



Controlling Electrical Devices with the Help of Messenger

¹Timna.P.Elizabeth, ²S.Suganya, ³P.Kabil Dev, ⁴Priyanka Prasad

PG scholars (CSE), Kathir College of Engineering, Coimbatore

¹timna615@gmail.com, ²suganya19.cse@gmail.com, ³kabil444dev@gmail.com, ⁴priyanka@gmail.com

ABSTRACT: There are several situations in which one may forget to switch off or on their house hold electric devices. In such situations there is no way to perform these types of operations. It may cause several types of loses such as power and money. This problem was identified by us when our family members and friends faced this problem. As a result we planned to find a solution for this problem. Thus we have planned to select it as a topic for our project. In order to overcome such a problem a system is created that implements home control through mobiles, reviewing the device status and can either switch on or off different devices like fan, light, A/C etc.

1. INTRODUCTION

Computers have changed the way we do things. Almost everything we do today is computerized. But technology doesn't stop there. The latest trend is convergence. The same sophisticated applications done in computer can today be implemented in mobile phones. Everything is moving from Desktop to Palmtop. This means more convenience, accessibility and expediency. This in turn leads to adoption of technology by masses.

ONE TOUCH HOME is a project that implements home control through mobiles. It aims at switching on or off different devices like fan, light etc. Here there are mainly two parts. One of them is a mobile part which performs operations such as identify the proper users and to send the messages for switching on or off the devices, viewing the status of device etc and another part is an Embedded part in which actual switch on or off operation is performed and it also handles the memory management.

In this project, we introduce a novel home network system for creating new network and service architecture by connecting home appliances networked using GSM technology. In this system, we mainly propose a new method of home network formation using mobile phones and a method to control/monitor networked home appliances with commands that are implicitly integrated within service contents offered by an application service provider to a user. Current information technology is an important aspect of mobile communications. It means that people's lifestyles, ways of thinking and methods of work have undergone tremendous changes. Computers are also encouraged people to the various data sources and the growing demand for network services. Intelligent Home Network to the emergence and development of the information society has injected new vigor and vitality.

J2ME, most compact of the three Java platforms, is inherently portable because it shares the Java "write once run anywhere" philosophy and thus enhances developer productivity. Java 2 Micro Edition (Java ME) provides a robust, flexible environment for applications running on mobile and other embedded devices mobile phones, personal digital assistants (PDAs), TV set-top boxes, and printers. Bluetooth allows devices to communicate wirelessly and J2ME allows you to write custom applications and deploy them on mobile devices. The control



network along with this module has a micro-controller (PIC16f877) which directs the controlling data to each appliance, thereby enabling home management. As described earlier, the software is aimed at making home control very efficient by providing a mobile phone interface. This can be very useful for users who forget to switch on or off their house hold electronic appliances. Besides mobile phones are so wide spread and has a greater reach.

The purpose of the project is to control different electric devices such as fan, light, TV etc. by simply sending a message from your mobile phone that supports java. The use of a mobile phone as an interface can really make these operations very convenient, easy, time-saving and also energy saving. More than one user is allowed to control devices from different phone numbers and authentication is provided through password.

2. SCOPE OF THE PROJECT

There are several situations in which one may forget to switch OFF or ON their house holding electric devices. In such situations there is no way to perform these types of operations without returning back to the home and manually switching off the devices. It may cause several types of loses such as power and money. It's not necessary to describe importance of electric power in our day to day life. Another important application is that a person may be able to control his air-conditioner to regulate the room temperature this is a blessing in many hot regions. Modern fast moving world requires an efficient house management system.

Earlier there was no way to perform any of these operations. Now there are some systems using Bluetooth technology and internet in which a server should always be in the ON state. But our software tries to implements the operations like switch on or off different devices through mobile phone, by simply sending a message thus enjoying true mobility.

