STATIC TRACKER AND CONTROLLER

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A report submitted in partial fulfillment of the requirements for the degree of Mechatronics Engineering

Faculty Of Electrical Engineering

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2009

"I hereby declare that I have read through this report entitle "Static Tracker and Controller by Using GSM modem" and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Mechatronics Engineering"

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Date : 13/5/09

I declare that this report entitle "Static Tracker and controller" is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Date : 13/5/2009

To my beloved mother and family

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First of all, I would like to express my grateful to Allah S.W.T. because the goodness that gives me strength in order to complete my project. I have successfully finished my PSM project even though I have to gone though many difficulties during the process to complete the project. I would like to say special thank to my parent because of their support in term of financial and advice.

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ABSTRACT

Static tracker and controller is one of system that capable to monitor and control the home apparatus status by using GSM application. This Project provided the user to monitor and controller their status of home appliance by sent the request massage to GSM modem either to check their status home appliance or changes the status. This project can be divided into two main parts which are hardware and software, in hardware part the PIC16F877A was using for interfacing between GSM modem and the home appliance input and output. The GSM modem was communicated with PIC16F877A with serial port in usart communication. This project was implement the GSM system is another additional feature that needs to be integrated for the purpose of sending status message when the user request to check their status . By using this system application now the user can montor and control their status home appliance via SMS application.

ABSTRAK

Pengesan statik dan pengawal adalah satu daripada sistem yang mampu untuk memantau dan mengawal selia status perkakasan dirumah dengan menggunakan aplikasi GSM. Project ini menyediakan aplikasi pemantauan oleh pengguna untuk memantau dan pengawal status peralatan rumah dengan menghantar mesej permintaan ke GSM menerusi telefon mudah alih pengguna iaitu sama ada bagi memeriksa status peralatan rumah mereka atau untuk menukar status peralatan dirumah mereka sama ade ingin menutupkannya atau untuk menghidupkannya. Projek ini boleh dibahagikan kepada dua bahagian penting, iaitu perkakasan dan perisian, Dalam bahagian perkakasan, microcontroller PIC16F877A digunakan sebagai pengantaramukaan antara modem GSM dan perkakasan dirumah. GSM disambungkan dengan microcontroller PIC16F877A dengan talian serial port dan ianya berkomunikasi didalam format penghantaran usart. Dengan menggunakan aplikasi sistem ini kini pengguna boleh mengawal dan menyelia status perkakasan dirumah sama ada telah ditutup atau masih hidup melalui aplikasi jarak jauh dengan menggunakan penghantaran SMS melalui telefon mudah alih pengguna

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CHAPTER 1

INTRODUCTION

This chapter are highlight past studies related to the subject of the project/literature review. These chapters also include problem statement/hypothesis, project objectives and scope/limitation of the project.

1.1 Project Background

The widespread use of information technology is dramatically improving both the quality and the efficiency of different services offered to people. The large deployment of wireless networks and increased use of hand held devices like the personal digital assistant (PDA) and mobile phones have encouraged developer to build different kind of applications and systems in all domains. Now day the application of mobile phone is increase for worldwide and long range communication. One of the communications that provided in mobile phone now is short message service (SMS) that provided for sent a short massage in American Standard Code for Information Interchange (ASCII) format for communication purpose.

Base on this short message service (SMS) application this project is developed. This project is using PIC 16F877A as interface between the input and output home appliance that connected with GSM modem that as an interfacing between the user mobile phone and home apparatus. PIC16F877A is use to processing the data that come out from SMS that sending by user mobile phone and receive to GSM to control the home appliance.

So that this project is provided with GSM modem that will send SMS that content with data of status of home appliance to the user when the user have been sent a request to check their status of home apparatus. It also provided the user to control their status of home appliance which is to turn on and to turn off in wide range application by sending the request to changes their status of home appliance which is require to switched on and switched off.

1.2 Project Objective

i) To design and develop a monitoring and controlling system for house owner that is capable of monitoring and controlling their house appliances via short message service (SMS).

ii) To develop one system that will monitor and control home appliance in wide range application via GSM. Besides that this project objective also I

iii) To study and investigate the other GSM functional.

