

Monthly Electricity Billing System Using Microcontroller

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ABSTRACT

The main purpose of this paper is to measure the monthly electricity bill as well as consumed electricity in units "Monthly Electricity Billing System Using Microcontroller". The people need not to be worry about their electricity bill. The people need not to be worry about bill tampering. The main advantage of this project is to save the time of user as well as MSEB. This system also helps to reduce the paper work.

KEYWORDS: GSM, Meter reading system, Microcontroller.

INTRODUCTION: As we know there are many problems in distribution of billing process of particular customer using paper format. Also we have to face the problem to give a special employees for meter reading of particular customer's home meter. This process takes lot of time and wastage of money of that employee as well as increase the man efforts. Hence this system is helps to reduce to face these all problems by sending the bill sms to customer's mobile. The project provides a system that allows for consumed electricity reading in units as well as the amount charged over it to the user. Our system provides the electricity readings on an LCD screen as well as can sms this reading and cost in rupees to the user. This lets the user know about his exact electricity units consumed and cost directly from his meter so that there is no chance of bill tampering. The project allows a two way reading. One on LCD display and the second on sms. Our project consists of a GSM modem connected to a microcontroller of 8051 family. The system continuously monitors electrical pulses and calculates the unit consumption. The system then uses the cost of each unit to calculate the electricity cost. It then sends all this data to user and electric company via SMS and also displays it on an LCD screen for viewing. The system can be further enhanced to receive user messages and control load operations.

PROBLEM IDENTIFIED: There are number of limitations related to meter reading as well as billing system and there are :

- Increase the manpower for meter reading in parallel with increase of new housing.
- Time and labour consuming.
- Human error while taking the energy meter readings.

LITERATURE REVIEW: In this paper a new idea of billing system which is different from previous billing system. In previous billing system there was method of on paper billing system which consume lot of time as well as manpower. At the time of paper billing system there were number of different works like printing paper as well as distribute these all billing papers at every consumer home. So these will be requirement of number of employee of MSEB. That's why we are implementing this system of Monthly Electricity Billing System Using Microcontroller. In this system we can improve all the drawbacks of previous billing system. By using these system we can directly send the billing sms as well as consumed units of electricity sms to the customers mobile with the help of GSM module. So this system reduce the paper work. This system also reduce the manpower because there is no need to go at every customer's home and take photo of energy meter. So this will result in to reduce wastage of money. There is no chance of tampering of bill so this will mainly help to customer to observe timely electricity bill using this system.

PROJECT ANALYSIS: This system consist of so many components like Power Supply, Microcontroller, LCD Display, Energy meter,GModule,RS232,Load,Keil u-vision 4 software etc.

Block Diagram:

- Energy meter is use to calculate how much units of electricity are used.
- We will check this system by connecting the bulb as a load.
- After that, when load is ON then energy meter generates pulses which are given by optocoupler to microcontroller.
- The microcontroller sends the bill information to customer mobile in form of SMS though the GSM modem.
- LCD Display is used to display amount of electricity bill and units of electricity used in a month.

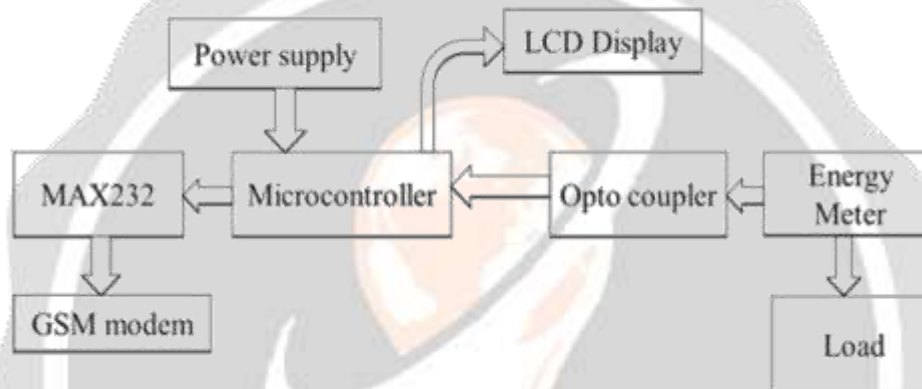


Fig1.Block Diagram of Monthly Electricity Billing System



Fig2.Mobile Section

Discription of all above mentioned components:

Power Supply:This system require 5v DC supply,which is converted from 230v AC supply by using Stepdown transformer.Also 7805 Ic used for accurate DC supply of 5v.The most important point is that we designed power supply with the help of bridge rectifier.

Microcontroller:In this system we have used 40 pin microcontroller named as AT89C51.Microcontroller is the main unit of this system.The input to the microcontroller is given by energy meter through optocoupler.Microcontroller will convert this input in proper format of bill as well as units and send it to GSM module through RS232 module.The microcontroller also operate on 5v DC.

