Automated EB Bill Control Measurement with Automated Power Disconnection

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Abstract: **The design presents a latest methodology for avoiding the maintenance costs and high construction in the existing indicator sense technology. Apart the use of wireless meter reading with network technologies has become need of the day. The designed system avoids the man involvement in Power Management. The online banking use to credit the amount in user or consumer account in time, if couldn't, the power connection may be disconnected automatically from the remote server. It displays the equivalent amount and reading information on LCD and data is sent to the server through the GSM Module. The PIC based hardware system consists of a processor core board and the peripheral board. The entire user interface design for microcontroller operation is based on Embedded C Language. This system provides capable meter reading, avoiding the billing mistake and reduces the protection charge. Online banking service is used to automatically debit the bill amount in user bank account this paper also addresses compensations of implementing the GSM communiqué module and design detail and discusses the forward-looking security of the data communications.**

Key words: **Wireless meter reading, GSM, PIC16F877AMicrocontroller.**

I.   INTRODUCTION

The microcontrollers use to developments in the Wireless communication technology, there are many improvements in automating industrial aspects for reducing manual efforts. The usual manual Meter Reading was not suitable for longer operating purposes as it spends much man and material source. It brings extra problems in estimate of readings and billing manually. Now-a-days the number of Electricity customers is increasing in huge extent. It became a hard task in management and maintaining the power as per the rising requirements. Presently maintenance of the power is also an important job as the human operator goes to the customer house and produces the bill as per the meter reading. If the customer is not available, the billing process will be awaiting and man operator again needs to revisit.

Going to each and every customer residence and generating the bill is a difficult task and requires more time. It becomes very difficult especially in rainy season. If any consumer did not pay the bill amount, the worker needs to go to their house to cut off the power supply. These processes are time consuming and not easy to handle. Moreover, the manual operator cannot find the not allowable connections or malpractices carried out by the consumer to reduce the meter reading the man error can open an opportunity for corruption done by the man meter reader. So the difficulty which arises in the billing way can become incorrect and inefficient.

The wireless communication media has made the transfer of information quick, secured and correct. The digital performance caused the rapid consumption of devices such as computers and telecommunication devices. Communication media like the internet, GSM networks, etc exists everywhere. Wireless meter reading puts more control into the hands of both utilities and consumers by giving them more complete information about power consumption.

II.   EXISTING SYSTEM

Step down transformer is use to allows better regulate power supply. So, remote wireless meter reading system and management kinds of network technologies has become a trend now. In the work presented here, a technique has been developed to read power meter readings from a remote server automatically using the existing GSM technology for cellular phones.

This technique can be used for gas or water meters as well. The meters transfer the power measurement like kilo-watt-hour (kWh). by SMS to a main server. The online banking option use to debit the amount in user bank

account automatically and the user account balance is low buzzer and LED are use to indicate or alert the user in particular time after relay is use to disconnect the power supply and user pay the bill after connect the power supply.

The central server then stores the data in database for analysis and sends the bill to the consumer mobile phone. The SMS based data set can be done v rapidly and efficiently. Data can be collected after any desired time period such as hourly, daily, weekly, or monthly basis. As there is no man intervention in the entire process, there is no chance of man error and corruption. In the extremely bad weather like a raining is conditions man is not work the condition so the system will not hamper on collecting data as long as GSM networks are steady. The development cost of the SMS based remote power meter will be larger than conventional meter but the electric supplier revenue will increase in the successive months because it will eliminate the possibility of corruption done by the customer or as of a reader. Remote meter can be used in housing apartment and particularly in industrial customer where bulk energy is consumed.

III.   PROPOSED SYSTEM

In below block diagram is the wireless meter reading system is show in figure.1. The power supplies the step down transformer use to covert 230V into +5v phase shift DC current and bridge rectifier and regulator use to convert pure DC   and its connect to the PIC16F877A microcontroller relay and energy meter are connect to the microcontroller and the energy meter is measure the reading and microcontroller use.
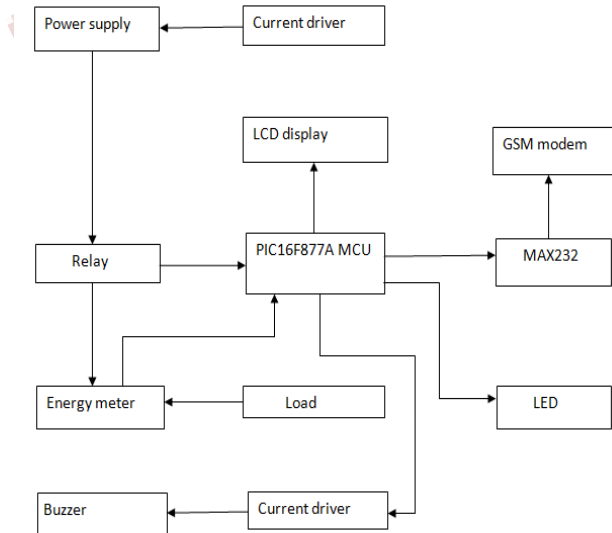