1.3 Project Scope

The scope of this project is to design one system that will monitor and control the home apparatus status using the GSM application as a wide range communication. This project also will use a programmable ic control (PIC) 16F877A as a home appliance monitor and controller that. This project used (5v/240v) relay as a to control the home apparatus.

There are a few scopes and guidelines listed to ensure the project is conducted within its intended boundary. This is to ensure the project is heading in the right direction to achieve its intended objectives.

i. To design circuitry for the overall system

ii. To develop the program that can integrate and control the overall system.

1.4 Problem statement

Now people very busy with their routine work and sometimes forget to switch off their home appliance, it will waste a lot of energy in uncontrolled way. Some home appliance also will be dangerously and will cause accident if this it is turn on in a long time.

1.5 Thesis Layout

Chapter 2

This chapter was included with literature review that has been related with this project where will can help to understanding more about this project.

Chapter 3

This chapter is described the materials and methods that implement to succeed this project. It discusses all the material and method that used in this project to complete this project. This section will discuss how to build the PIC16F877A target board, the external of the PIC component and the connection between PIC with GSM and the connection PIC with PC. Next describe the basic concept of microcontroller and serial communications that been used.

Chapter 4

In this chapter will focus on discussion the result that should obtain and what the method that used to obtain the result. Discuss about the design of project which been implemented in this thesis. Discussion is included with how the software is work and the hardware work.

Chapter 5

This chapter is discussing which is conclusion will wrap up this project. Furthermore, the suggestions or recommendations for future researches are included.

CHAPTER 2

LITERATURE REVIEW

2.0.1 First literature review - SMS remote control (SMSrc)

This project are designed and published by **Serasidis Vasilis.** This project is provide to control up to 8 devices (4 devices in this example project), by sending a specific SMS message with any mobile phone. This project use T10 ericsson mobile phone which provided as a GSM modem. The controlling provided with controlled ON, OFF and reset the output device. This project is provided at. www.serasidis.gr/circuit/smscontrol.htm

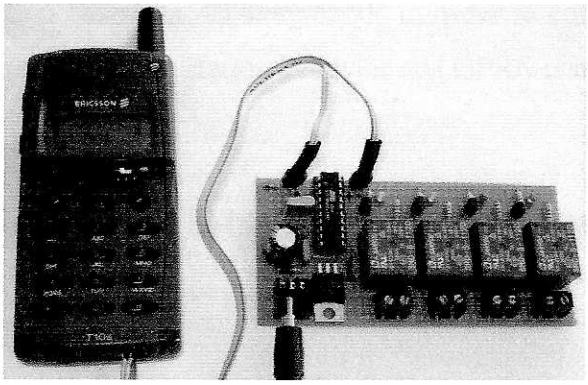


Figure 2.0: SMS remote control with 4 relays version.

2.0.2 Second literature review - Open GPS Tracker

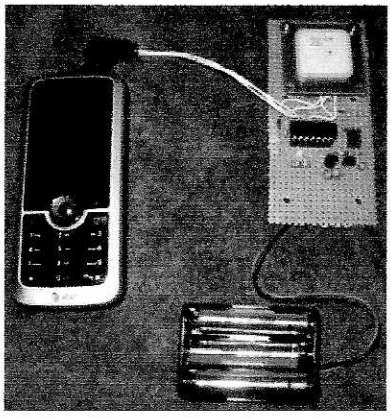


Figure 2.1: Open GPS Tracker connected with GPS

The Open GPS Tracker is a small device which plugs into a prepaid mobile phone to make a GPS tracker. The Tracker responds to text message commands, detects motion, and sends the current exact position, this project are ready for Google Maps or mapping software. The Tracker firmware is open source and user-customizable.

This project status is Current build is 0.19B assembled 01/09/2009 this project has a dedicated car security mode with alarm inputs, remote starter disable, remote unlock, and remote horn/lights. This project also includes detailed text alerting in remote I/O mode, and automatic power on/reset of the GC864 module. This project use c168 mobile phone as a GSM modem where the purpose is to send the data to user mobile phone. This project is provided at http://www.opengpstracker.org

2.0.3 Third literature review - Teltonika AT command manual

This document describes the messages exchanged between an external application and the N701 mobile station based on AT commands in order to control incoming / outgoing calls, SMS administration, mobile station behavior and GPRS connections.

