

Using SMS in Mobile Phone for Home Appliances Controlling Through PC Parallel Port Interfacing

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Keywords: Mobile phone, PC ports, Interfacing, Visual C++.

ABSTRACT

This paper presents a system of the PC remote Controlling with the Mobile Telephone through accessing the main PC ports; serial and parallel. Serial port for transferring data from Mobile phone to PC and parallel port for interfacing PC with real time controlling hardware. The system is implemented by using the SMS (Short Message Service) as associated with all modern mobile phone devices and mobile telecommunication networks. The software for whole system is designed and implemented with KORAK Telecom Network in Erbil City, Nokia mobile phone device and with ordinary type of PC that running under Windows XP or compatible. The software for system is divided into two parts; Mobile to PC through serial port is a general commercial program that associated with the Nokia mobile devices, and second which access SMS file and control all parts of system is designed by using Microsoft Visual C++ Ver. 6 . Such idea is quiet new and represents the ability of anyone who has Mobile and PC to control remotely major devices in his/her home, office and etc.

1. INTRODUCTION

Nowadays, the communications becomes very simple, fast, interactive and more compact, that makes the global as a small village. So it is very easy of anyone to subscribe in the local or global telecommunication networks with individual mobile phone device.

Mobile devices, such as mobile phones, are becoming multipurpose devices. These devices are capable of storing data as well as running custom application. As more people adopt these devices and begin to use them for personal or business tasks, the need for controlling access to the data stored within the devices will become vital [1].

With today's and tomorrow's wireless technologies, such as IEEE 802.11, Blue tooth and G3, mobile devices will frequently be in close and interactive communication. Many environments including offices, meeting rooms, automobiles and class rooms already contains many computers and computerized applications, and the smart

homes of the nearest future will have ubiquitous embedded computation [2].

PC remote control with small mobile device is a challenging topic of mobile/ubiquitous computing. Enabling users to use data and functions stored in/served by their home/office PCs from anywhere with small mobile devices is beneficial because users can access the data/functions at any time they want without carrying heavy notebook PCs. Further more, users cab control applications they want to keep running even while they are out. Several systems and methods have been proposed and developed for controlling remote PCs with mobile phone;

The system that employing for translating PC GUIs into mobile device UIs (screen sizes, input device, etc.)[3], such system requires converting image data to text data will be very expensive. The evaluation of the cell phone from analog handset passing by PCs and WAP (Web – enabled Phones)[4], which need continuously working and connecting with the internet networks. The system that uses the email enabled mobile devices [5]; require Java enabled devices, because the systems use client Java applets. Consequently, older model mobile devices that are email enabled but not Java enabled, cannot be used for this system.

This paper represents a simple, practical and very low cast method which applies the SMS technique that already available in all types of mobile phone devices and provided with all modern mobile telecommunication networks.

II. PC Interfacing System

To make an ordinary home as a future and a smart home, all appliances must be computerized controllable. To do that, it's very preferable that using PC.

As the PCs are provided with input/ output ports, which makes easily to interface PC with the real world control applications. The interface is the combination of hardware and software embodies [6], the hardware is an electronic circuit that matches with the PC's port protocol signal, and the software is the programming of the PC to manage

all input/output signals from its ports, hence, the interface hardware circuits.

In this paper, for the purpose of interfacing with the real time control applications, the PC parallel port is used. Since the parallel port works well as hardware interfacing [7].

The parallel port pins are TTL levels output (originally derived by a 74LS374 octal latch). This means that they put output 0 to 0.8 dc volt logically 0, and 2.4 to 5 dc volt logically 1. According to the parallel port behaviors, there are 8 bits for data input/output, which can produce 256 different control signal statuses [8].

The data bit signals can be managed by software that applied for this purpose, the powerful software language is C++ which can access the ports more efficiently than other available computer program languages. As the whole project software here is written and implemented through the use of Microsoft Visual C++ ver. 6. Inside the program by using the command `_outp()` which is a member in "conio.h" header file could be used to directly access all data port signals, for example the following code;

```

_outp( 0x378, 0);
makes all data pins of parallel port to low logic (zero
output signal), and the following;
_outp( 0x378, 1);
means to make the first bit high and low for the rest of
bits.

```

There are many ways could be used to control all home's appliances by sending appropriate signals to the PC's ports, parallel or serial. Then these signals inserted to the interface hardware system that prepared, designed and matches with the output signals, then depend on the signal, the interface hardware control or manage one or more of the home appliances.

The designed program will make the PC parallel port to send signals which appear as approximately 5 volts at one or more bits of eight data bits on the parallel port. These volts will change the status of the interface hardware [9]. In order to do that, there are many electronic circuits which can be useful for this purpose, or one could build its own electronic circuits. In most cases the general Transistor is used as a switch mode operation and the mini contactors. As the interface system is directly connected to the PC parallel port, it's at high degree recommended to protect the PC and its ports from any back feed misused, thus achieved by using any available type of buffering [10].