Figure 1: Block diagram of proposed system

To count the values and Buzzer and LED are use is alerting purpose and MCU is connect to the MAX232 IC (RS-232 driver) its transfer the data from microcontroller to the

GSM modem RS-232 cables is connect the MAX-232 IC and GSM modem. GSM modem transfer the information to the EB station and PC use to collect the data and online banking service use to automatically debit the amount in user account and bill details send to user mobile phone ,no balance in user account Buzzer and LED are use to alert the user and LED billing continually

IV.   FLOW CHART
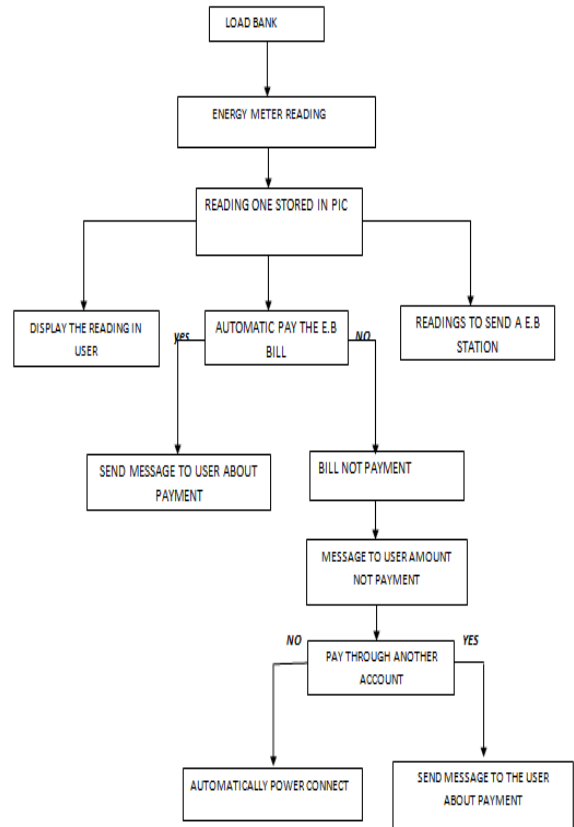
V.   SYSTEM HARDWARE

 The basic hardware components are used in the project the hardware show in figure.2

Figure

1)   PIC16F877A microcontroller
2)   Energy meter

3) GSM modem
4) RS-232 driver
5) Power supply
6) Load
7) PC (online banking)
8) Mobile phone

1) PIC16F877A microcontroller

PIC microcontroller operating frequency is DC-MHz and 15 interrupts, the microcontroller five I/O (input/output) ports are present three timers and parallel communications, most of the pins are used to connect to I/O devices, five I/O port take 33 pins

2) ENERGY METER

Electro meter module is composed of ADE7757 which is power metering IC with integrated oscillator and load and which produces the continues signal can be converted into descried signal and that digital signal in the form of pulses and ADE7757 outputs average real power details [11] based on the load. These outputs are interfaced with the LPC2148. One of the feature in ADE7757 to enhance the ability of this work is having a power supply display circuit on the VDD supply pin of the ADE7757. Due to this, proper machine process [6] is achieved at power rise and power losing modes. High degree of immunity to false triggering from noisy provisions is attained due to built in hysteresis and filtering operations in power supply monitor of the ADE7757.

3) GSM MODEM

A GSM Modem is a specialized type of modem which accepts a SIM card and operates over a subscription to a mobile operator, just like a mobile phone.

When A GSM modem is connected to a PC, this allows the computer to use the GSM modem to communicate over the mobile network.