The specialty about our system is that we can switch on or off different devices and also can check the status of devices in our house anywhere from the world without any cost. Our system can use any where if the user has a mobile phone that supports java. As mobile phone is now ubiquitous part in everyone's life, it is no wonder that people demand these kinds of facilities and comfortless of their cell phones and this is the basic concept behind this project.

3. IMPORTANCE OF THE PROJECT

- Our system will have the following advantages over the existing system.
- The devices are controlled by simply selecting a device listed in the user's phone j2me application.
- Our system does not require a server.
- No database is required to store the authentication details.
- Power failure conditions are easily handled.
- New users can be easily be added if the owner of the system wishes.
- The system can be implemented in a cost effective manner.
- We can save electric power and money and at the same time make life more luxurious

OBJECTIVES

We have planned to achieve these aims by creating a J2ME application in a cell phone and making an embedded device in the house which is connected to the switch board. We have planned to use the GSM network for sending and receiving messages. The status of the devices are planned to be returned to the phone from which the accessing was done. The current status of the accessed device is returned to the cell phone which was used to control the devices.

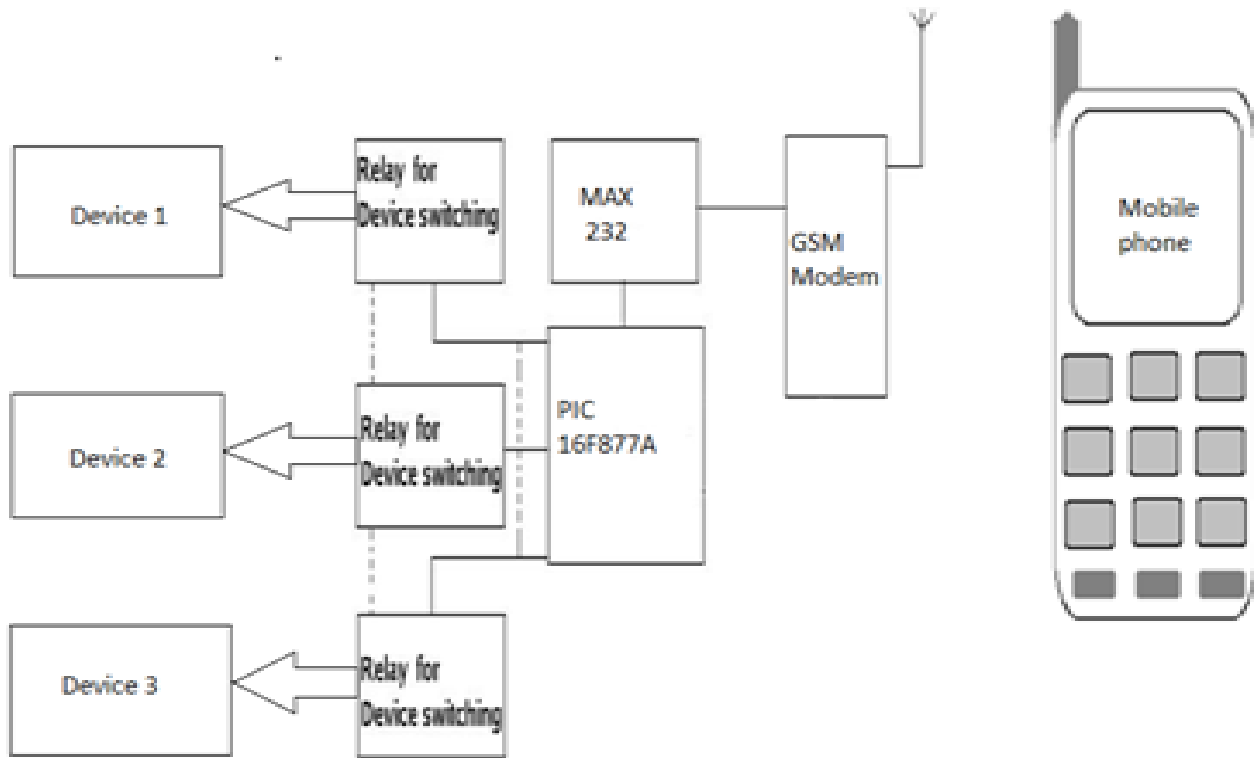


Fig:1 3

PIC 16877A