III. Remotely PC controlling System

The goal is to control remote PC with a mobile phone device through using the SMS message services. Which

can be done by using two mobile phones, there is no so conditions that both mobile phones must be the same types or versions. The only condition is, they must support SMS inside the devices and can work with the network that provide the services of SMS.

The following figure depicts the proposed system that controlled remote PC.

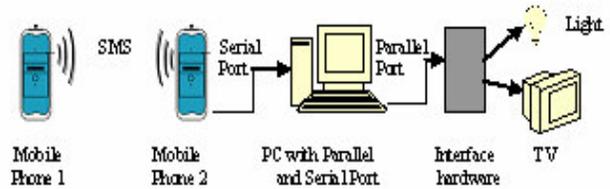


Figure1. PC remote control system

The block diagram of the system is shown in Fig. 2, where the PC is read and receives the SMS from the mobile phone that connected to it through serial port. Hence, according to the type of mobile phone that in use, the available software which comes with the type of mobile phones manufactures, which includes the recognizable device software, reading, saving, and managing the data of the mobile phone device inside the PC. Here, as the type of the mobile phone is Nokia, the general Nokia mobile phone which is the Oxygen product software is used [11].

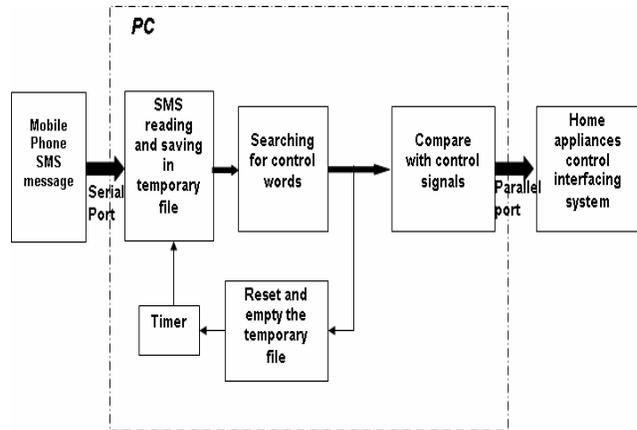


Figure 2. The Block diagram of the remote PC control system.

As the mobile phone is recognized by the PC and it's received the SMS message from any other mobile phone, then its send the message to the PC. The PC read the message and put it in a temporary file.

Searching inside the received SMS message for any available control words this is done by using the appropriate program as prepared in this paper. Thus, the

program is managing the SMS data and compares with any available control words that the whole project is designed for.

The program in this project will continuously search inside the receiving SMS for any probability of containing the control words, so if the control words are not found in the received message, the program will delete the entire message file, so as to prepare this file to receive a new SMS message that may send by the remote mobile phone at any time.

The comparison with available control words will be achieved after the program has found the control words inside the message. Then, the program will prepare and initialize the parallel port to send the proportional signal to the interface hardware that designed in this project; this signal will be proportional with the control appliance in the house with the SMS message that delivered by the PC from the remote mobile phone.

IV. System algorithm and program

The system in this project is design to receive the SMS from any mobile device to the mobile phone that directly connected to the PC. This can be achieved by knowing the dial number of the phone that connected to the PC, here this phone may be any ordinary mobile phone that has SMS capability. In order to prevent any occurrence of SMS likelihood control words, the sending SMS that contain control words should come between the specified codes that protocol between user of far mobile phone and the mobile phone that connected to the PC.

After the mobile phone which connected to the PC receives the sent message, it sends this message to the PC. Thus, the mobile phone program save this message to a file, this file works as temporary file and may known as "Inbox.dat" which is a text file that any windows operating system support this type of file.

The graphical user interface program is designed in this project by using the Microsoft Visual Studio C++. This program is responsible for manage the whole system as the following;

- (i) The program is using the internal system timer for continuously observing the received message from mobile phone.
- (ii) After the PC received the new message, the program is read the entire file "Inbox.dat" .
- (iii) Searching the entire message for acceptable codes that matches between the two mobile phones and the user.
- (iv) If there are no such codes, the program will delete the content of the "Inbox.dat" file and prepared it to receive a new message that may send at any moment.

- (v) If the program found the acceptable codes, then carry the words between these codes to compare them with a list of control words that the system is designed for controlling the corresponding home appliances.
- (vi) The program through the parallel port send a suitable signal to there bit so as can be carry out by the interface hardware that connected to the parallel port and the home appliances.
- (vii)After achieving the step (vi), the program again reset the content of "Inbox.dat" file, and make it to be ready to receive a new message at any time. Hence, the program is return to first step to repeat the above procedure continually.

The flowchart for the program is shown in the following figure.

