



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

POWER METER READING OF LOAD CONTROL USING GSM

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor of Engineering Technology
(Industrial Electronics) (Hons.)

by

SITI NUR HIDAYAH BINTI PARSIH

B071310295

910706-01-6286

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BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

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FELDA Ulu Penggeli,

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DECLARATION

This Final Year Project Report dedicates:

To my parents who inspired me to higher ideals of life, for their sacrifices, for their prayers, and for their endless patience and they are “Heaven on Earth”.

To my supervisor En. Hasrul Nisham Bin Rosly and other lectures, for their guidance throughout in the implement of the Power Meter Reading of Load Control Using GSM project.

To all my friends and classmates, for their support and giving are brilliant ideas when solving problems.

Signature :

Author's Name : SITI NUR HIDAYAH BINTI PARSIH

Date : 25 Disember 2016

APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Industrial Electronic) with Honours. The member of the supervisory is as follow:

.....
(EN. HASRUL NISHAM BIN ROSLY)

ABSTRAK

Report ini adalah hasil daripada kajian pembinaan “Power Meter Reading of Load Control Using GSM”. Tujuan penghasilan projek ini adalah untuk penambahbaikan perkhidmatan tenaga elektrik berdasarkan masalah-masalah yang dihadapi oleh pengguna. Kelebihan projek ini adalah, pengguna dapat mengawal peralatan elektrik dirumah dengan menggunakan telefon bimbit, mengetahui status peralatan elektrik samada dalam keadaan hidup atau mati dengan menghantar SMS menggunakan arahan tertentu. Selain itu, pengguna dapat mengetahui jumlah tenaga elektrik yang telah digunakan dan kos bil elektrik bulanan yang perlu dibayar. Di samping itu, penghasilan “Power Meter Reading of Load Control Using GSM” telah menggunakan teknologi Arduino dan GSM untuk mengawal peralatan elektrik, memaparkan dan memberi bacaan meter tenaga elektrik dan kos kepada pengguna.

ABSTRACT

This report is the result from the development of "Power Meter Reading of Load Control Using GSM". The purpose of the production of this project is to electricity service improvement based on problems in faced by the user. The advantages of the project, users can control electrical appliances at home by using a cell phone, knowing the status of the electrical equipment condition in on or off by sending SMS using specific direction. In addition, users can determine the amount of electricity used and the cost of the monthly electricity bills to be paid. In addition, the development of the "Power Meter Reading of Load Control Using GSM" have been using Arduino and GSM technology to control electrical appliances, display and give meter readings and the cost of electricity to consumers.

DEDICATION

This Final Year Project Report dedicates:

To my parents who inspired me to higher ideals of life, for their sacrifices, for their prayers, and for their endless patience and they are “Heaven on Earth”.

To my supervisor En. Hasrul Nisham Bin Rosly and other lectures, for their guidance throughout in the implement of the Power Meter Reading of Load Control Using GSM project.

To all my friends, for their support and giving are brilliant ideas when solving problems.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

kWh	-	kilowatt-hours
AC	-	Alternating Current
DC	-	Direct Current
SIM	-	Subscriber Identity Module
Tx	-	Transmitter
Rx	-	Receiver
GSM	-	Global Communication of Mobile
RTC	-	Real Time Clock
Gnd	-	Ground

CHAPTER 1

INTRODUCTION

1.0 Background

The electricity is a very important in daily life; it had become priority and necessities, this is because the electricity it is versatile and controlled easily. Electricity is considered a very efficient way of energy consumption in part because it is light as well as easy to distribute and do not contribute the environmental pollution. Besides that, this source is used without creating the loss, without creating pollution and safe to be used by consumers. The electrical power meter is an important component in electric energy service to giving the information or data about the amount of energy in (kWh) that had in use for per month. Electricity systems in Malaysia, there are several weaknesses and cause problems to the user and need to improvement. The purpose for this project is to solve the problem of consumer power meter. This project is to facilitate user knows the meter readings and their electricity cost either for monthly and currently. Furthermore, it can avoid electricity wastage and then can reduce the electricity cost. This project will use are few lamp as a prototype. To use this project consumers can control any device electronic for example lamp, fan or etc. via SMS whether to in on or off. By using SMS, consumer can find out load status whether it is in on or off condition. Finally, consumer can find out the meter readings and electricity cost for monthly and currently by using SMS and they also can analyze the energy consumption and electricity cost.

