Talking Energy Meter

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Abstract

GSM primarily based post-paid Talking Energy meter could be another start inside the development of intensity usage remotely on irregular reason and disturbing customer concerning power use, over-troubling and treating through sound sign. This methodology of development and data assortment discards the regular strategy of taking the meter examining physically. The Talking Energy Meter show and sounds the proportion of electrical units ate up by the customer moreover as caution at the stack centre in any case around the opposite viewpoint, there's crushing found the opportunity to develop a structure which can transmit the units ate up by the individual customer to the workplace Utility Company (PUC). During this paper style of GSM on a very basic level based post-paid Talking Energy Meter is given which can} have the alternative to pass on reinforced GSM sort out; for the straightforwardness between the customer and thusly the PUC. The GSM in a general sense based post-paid Talking Energy Meter (GPTEM) consolidate an essentialness meter related with the great microcontroller, a show device, A sound module, GSM electronic equipment and an ideal PC code to get, transmit and keep up the record of the power usage data on a particulariser.

I. Introduction

Watt hour meter or vitality meter is an instrument that estimates amount of intensity used by the retailers. Utilities ought to introduce these instruments at each spot place like private, business associations to charge the power utilization by hundreds like light sources, air sources and other elective gear. Most captivating kind square measure utilized as paid power meters; be that as it may, we tend to square quantify exemplify a few offices and made a GSM essentially based paid Talking Energy Meter (GPTEM). The essential unit of intensity is watt. On the off chance that we tend to utilize a power unit in 60 minutes, it is an idea of commonly unit of vitality expended. These meters live the quick voltage and current figure its item and give quick power. This power is incorporated over the sum which supplies the vitality used over that sum. These are the single or 3 area meter relying on the accessibility used by private or business purposes. For any minor assistance estimations like local customers, these are straightforwardly associated among line and load. but some bigger hundreds, except for greater hundreds, advance down current transformers should be set to confine essentialness meters from higher streams.

GSM basically based paid Talking Energy Meter (GPTEM) expect a noteworthy activity to deal with the over referenced issues. to achieve judicious meter per utilizing undertakings.

- Minimize charge questions and operational worth.
- Facilitate weakened client.
- GPTEM is a gainful suggests that of information assortment that permit liberal saving through reduction of meter re-read.
- Larger information accuracy.
- Improved charge and client organizations.
- More helpful imperativeness profiles
- Additional helpful for client with occupied way.
- Extremely assistance to physically debilitate people.
- Higher preparing of human asset.

GSM in a general sense based paid Talking Energy Meter (GPTEM) maintained GSM arrange is given during this paper takes favorable circumstances of out there. GSM system the country over consideration inside the country and moreover the SMS cell broadcasting feature to request and recuperate solitary homes and building power use meter scrutinizing back to the workplace Utility Company (PUC) remotely. The Audio Module of this Automatic Meter Reading (AMR) structure alerts the client through sound sign with respect to control use, bill due dates, meter over-troubling just as meter treating. This part supports in advised the client having involved schedule and conjointly to physically debilitated individuals.

II. Talking Energy Meter

The structure of the GSM based Talking Energy Meter is an assortment of a one stage, IEC61036 standard consistence advanced kWh control meter, 8-piece Microcontroller, GSM Modem with RS-232 correspondence interface, Audio Module APR-9600, EEPROM, Current, Pulse and Temper sensors and Relay module. The GSM based Talking Energy Meter (GTEM) is utilized for the estimation of the power devoured drawn from the PUC substation to the customer unit in kWh unit. A Static Single-Phase Watt Hour Meter from is picked for Talking Energy Meter usage. The computerized power meter was set to show six digits with one decimal point perusing in kWh unit and a meter steady of 800 drive for each KWh. The computerized power meter has as opto couple intended to couple the motivation check to any outer hardware without direct contact to the advanced power meter hardware.

- 8-bit Microcontroller from ATMEL partnership - AT89S52 is utilized to control and process every fundamental square of this framework.
- 16*2 LCD is utilized to show the data structure microcontroller.
- GSM modem is interfaced to microcontroller through RS-232 standard utilizing MAX-232 IC.
- Predefined Audio Warning and Alert sign are put away in memory of sound module APR9600.
- The PUC can disengage any client remotely and in a split second with assistance of hand-off module. Current and Pulse sensors of vitality meter are interfaced with microcontroller through opto coupler.
- This gathered perusing is put away in EEPROM of framework before showing on LCD.

This memory assumes an essential job for control utilization perusing reinforcement if there should arise an occurrence of intensity disappointment. At whatever point the present sensor shows meter over-burden or temper sensor shows meter hardening, comparing message is appeared on LCD just as sent to PUC by means of GSM arrange. The perusing data of client's capacity utilization is likewise sent occasionally, at the same time or on request to PUC through GSM modem in SMS structure intermittently. The instant message is decoded by PUC server for authentic records and documentations. An instant message additionally sent to client for showing data about power utilization in KWh.

