



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

Procedia Engineering 8 (2011) 186–189

---

---

**Engineering**  
**Procedia**

---

---

2<sup>nd</sup> International Science, Social-Science, Engineering and Energy Conference 2010:  
Engineering Science and Management

## SMS Information Display Board

A. Tanadumrongpattana<sup>a,\*</sup>, A. Suethakorn<sup>a</sup>, S. Mitatha<sup>b</sup> and C. Vongchumyen<sup>b</sup>

<sup>a</sup>*Faculty of Engineering, Kasetsart University Sriracha, Chonburi 20230, Thailand*

<sup>b</sup>*Hybrid Computing Research Laboratory, Faculty of Engineering  
King Mongkut's Institute of Technology Ladkrabang, Bangkok 10520, Thailand*

**Elsevier use only:** Received 15 November 2010; revised 15 December 2010; accepted 20 December 2010

---

### Abstract

We propose a new system for SMS information display board. The system will display texts and icons of a message on the matrix LED. To sending a message to the system, A user have to send a message SMS on a mobile phone. It's mean, the user can be anywhere in the range of mobile signal to control the message on the display board. Furthermore, the user is able to control the pattern, speed and time duration of the display message. In additional, the user can set the time of the message to display on the system in advance or cancel it. The system provide the security by using password method to verified the authorize user only. Finally the system can apply to variety of usage with a lot of concurrent users and message scheduling application.

© 2011 Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

*Keywords:* SMS, Display board, Matrix LED, Microcontroller

---

### 1. System Overview

News and information are very important to the modern world, it affects the way we live in every way such as earthquake warning, weather forecast and stocks market. Updated information becomes necessary need for every person. There are many ways to broadcast the information[1], [2], such as radio, television, billboard, newspaper and internet. From that reason, ordinary information board has been developed. It has function to display information to people via series of matrix LED. Many places use it as main publication tools. For an instance, hospital, department store, bus terminal.

For normal people, there are many to receive information, but for the disability such as the deaf or the people who has the problem with hearing, running text on the matrix LED is the most preferable channel to communication with them. Anyway, the ordinary matrix LED information board has a limitation to update its information. Users have to connect it with PC via serial port (RS-232) in order to change or update the display information. According to that inconvenience, we propose a new system of an information board that makes users have an ability to update display information via SMS on mobile phone. It extends ability to access to the system with ease and comfort. Fig 1 shows the overview of the system, user has to texting the display information from their phone to the system, then the system will process stick to their command.

---

\* Corresponding author. Tel.: +66-42-772-391; fax: +66-42-772-392  
E-mail address: [kvocharo@kmitl.ac.th](mailto:kvocharo@kmitl.ac.th)

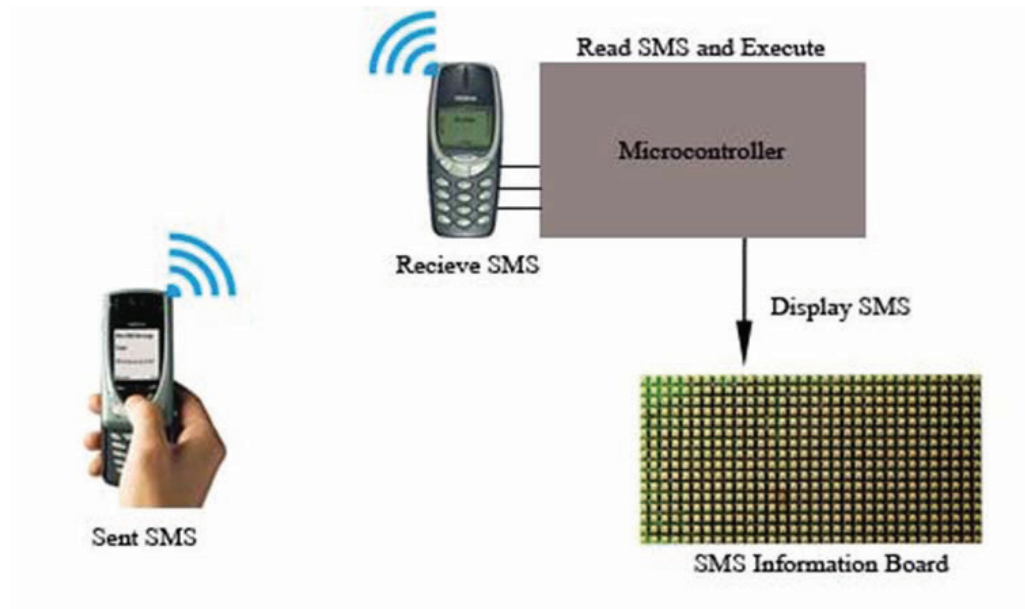


Fig. 1. System overview.

## 2. SMS Module

SMS is a text based message on mobile network, created by Friedhelm hillebrand, the researcher in communication and head of management committee of GSM association in additional service division. There are two reasons why the SMS is 160 characters long text message. First, from research information, most of text in postcard has characters not exceed 150. Second, from the sending message via telex, still have characters equal to postcard.



Fig. 2. SIM300CZ GSM module.

In our research, we use SIM300CZ GSM module [3] to receive the SMS message via AT command protocol. AT command is a set of ASCII using to communicate the modem with PC. It proposed by Hayes Communications in 1977. SIM300CZ has two SMS modes, PDU and text mode. PDU receive and display the status in binary code format, but text mode in ASCII with ease to translate and use. In order to receive message, Main control has to send “AT+CMGF=1” command to the module to entering text mode. If there are new message receive, the module

response by sending out the command such as +CMTI: "SM",3 with mean there is a new message in memory number 3. Then send "AT+CMGR=3" command to the module to read message in memory number 3. As show in fig 3.

```
+CMTI: "SM",3
AT+CMGR=3<Ent>
+CMGR: "REC UNREAD","+66812505187",,"07/11/19,13:29:25+28"
Hello 12345
OK
```

Fig. 3. New message reading status.