PIC is the peripheral interface controller and we are using a 40 pin chip. There are five ports in PIC. The ports are PortA, PortB, PortC, PortD and PortE. PortA is of 6bit length, PortB has 8bit, PortC has 8bit, PortD has 8bit and PortE has 3bit. There are five registers which are used to control all these ports. TRISA, TRISB, TRISC, TRISD and TRISE are used to convert the five ports as input/output port. The pin diagram of PIC is as follows.

Pin Diagram

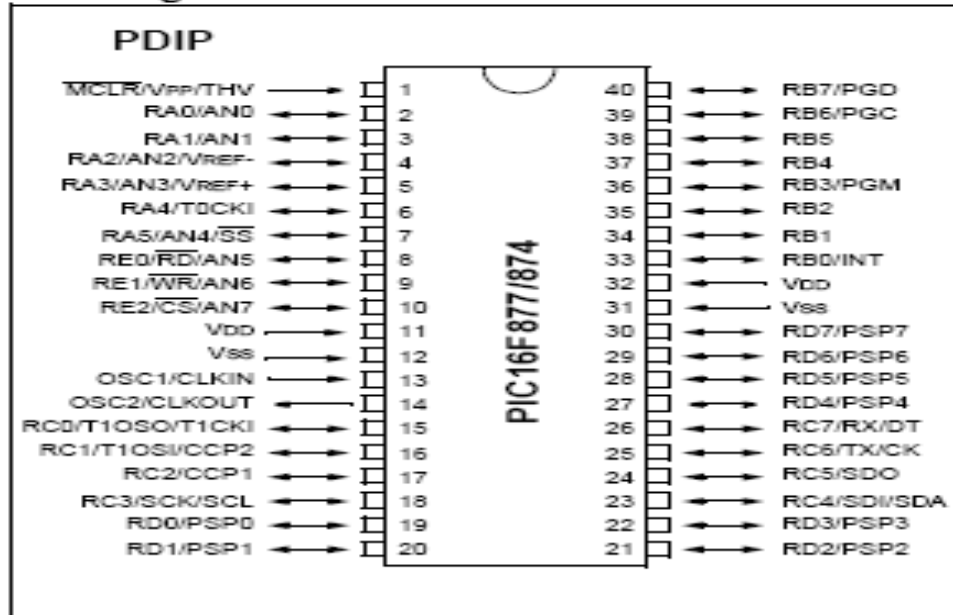


Fig:2

TABLE 1-2: PIC16F874 AND PIC16F877 PINOUT DESCRIPTION (CONTINUED)

Pin Name	DIP Pin#	PLCC Pin#	QFP Pin#	I/O/P Type	Buffer Type	Description
RD0/PSP0	19	21	38	I/O	ST/TTL ⁽³⁾	PORTD is a bi-directional I/O port or parallel slave port when interfacing to a microprocessor bus.
RD1/PSP1	20	22	39	I/O	ST/TTL ⁽³⁾	
RD2/PSP2	21	23	40	I/O	ST/TTL ⁽³⁾	
RD3/PSP3	22	24	41	I/O	ST/TTL ⁽³⁾	
RD4/PSP4	27	30	2	I/O	ST/TTL ⁽³⁾	
RD5/PSP5	28	31	3	I/O	ST/TTL ⁽³⁾	
RD6/PSP6	29	32	4	I/O	ST/TTL ⁽³⁾	
RD7/PSP7	30	33	5	I/O	ST/TTL ⁽³⁾	
RE0/RD/AN5	8	9	25	I/O	ST/TTL ⁽³⁾	PORTE is a bi-directional I/O port. RE0 can also be read control for the parallel slave port, or analog input5. RE1 can also be write control for the parallel slave port, or analog input6. RE2 can also be select control for the parallel slave port, or analog input7.
RE1/WR/AN6	9	10	26	I/O	ST/TTL ⁽³⁾	
RE2/CS/AN7	10	11	27	I/O	ST/TTL ⁽³⁾	
VSS	12,31	13,34	6,29	P	—	Ground reference for logic and I/O pins.
VDD	11,32	12,35	7,28	P	—	Positive supply for logic and I/O pins.
NC	—	1,17,28,40	12,13,33,34		—	These pins are not internally connected. These pins should be left unconnected.