1.1 Problem Statement

There are a lot of problem regarding the energy electric meter in the houses consumers. Therefore, the main idea to produce this project is based on the problem faced by Tenaga Nasional Berhad (TNB's) customer, because to read of the meter reading for electricity consumption and billing is implemented by human from house to house and building to building [1]. A few consumers had a problem late to obtain monthly electricity bill and have complained about reading inaccurate of the electric meter [2]. An inaccurate reading occurs because of the sometimes the house electric power meter is placed in a location where it is difficult to accessible. In addition, there is a lot of consumers does not receive their electricity bill receipt caused the receipt lose before those they accept and also the receipt suffer damage because affected rain. The other problem view, certain electric consumer forget or careless to the turn switch off the electric equipment after use and this is cause their electricity bill is raising up per-month [3] [4].

1.2 Objectives

This project has a several objectives and ensures the objectives are achieved:

- a. To apply the concept of GSM and its application in the electricity meter.
- b. To simulate and develop Arduino application in order to receive and transmit a message through GSM.
- c. To design and develop a prototype of the new meter reader.

1.4 Project Outline.

The provision for entire project report consists of several parts to understand the whole of the application system the project that is produced.

CHAPTER 1:

The introduction chapter is brief about an idea of the project and will cover the overview of the project. This chapter will cover several important parts are the synopsis for project, problem statement, objectives, and scope of a project.

CHAPTER 2:

This chapter will explain the literature review regarding and related to the project. The chapter is divided into two parts, first part research about the previous project have related with the project and second part regarding the component and hardware will using for the application system of the project.

CHAPTER 3:

This chapter will brief all the methodology and implementation of projects to ensure all of the objectives are achieved. The technical parts will explain in this chapter.

CHAPTER 4:

This chapter is describing the result and analyze of this project. The result is based on the problem statement to ensure that the problems encountered can be solved or not. The analysis is based on the obtained result.

CHAPTER 5:

This is a conclusion or summary for the overall of the implementation project, this will conclude the all of objectives is achieved or not. This chapter is also giving the recommendation to improvement for future.

CHAPTER 2

LITERATURE REVIEW

2.0 Overview

This chapter will brief the literature review and divided into two parts, there are about the previous project where has related with the project will implement and about the hardware or component that will use to development the project. The sources to find the literature review are from books, journals, and the website.

2.1 Research of the Previous Project

The electricity is a need in daily life because all of the electronics devices need a power supply for function. Effect of the electrical energy usage can cause some problems of users because every of total energy that is used need to do payments. The common problems that often arise are on the electricity payment bill receipt and also electrical energy usage wastage. Thus, since the past few years more, the inventor or designer endeavored to solve the problem that is existing by creating an application system that is technology and analyzes to solve the problems.

The previous project from Kumar.D,Jain.A& Kedia.J (2012) proposed the “Design and Development of GSM based Energy Meter”, by using microcontroller AT89S52 types and GSM to control the application system. The power of energy measuring module is operations in the form of the pulse, and where it is will count continuously according to loads connected. The features of these systems are the

microcontroller will send the information reading of energy meter consumers to energy Provider Company. Then, the company will send the notification billing per-months either by emails and post to the customer's address. The customers can pay the bills through net-banking. The others feature is if the customers fail to make payments, the company will send notification information through by SMS message and the power will an automatic cut off until the customer paid the payment of bills and will reconnect.

Next, Prof.Modi.J(2012) developed “GSM Based Meter Reading and Control System” that utilized the microcontroller ATMEGA68 to control systems and using the visual studio 2015 software to developed the GUI of electronics billing the information's. The features of the application systems are, the customers will receive the SMS notification from the energy meter regarding of total usage of energy meters for per-day. The data information will store until the end month, and then the server system will calculate total billing for energy meters and will send the billing by using SMS message and emails.

Apart from that, Adnan Rashid (2012) was present the research about “Remote Energy Monitoring, Profiling, and Control through GSM Network”. The electric energy company will monitoring system by install a digital energy meter in customer houses to enabling company take reading of energy meters by using GSM system, of which the company will send text SMS to energy meter reading customers and then will receive SMS text regarding the amount of energy that has been used by they to every month. An energy monitoring system is using to monitoring all of the data receivers by SMS and then calculate the bills of electricity consumers. This system is a simple project to reducing the employee and solving problems of with the electricity bills.

Another previous project if from Prof.Dr.Satheymoorthy(2013) was the design of “Smart Energy Meter Load Control” by using a microcontroller and GSM for developing the system. This application has simple features, where the customer can get the details reading of energy power meter that was used in any times. This