of written documents are widely used. This is a slow and inaccurate method of communicating information which may be general or of a high importance. Thus, an efficient and accurate communication is required in order to carry out the tasks as per the schedules and instructions. If failed, this may lead a company to bear loss or go through a great inconvenience.

The recent technologies have made it easier to carry out fast one-way or two-way communication, using mobile phones and computers. However, there are some limitations to this. One cannot keep his devices awake every time just to look for any important update from his leadership. Mainly for the employees who are on the production floors, or the students in an ongoing class are not allowed to use their mobile phones and therefore they don't have any access to any updates unless and until someone gets an update via the earlier mentioned conventional methods.

Some organizations/institutes use public address systems, which too, have their own limitations. Acoustic systems are not very reliable because of the geographical factors (example: an organization situated in a densely populated area having high noise due to vehicular traffic, etc.), the interior of the building causing reverberation, and so on. Therefore, to overcome all these factors, a system which will display information is proposed here. There have been researches and developments on our proposed topic too. The implementations were done on controllers like Arduino, Peripheral Interface Controller (PIC) and Zigbee.

A paper was published by the authors [1] Kruthika Simha, Shreya, Chethan Kumar, Parinitha C and Shashidhar Tantry, which dealt with implementation of an electronic display system using GSM to transmit data by using Arduino as the heart and displayed the message on two LCDs. This

system offered flexibility to control information display within a given range on multiple displays.

Another paper published by [2] Azam Rafique Memon and Bhawani Shankar Chowdhry deals about displaying a message on a mobile phone on user's request. This system was implemented to convey information to students or staff in any institution without any hassle if there is a loss of internet connectivity or no connectivity at all.

The authors [4] Sayidul Morsalin and Prattay Saha wrote on how to build a multiuser system which can accept signal only from authorized users. This system was a completely secure one since no one could alter any messages because of password protection.

These papers proved helpful for us and encouraged to establish such system which will completely eliminate the use of paper, chalk and board, and also won't get affected by any unauthorized intervention.

III. FLOW DIAGRAM

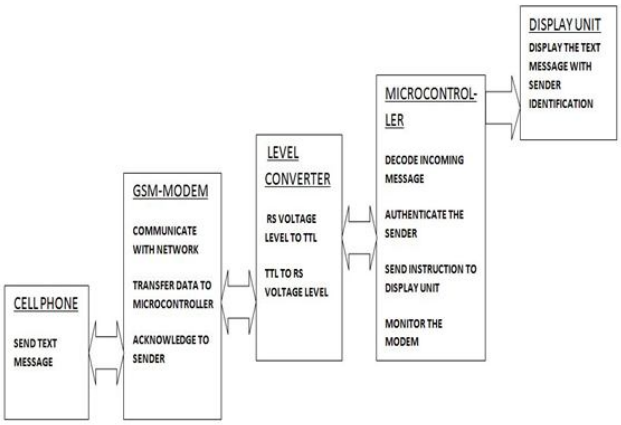

Fig.2: Flow Diagram of the control

IV. BLOCK DIAGRAM

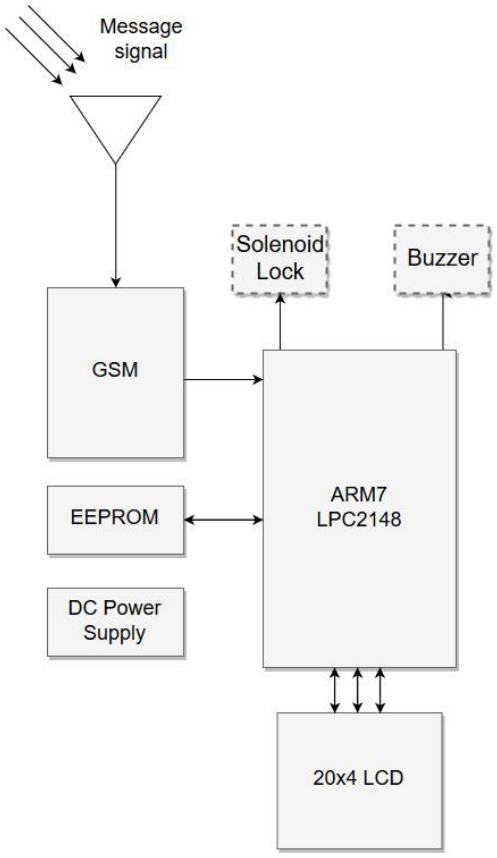

Fig.1: Block Diagram

V. WORKING

The heart of this electronic notice displaying system is the controller LPC2148 of ARM7 family. The other modules interfaced with this controller are GSM and a 20x4 Liquid Crystal Display (LCD). A mobile phone is used to transmit a short message (SMS). This message is supposed to be sent to the Subscriber Identity Module (SIM) card which is inserted in the GSM. The GSM will then receive this signal and send it to the controller for further processing. LPC2148 will analyse the message and process it, and then will send it to the LCD for final output. GSM and LPC2148 are buffered with MAX232 level converter because the operating voltages of both the devices differ.