Fig:3



There are three important registers which are used to control the devices in our project, they are

1. Status Register

	RP1	RP0	TO	PD	Z	OC	C
--	-----	-----	----	----	---	----	---

2. TXSTA Register

SRC	TX9	TXEN	SYNC	-	BRGH	RMT	X9D
-----	-----	------	------	---	------	-----	-----

3. RCSTA Register

	RX9	CREN	-	FERR	OERR	RX9D
--	-----	------	---	------	------	------

Fig 4

4. SPBRG Register: This register is used to find out the baud rate of the transmission.

5. TXREG Register: This register is used to store the data to be transmitted.

6. RCREG Register: This register is used to store the data that is received.

7. TRIS Register: This register is used to configure a port. An input 0 will make the port as output port and 1 will make the port as an input port. During transmission the TXIF register is made as 1 and when all the transmission is completed it is made as 0. During receiving the RCIF register is made as 1 and when the receiving process is completed it is made as 0.

Special micro controller features are

- Power on reset
- Programmable code protection
- Power saving sleep mode
- Selectable oscillator options

3.2 MAX 232

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V supply. Each receiver converts TIA/EIA-232-F inputs to 5-V TTL/CMOS levels. These receivers have a typical threshold of 1.3 V, a typical hysteresis of 0.5 V, and can accept ±30-V inputs. Each driver converts TTL/CMOS input levels into TIA/EIA-232-F levels. The driver, receiver, and voltage-generator functions are available as cells in the Texas Instruments LinASIC, library.



PIN DIAGRAM(MAX 232)

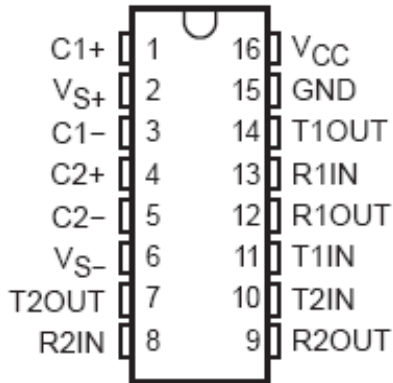


Fig:5

3.3 GSM Modem 81GC

VISIONTEK 81GC is a highly flexible plug-n-play GSM modem for easy integration with RS-232 and audio interface. It is equipped with features of circuit switched data, SMS, Fax, Voice and GPRS (Class 10). VISIONTEK 81GC is a perfect solution to use with SMS gateways, access internet while on the move and corporate communications (GPRS, Data transfer & PC Fax even in remote location).

Advantages of the System

1. It provides a convenient and easy way to perform the common house control.
2. The electric devices such as light, fan, TV etc can be switch on or off from any distance by using our system.
3. The power failure situations are indicated by our system.
4. The status of each connected device can be easily checked.
5. Our system would save a lot of time and money.
6. Our system is that it can be accessed from anywhere.
7. There is no need for a server.