While these GSM modems are most regularly used to give mobile internet connectivity many of them can also be used for transfer and receiving SMS and mms messagesThe GSM network conformed the identity of the subscriber through the use of a challenge-response mechanism. A 128-bit random number (RAND) is sent to the MS.

The Mobile station computes the 32-bit signed reaction (SRES) based on the encryption of the random number (RAND) with the verification algorithm using the particular subscriber verification key (Ki). Upon receiving the signed response (SRES) from the user, the GSM network repeats the estimate to verify the identity of the user.

Note that the individual user confirmation key (Ki) is never transmitted over the radio channel. It is present in the user SIM, as well as the AUC, HLR, and VLR databases as before described. If the received SRES agrees with the calculated value, the MS has been successfully verified and may carry on. If the values do not match, the connection is terminated and an verification failure indicated to the Mobile station.

The result of the signed response is processed within the SIM. This provides better security, because the confidential user data such as the IMSI or the particular user verification key (Ki) is never released from the SIM during the verification process.

4) RS-232 driver

When a MAX232 IC receives a transistor to transistor logic level to convert, it changes a Transistor to transistor logic 0 to between +3V and +15 V, and changes Transistor to transistor logic 1 to between -3 to -15 V, and vice versa for converting from TIA-232 to TTL. This can be mystifying when you understand that the TIA-232 data transmission voltages at a sure logic state are differing from the TIA-232 control line voltages at the same logic state.

To clarify the topic, see the table lower. For more information, see RS-232 voltage levels The MAX232 (A) has two receivers that convert from RS-232 to Transistor to transistor logic voltage levels, and two drivers that convert from TTL logic to RS-232V levels. As a end result, only two out of every RS-232 signals can be converted in each way. Typically, the first driver/receiver pair of the MAX232 is used for broadcast and receives signals, and the next one for CTS and RTS signals.

There are not enough drivers/receivers in the MAX232 to also attach the DTR, DSR, and DCD signals. Usually, these signals can be misplaced when, for example, communicating with a Personal computers serial interface. If the DTE really requires these signals, either a next MAX232 is required, or some other Integrated circuit from the MAX232 family can be used. Also, it is possible to connect DTR female pin (DE-9 pin) directly to DSR (DE-9 pin) without going through any circuitry, which provides an automatic (brain-dead) DSR reception of the incoming DTR signal.

5) LCD DISPLAY

If an 8-bit data bus is used the LCD will require 11 lines (3 control lines and the 8 lines for the input lines). The three control lines are referred to as EN,RS, and RWEN-Enable(use to tell the LCD the you are sending it data)RS-Resister select(when RS is low(0), data is treat as a command) (when RS is high(1), data being transfer is text data)R/W-Read/Write (when RW is low(0), the data written to the LCD) (when RW is high(1), the data analysis to the LCD)

6) RELAY

A relay is an electrically operated switch. Many relay use an electromagnet to automatically operate the switch, but other operating principles are also used, such as solid

Relay are used were it is necessary to control circuit by a low-power signal.Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload

7) POWER SUPPLY

Step down transformer use to convert the +230V convert into +5v and bridge rectifier use to AC convert into phase shift DC and regulator 7805 use to convert pure DC,
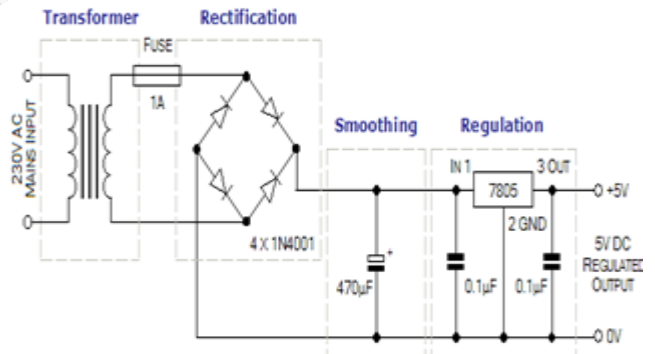

Figure 3: Regulated Power Supply

VI. ONLINE BANKING

Create the new online account in the user or add the older user account in EB station list and online banking service is use to automatically debit the EB bill amount in user account

VII.   CONCLUSION

In the present work wireless meter reading system is designed to continuously monitor the meter reading and to shut down the power supply remotely whenever the consumer fails to pay the bill. It avoids the human intervention, provides efficient meter reading, avoid the billing error and reduce the maintenance cost. It displays the corresponding information on LCD for user notification.

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