2.0.4 Fourth literature review: SMS transceiver for PIC (SMST4PIC)

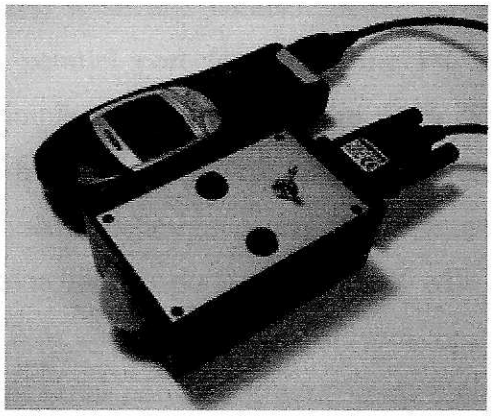


Figure 2.2:SMST4PIC Version 5 with a over serial line connected mobile phone

SMS Transceiver for PIC (SMST4PIC) is a tool for sending SMS via a RS232 serial connection between a PIC and a mobile phone. It establishes on the basis of a serial line connection a AT command based communication for sending SMS and SMS-based e-Mails. This partition of SMS Transceiver is a demonstration for sending SMS via mobile phone triggered manually or by a motion detector. In addition to the sending of SMS a

detected motion generates also a 440 Hz audio frequency output for e.g. a warlike talkie. This implementation of SMS4PIC could be used quite well as an alarm system. SMST4PIC is tested with many different mobile phones in many different GSM networks. SMST4PIC use a scandalized AT interface for communication with the mobile phone. The result is that it will work with nearly all available GSM phones.

2.0.5 Fifth literature review - Using SMS in Mobile Phone for Home Appliances Controlling Through PC Parallel Port Interfacing