The solenoid lock prevents any unauthorized person to manipulate with the physical circuitry of the system. The open/close position of the lock is again controlled via sending a message to the GSM. A physical switch is used to toggle between displaying the message on the LCD, and opening or closing the lock.

Notice/message input along with password:

A mobile phone can be used to compose a message because of its user friendly GUI. A computer can also be used

to compose the intended message. The message will consist of the notice to be conveyed along with a password. The password is required mandatorily so as to carry out the further process of the whole system. The message is typed using a keyboard and a recipient mobile number is required where the message has to be sent. In this case, it'd be the GSM where we would be sending our message.

Message reception:

The message is sent will be received by GSM. There are specific commands in order to make GSM work, these are the AT (ATtention) commands.

The GSM modem is operational with a SIM card. Any network operator can be used who supports the network range where the proposed system is being implemented. The operating frequency bands for GSM are: 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. GSM allows communication anywhere, anytime, and with anyone.

Validating and processing:

The message from GSM modem is then sent to LPC2148 controller which is the main processing unit. The processor will check the received signal and distinguish the "password" and the "message" to be displayed. Furthermore, when it is distinguished, it'll check whether the password is correct or incorrect.

Once it is validated the received password is correct, the message will be then sent forward for displaying. If the password is incorrect, the system won't take any action and there will be no change in the output, also, the buzzer will sound indicating the status.

The final output:

The validated signal will be then displayed on the 20x4 LCD used here. The LCD is interfaced in 8-bit mode. There are larger displays available in the market but they won't support this controller due to lack of available number of pins to interface. The largest sized display best suited to interface with LPC2148 is 20x4 LCD.

Fig.3: Sample output

The following image shows the screenshot of mobile used to transmit the message. The digits "12345" are used as password and the next message "Hello" is the information to be displayed.

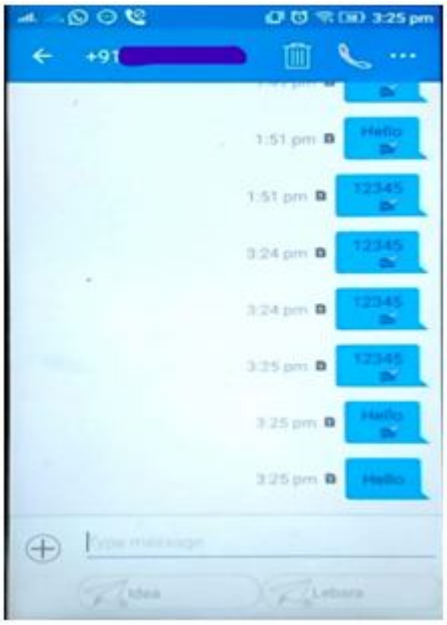

Fig.4: Password and message being sent to the GSM

Fig.5: LCD shows "No New MSG".

This is the condition when the password has been validated and the system awaits notice to be displayed.

Fig. 6: LCD shows “Hello”.

This is the actual information received and displayed on the system.

VI. CONCLUSION

Implementation of the system is easy however, interfacing it with EEPROM is a tedious job. Further improvements can be done in the system depending upon the size of messages/notices. The method used to authenticate the user is inbuilt and can be changed to external authenticating devices like fingerprint sensor, biometric devices, etc.

Overall, the system would prove much helpful in conveying updates to the organizations and institutions much fast and reliably.

REFERENCES

[1] Kruthika Simha, Shreya, Chethan Kumar, “Electronic Notice Board With Multiple Output Display”, International Conference on SCOPES-2016
[2] Azam Rafique Memon and Bhawani Shankar Chowdhry, “An Electronic Information Desk System for
[3] Information Dissemination in Educational Institutions”, 2015 2nd International Conference on Computing for Sustainable Global Development (INDIACom)
[4] Sayidul Morsalin and Prattay Saha, “Password Protected Multiuser Wireless Electronic Noticing System by GSM with Robust Algorithm”, International Conference on Electrical Information and Communication Technology (EICT 2015)
[5] GSM Fundamentals. (n.d.). Telecom & Datacom education: http://telecomedu.blogspot.in/2013/01/gsmfundamentals.html
[6] “RS-232, RS-422 [1], RS-485 Serial Communication General Concepts," National Instruments, p. 4, 29 June 2016.