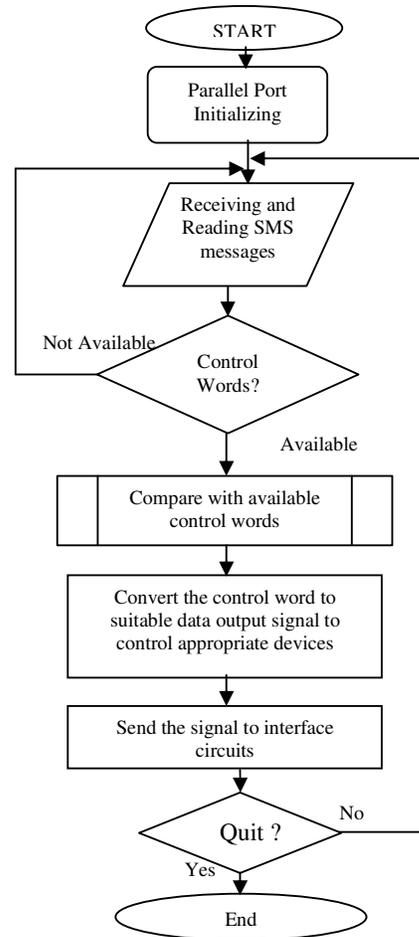


Figure 3. System flowchart

V. System testing

The proposed system that designed in this paper is tested in the Computer Laboratory in Electrical Engineering Department/College of Engineering/ University of Salahaddin.

Where the PC under the test has the following properties; PIV, 2.8 GHz, 256 MB of RAM and operated under windows XP. The type of the mobile phone that connected with the PC is NOKIA ver 3220 that used serial data transfer. The remote mobile phone device may be any mobile phone devices. Where both mobile phones are communicated in the KORAK telecommunication network.

The common controlled appliances are ; PC Shutdown, TV on/off, Light on/off .

The test is applied by sending the following SMS message ; “pcshutdown”, “lighton” and “tvoﬀ”. These words which are control words found to be as the following shape in Inbox.dat,” Oxygen Software SMS. v3. +9647504521507& & pcshutdown & & +964750001140”,” Oxygen Software SMS. v3. +9647504521507& & lighton & & +96475000114”and “Oxygen Software SMS. v3. +9647504521507& & tvoﬀ & & +96475000114” respectively. Where the Oxygen is the software that comes commercially with the NOKIA mobile phone device and the number (+9647504521507) is the dial number of the phone that directly connected to the PC. The control words are found between the codes where here are the two double (&) characters. For all cases the system successfully do the processes without any notice or errors, only the simple problem that may came with mobile phone where in some cases the network may be in busy status, otherwise there is no difficulty noted.

Figure 4. Depicts the graphical user interface program where running and continuously observe the system.

V1. Conclusion and future works

In this paper the SMS message between two mobile phones is presented that used to control remote PC.

The C++ language is successfully used to build the software that manage the received data and controlled the output of the PC.

Since the software is worked on system operated under Windows XP, this type of operating system lock the parallel port for any program that designed to using it. This problem is solved by first making the port ready by using a proper DLL file that come with the initializing of the PC parallel port.

The conclusion can be summarized in the following points;

- (i) Using the SMS message in mobile phone, which is very famous by the mobile user, this make this system be very effective and attractive method.

- (ii)The parallel port data rate is at high degree when compared with other ports.

- (iii) Making all home appliances controllable is very attractive by many house owners, office and so on.

- (iv) The system cost is in acceptable cost range, as nowadays many houses have a PC, and anyone can get a skill working with the PC.

There are many works have lefts for the future. That includes, using other methods that can be connected to the PC as using normal telephone device, other features that came with modern mobile phones like G3 mobile communications which include image rather text based.

V11. References

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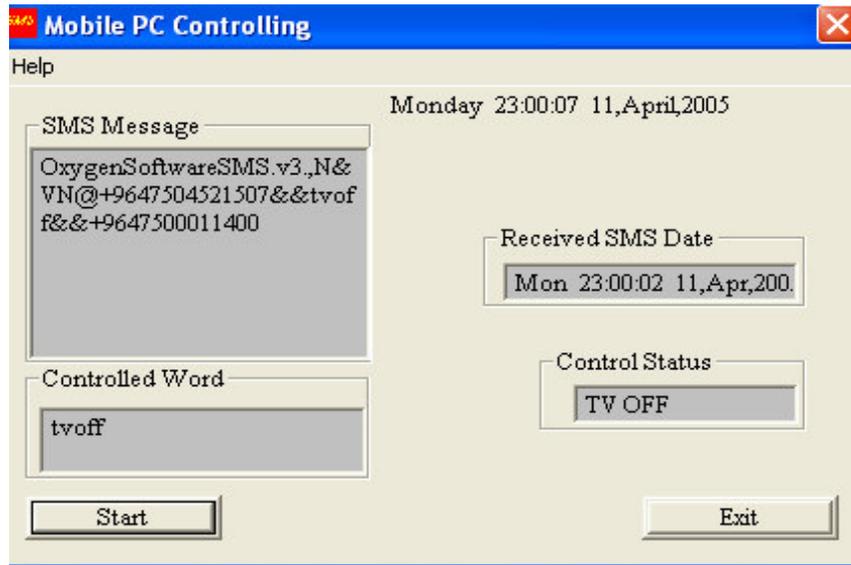


Figure 4. Typical graphical user interface program of the SMS PC control system.