### 3. Firmware function



Fig. 4. The process of the system.

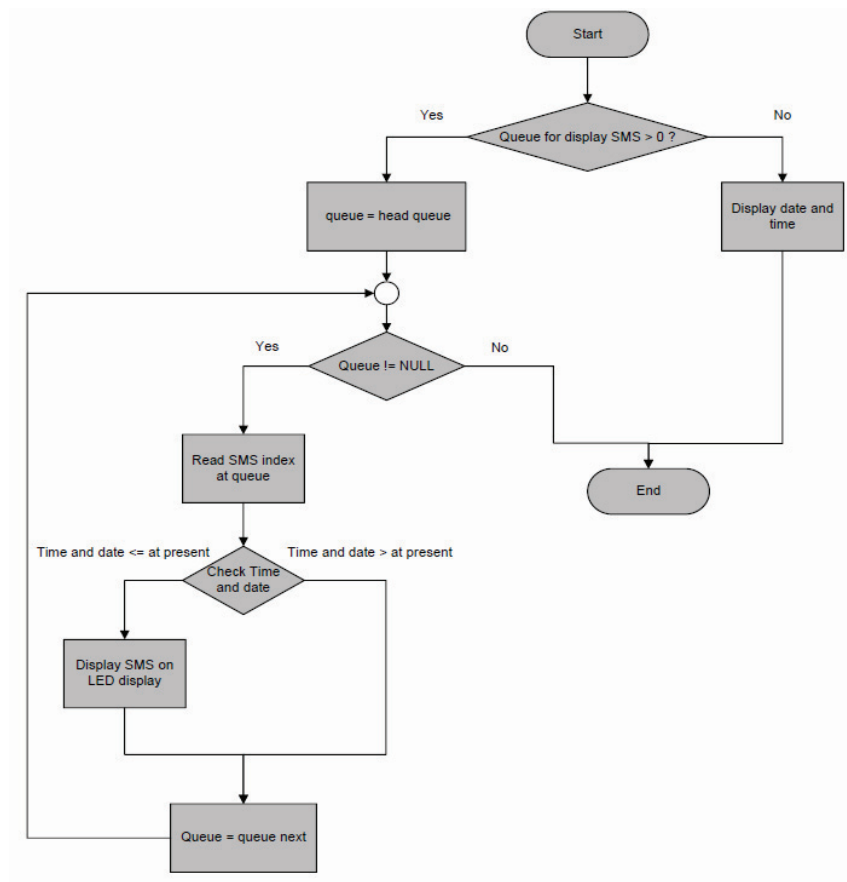


Fig. 5. Display process.

The process of the system starts by the user sending a SMS to the system with password as show in fig 4. After receive a message, firmware in control module will gets the content of the message and check password provided by user. If password verified, the system will check the command and format of the message. In case of nothing error, the content of the information will adds to queue for further display according to its command. In the display function, main control periodically checks for display queue. If queue is empty, it mean no message left to display so it show the current date and time reading from internal real time clock (RTC DS-1307). In case of queue is not empty, it will check time and date of message in queue and display the message if time and date match the command as show in Fig. 5.

There are 7 commands available for this information board, clear message command, start command, stop command, speed set up command, status requesting command, scheduling command and duration setting command. “-c” with index of message forces the system to clear or delete specific message in the system. “-o” is a command to start the system and “-f” is force the system to stop working. “-s” with number 1-3 is setting the speed of moving text on the board, 1 is fastest and 3 is slowest. “-st” is a command to request the status of the system, it will return the number or currently display message. “-t” with time and date is a command to set up the schedule to display the message when the time come. Finally, “-p” with integer number and time unit is a command to set up the duration to show that message after receive, there are 3 types of unit, m, h and d for minute, hour and day respectively. Nevertheless, combination of command is acceptable. For an instance, “-t 13/04/10 -s1 #Today is holiday.#” will show ‘Today is holiday’ on 15 march 2010 with faster speed. “-p30m -t 9:00:00 1/05/10 #Welcome to SMS information board#” will show ‘Welcome to SMS information board’ on 09.00 to 09.30 on 1 January 2010.



Fig. 6. The system with sliding text message.

#### 4. Conclusion

We have show the new system of information board use to present information and News by sending a SMS to the system. It allow user to updates new information anytime anywhere in mobile network range. There are plenty of advantages from this system. First, give ability to install any place with mobile signal without connecting to PC and internet. It also reduces the cost of internet free. It still has many functions to manage the text on the display such as speed setting, scheduling and time interval. Finally, with no message in queue the system will show current time and date as neaten modern clock.

#### Reference

- [1] B.K. Siang, B. Ramli, V. Prakash, M.B. Syed, “SMS gateway interface remote monitoring and controlling via GSM SMS” Telecommunication Technology, 2003. NCTT 2003 Proceedings. 4th National Conference, pp. 84 – 87, 2003.
- [2] D. Lisonek, M. Drahansky, “SMS Encryption for Mobile Communication” Security Technology, 2008. SECTECH '08. International conference, pp. 198 – 201, 2008.
- [3] Z. Shijue, Q. Xiangtao, “Research of Wireless Data Transmission Based on Embedded Systems” 2009 International Conference on Networking and Digital Society, 2009.