LCD Display: In this system we have used 16x2 LCD Display.The electricity bill as well as consumed units are displayed on this display.This display also works on 5v supply.the input to this display is given by microcontroller.

Energy Meter: The main purpose to use the energy meter to measure the electricity bill as well as consumed units of electricity.

GSM Module: Mainly the GSM module is used to send the sms of electricity bill and consumed units of electricity. we have used SIM800D module.

RS232:RS232 is used for serial communication between microcontroller and GSM module.

Load: Load is used for demonstration purpose.

Keil uvision4 Software: This software is used for programming purpose.

System Workflow:

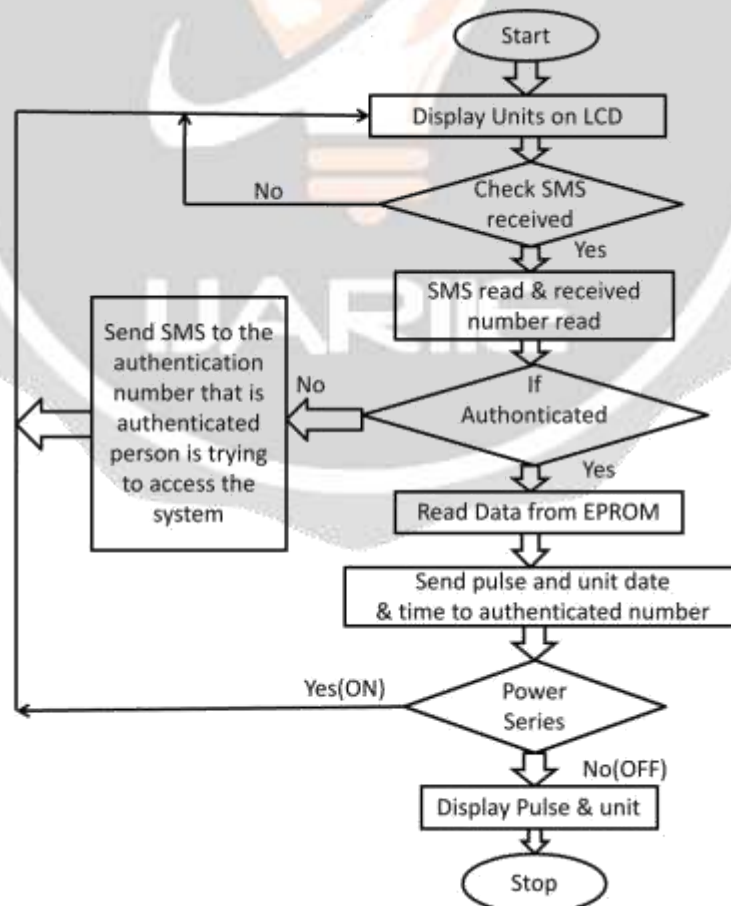


Fig3.System Workflow

General description: In this system the backbone of whole system is Microcontroller. This microcontroller working on 5v DC supply. It is 40 pin IC. It is having 4 input/output port. In this system the LCD display, GSM module, Energy Meter are interfaced with microcontroller. In this system LCD display is interfaced with microcontroller through port2 pins. Also energy meter is interfaced with microcontroller through pin3.2 and GSM module is interfaced with microcontroller

through RS232. The serial communication between microcontroller and GSM module is done through RS232 module.

Features: The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4 Kbytes of Flash Programmable and Erasable Read Only Memory (EEPROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard MCS-51 instruction set and pin-out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

Applications: This system is applicable at our home, college, number of different types of industries, etc.

Result & Discussion:

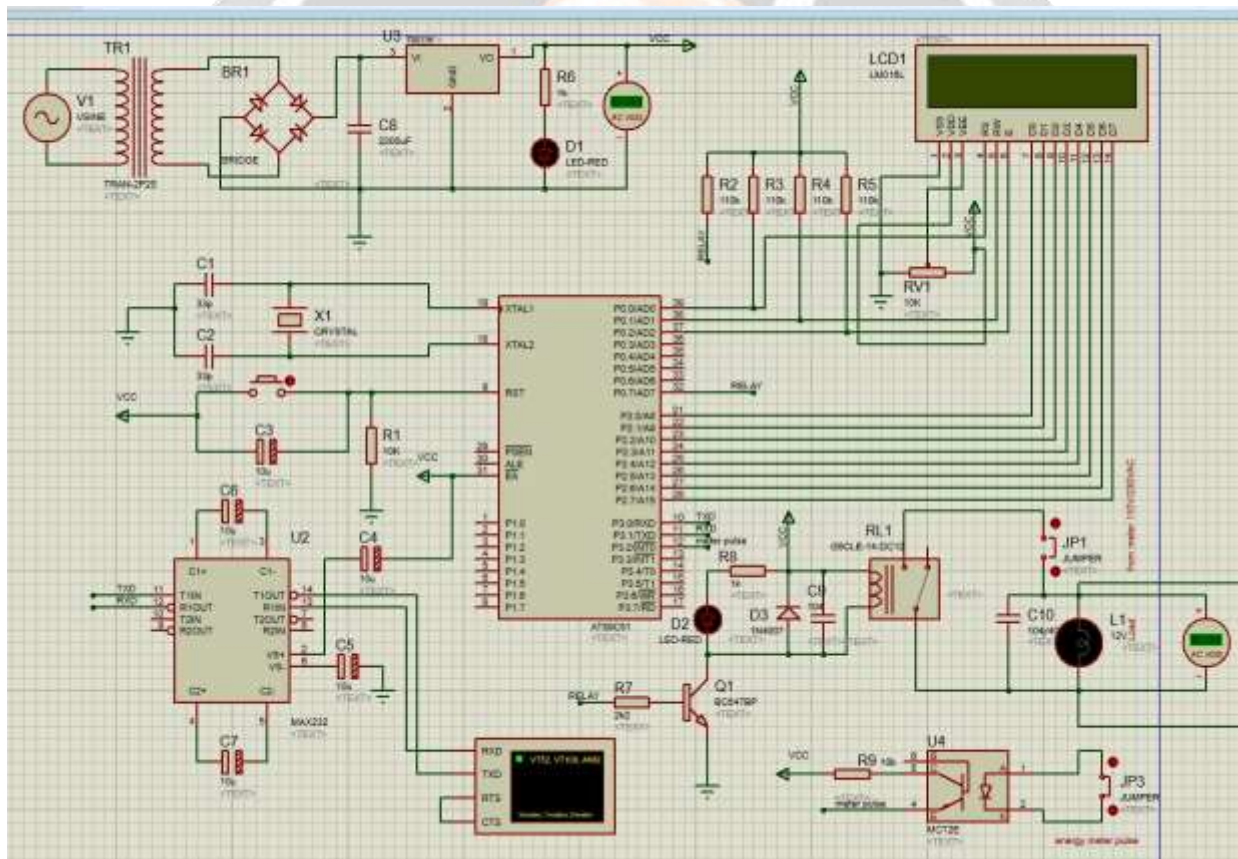


Fig4.Simulation diagram

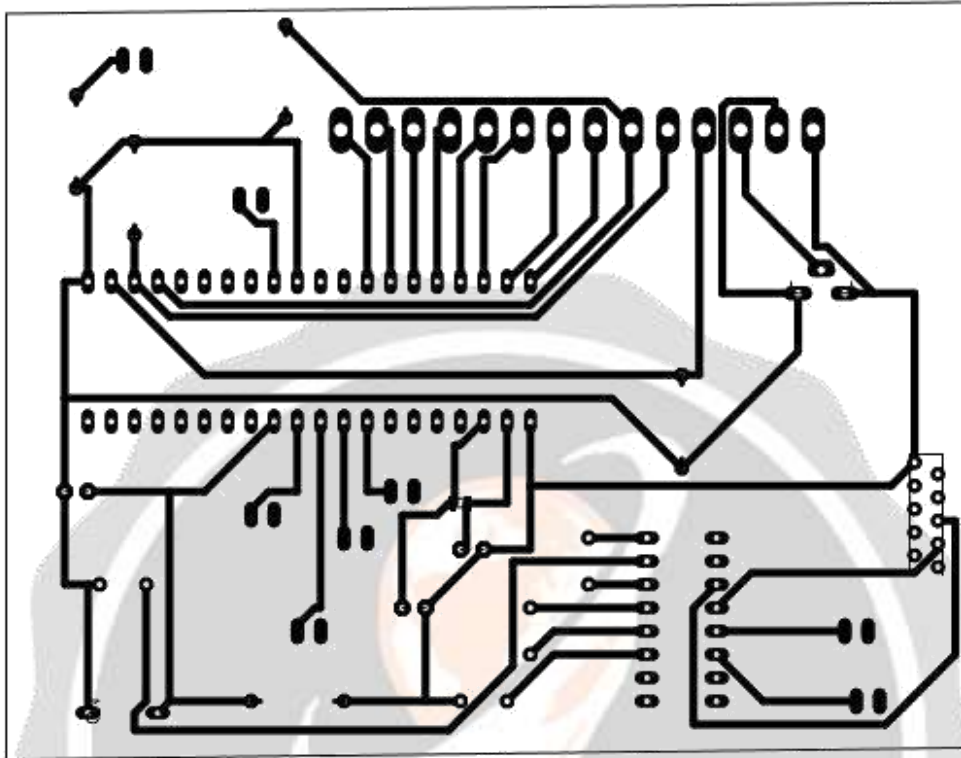


Fig5.PCB Layout

Conclusion: In this system monthly electricity billing system has been developed. The use of GSM module provide lot of advantages over the previously used billing method. This system is mainly applicable at home as well as MSEB.

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