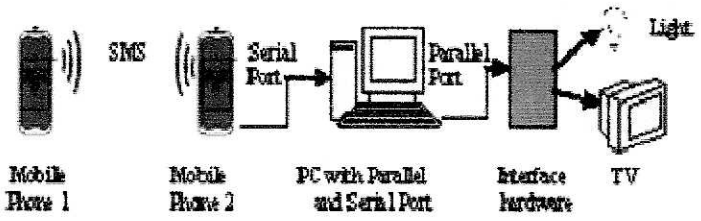


Figure 2.3: PC remote control system

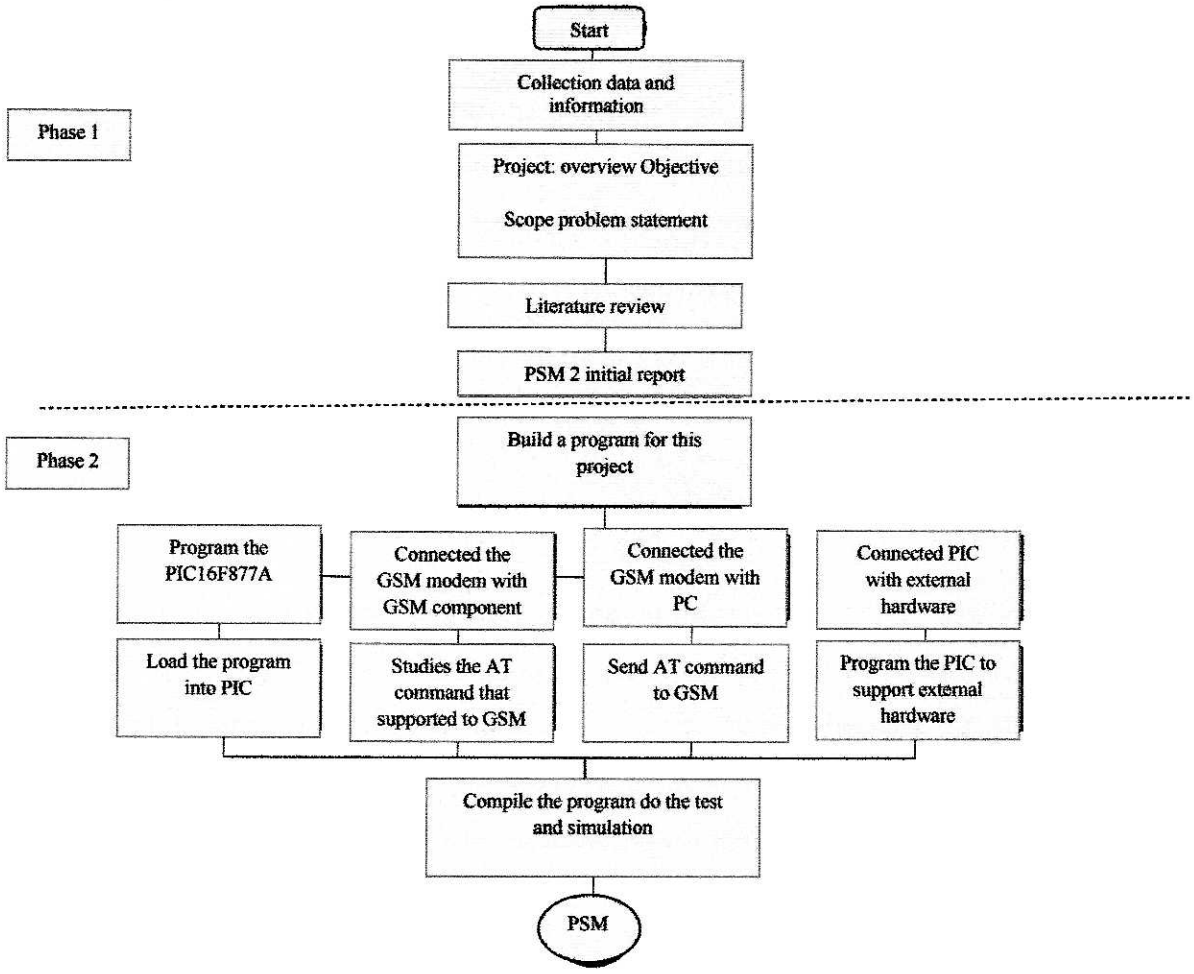
This project are designed and published by Fadhil T. Aula of University of Salahaddin, College of Engineering, Electrical Engineering Department Erbil, Iraq. This paper presents a system of the PC remote Controlling with the Mobile Telephone through accessing the main PC ports; serial and parallel. Serial 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.

CHAPTER 3

MATERIAL & METHOD

All relevant experimental, descriptive, theoretical and analytical techniques used in the project are outlined, such that the study could be repeated by another researcher. The sentences are in past tense and passive voice. Reference of methods to other researchers should be made where appropriate.