3.4 MODULE DESCRIPTION

There are mainly three modules in our project they are

i) Mobile unit

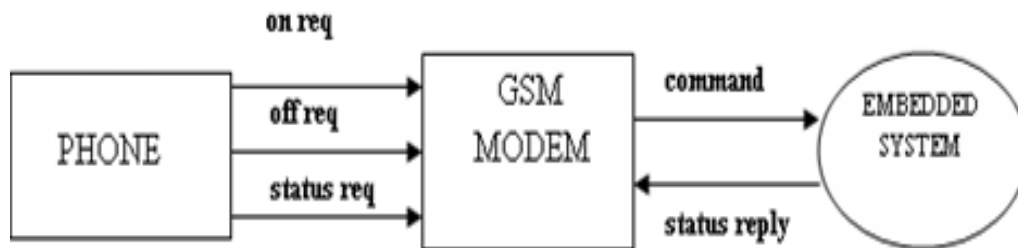
At first there will be a login panel where the user will enter the password. The password would be preset in some record. So the comparison will be done within the J2ME application itself. If the user is an authenticated one then application would move to another form.



After entering the proper password, the next panel would list the set of devices which can be controlled. There will be some images for making the identification process much easier. When the device is selected there are three options for each device. They are on, off and status request. When the on/off option is selected the corresponding message will be send to the GSM modem. When the user selects the status button the user can know about the current status of the device. This message would reach to the inbox of the mobile from the GSM modem. So the user can check his inbox to find out the status.

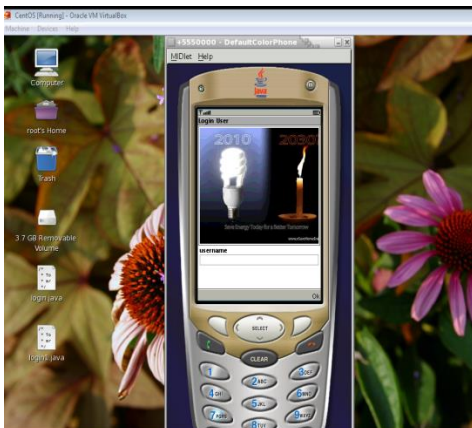
If there is no power supply in the house when the user check the status of the device then an alert message would be produced after waiting some time for the reply. When the on/off option is selected the message will automatically be send to the GSM modem. New users can added by sending messages containing 0* as content of message.

ii) Receiver unit



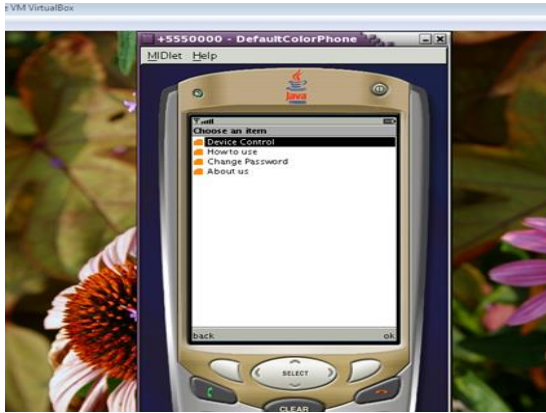
GSM modem is used to connect the J2ME application with the embedded system. GSM modem receives the message from the J2ME application and it will transmit the message to the embedded system. The PIC microcontroller in the embedded system will poll the GSM modem for any new messages and retrieves the same. The PIC then decodes the message and initiates the required action. The PIC then transfer the status to GSM modem. The phone numbers and status of devices are stored in EEPROM.

LOGIN PANEL



Whenever the message that is send from the J2ME application is received by the GSM modem, it will give an indication to the microcontroller that the message has been received. The message will consist of more than 80 bits. The first 39 bits will be skipped and the 10 bits followed by the first 39 bits will indicate the phone number of the sender, so it will be stored to our EEPROM in order to verify the authenticity of the sender of message. In the remaining 27 bits are not considered and the remaining portion will represent the control message that is sent from the J2ME application and it will be saved to the memory.