3.0 Method to success the project



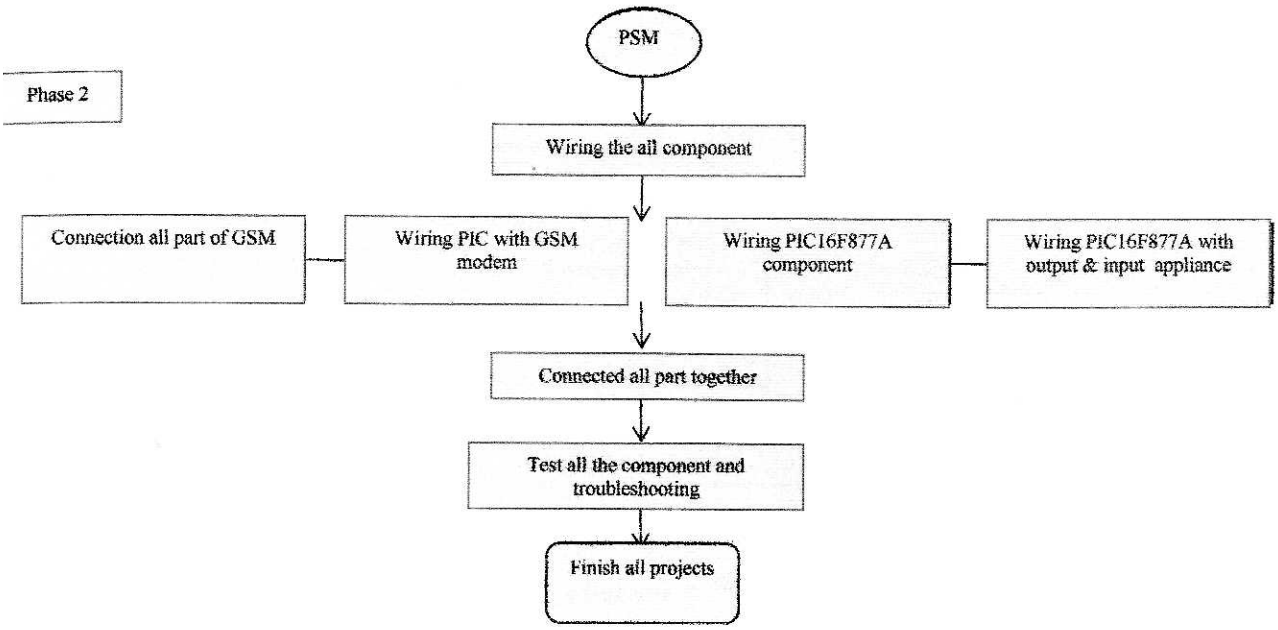


Chart 1

3.0.1 Project implementation

To be succeeding of this project there have a 3 phase work that need to do. Where in phase 1 is all about the information collection, data collection and documentation. In Phase 2 the software build will be started and simulation test will be done. In Phase 3 this project will go through hardware build and software integrated with hardware and testing and troubleshooting the project. The work flow chart is show is like chart1.

3.0.2 Phase 1 component

In this phase this project will started with an information gating. The information that initially collected is the information is related with the GSM information and functional, AT command functional, the statistic of fire tragedy because the short circuit from home apparatus. The second information of this project is about to gating the literature review that will relate with this project. The literature that has been search must relate with a project and if the literature review is not related, then the new literature review is searching. In the end of this project Phase 1 will overcome with a project proposal. The flow cart of phase 1 work will show in chart 2.

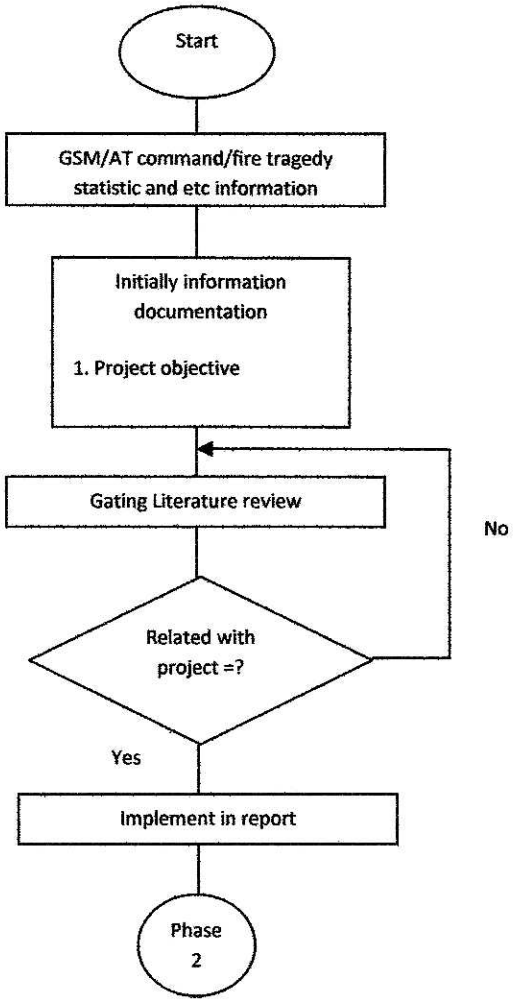


Chart 2

3.0.3 Phase 2 component

In phase 2 of this project will concentrate with software build and simulation test. This Project is included several programs, where the programs are:-

i. PIC16F877A – use a MikroC v8 as compiler and Proteus 7 Lite as a Simulator.

ii. GSM modem – Hyper terminal & communication terminal

After all programming will be success, this Phase 2 section will continue with a do simulation to all software that has been created. If the simulation is failure the program that in the sequence must be changes until the all simulation of the sequence will be succeed. The flow cart of phase 2 work will show in chart 3