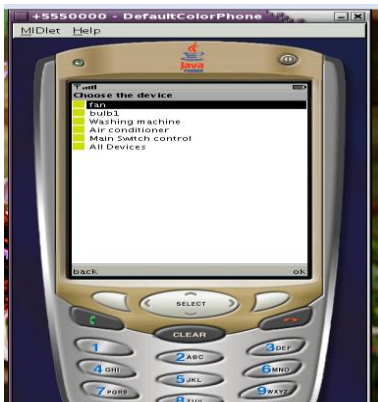
MAIN MENU

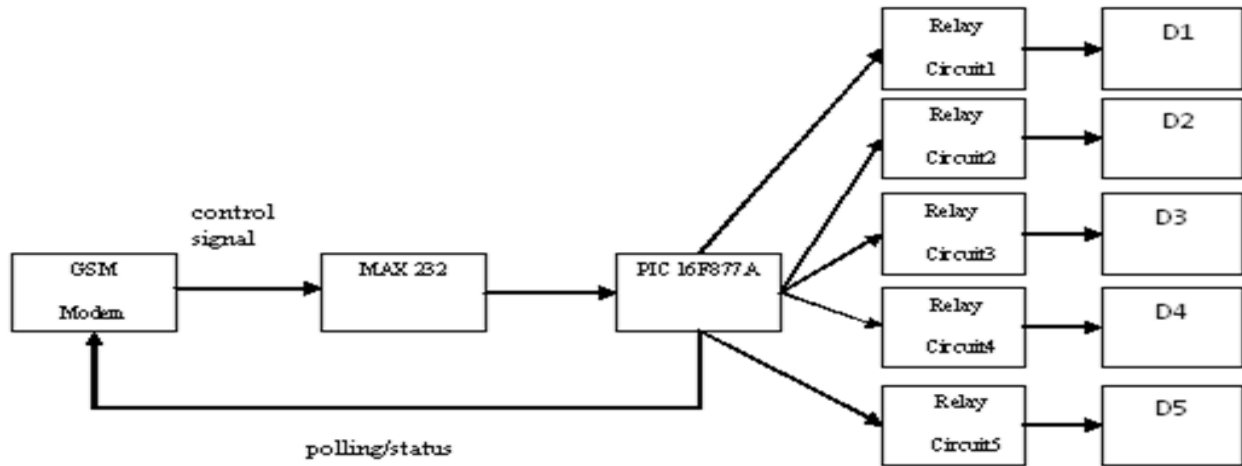


iii) Device control unit

This is the hardware end it consists of a micro controller along with its supporting devices. This unit retrieves control messages from GSM module. This PIC is programmed in such way to decode the control messages and it will set the value of output pins to high or low. The relay circuit connected to these pins will perform the actual ON / OFF of devices.

SELECT DEVICE





Authenticity of the users will be verified by comparing it with that is stored in EEPROM. The updates in status of device will be sending back to the user.

CONTROL DEVICE



4. CONCLUSIONS AND FUTURE ENHANCEMENTS

The project “ONE TOUCH HOME” makes the home control like switch on / off the electric devices. There is no need for a server. The basic requirements are a phone should be Java enabled. The home control can be done by simply clicking some buttons from their mobile phones. Thus in the future entire system need to be non-wired and thus the status of devices need to be returned for J2ME application itself. Hence in the current system the control over a device are connected to a single switch board.



Timna.P.Elizabeth *et al*, International Journal of Computer Science and Mobile Applications,
Vol.2 Issue. 2, February- 2014, pg. 143-153

ISSN: 2321-8363

REFERENCES

- [1] Software Engineering A practical approach by Roger.S.Pressman
- [2] Programming embedded systems 1 by Micheal j.Pont, University of Leicester
- [3] Introduction to J2ME by Juliano Carniel.
- [4] J2ME: Step by step, Presented by developer Works, your source for great tutorials, ibm.com/developer Works.
- [5] GSM_AUTO_INSTRUCTIONS”http://www.gsm-auto.com/GSM_AUTO_INSTRUCTIONS.pdf”