III. Components utilized:

Microcontroller AT89S52

Description:

The Microcontroller AT89S52 is a 8 piece low power, unrivalled CMOS device with 8k bytes of in structure programmable Flash memory. Generally,8-bit microcontroller is used in various control applications, for instance, speed control, position control, and any method control system. It's made by using Atmel's high thickness non-unpredictable memory development. The microcontroller AT89S52 has 4 one of a kind ports, each port having 8 data/yield lines giving total of 32 I/O pins. From these different ports we can play out various limit like we can scrutinize or make the data, interface with various devices, read the state of the sensor Most of the ports of AT89S52 have various limits.

Pin Configuration of Microcontroller AT89S52

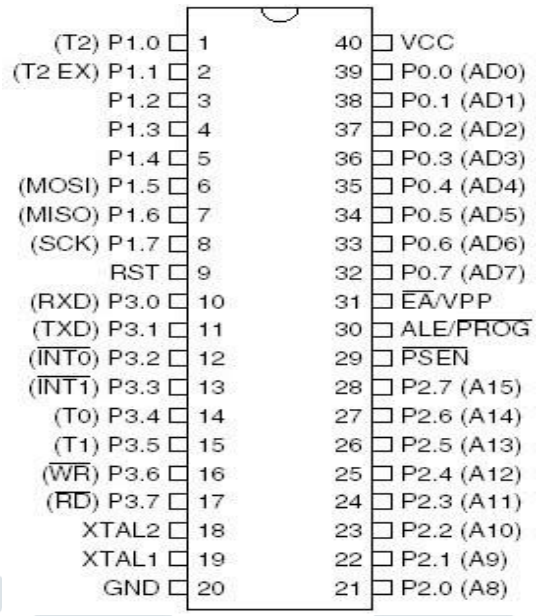

Fig:1Pin Diagram of AT89S52

Pin Description:

- Vcc-This pin is utilized for giving 5volt D.C supply.
- GND-This is control supply ground pin.
- RESET-The RESET information pin resets the 89S52
- ALE (Address Latch Enable)- ALE is utilized for de multiplexing the location and the information transport when the microcontroller is interfacing with outer memory.
- EA (External Access)- This pin is associated with either vcc or ground. at the point when this pin is Vcc or high, AT89S52 can execute programs from inside memory and if EA is low program can execute from outside memory.
- PSEN (Program store Enable)- The pin is a functioning low yield control signal. This is utilized as a read sign for perusing information from outside program memory.
- Port 0(P0.0-P0.7)- Port 0 contains 8-piece bidirectional I/O port pins. These are bit addressable. Port 0 goes about as multiplexed low request address/information transport AD7-AD0.
- Port 1(P1.0-P1.7)- Port 1 pins can be utilized as either information or yield. This port is a 8-piece semi bidirectional port, and Port1 pins are inside pulled high with repaired pull resistors.
- Port 2(P2.0-P2.7)- Port 2 is likewise a 8-piece semi bidirectional piece addressable I/O port and port pins are pulled high inside.
- Port 3(P3.0-P3.7)- Port 3 is likewise a 8-piece bi-directional piece addressable I/O port with interior draw up protections.
- XTAL1 AND XTAL2-These pins are oscillator pins to interface the gem oscillators of ostensible recurrence of 12or 11.059 MHz

Architecture of AT89S52 Microcontroller

This microcontroller IC includes standard on-chip peripherals, i.e., timekeepers, counters and UART,8k bytes on-chip software program and its memory and 256 bytes of data memory. The AT89S52 has separate area spaces for program memory and data memory with the help of balanced Harvard plan. The device has low-control static structure, which offers a wide extent of working frequencies down to zero. Two programming – selectable techniques for power decline - dormant mode and shut down mode are available. The latent mode

hardens the CPU while allowing the RAM and ROM, timekeepers, consecutive ports and meddles with structure to continue working. The shutdown mode saves the RAM substance anyway hardens the oscillators.

Accumulator (ACC) -The accumulator register (ACC)acts as an operand register. The accumulator is commonly used foe data transfer and arithmetic instructions.

Register -The B register is used during multiply and divide operations to store the second operands for multiply and divide instruction MUL AB and DIV AB respectively. After multiplication and division, a part of the result such as upper 8bits of multiplication result and remainder in case of division are stored in the B register.

Program Status Word(PSW) -This is a special function register .This register consists of the different status bits that reflect the current state of microcontroller .It contains the Carry(CY),the Auxiliary Carry(AC),the two register bank select bits(RS1 and RS0),the Overflow Flag(OV),a Parity bit(P),and two user-definable status flags.

Serial Port Data Buffer-The serial port data buffer internally consists of two independent registers such as transmit buffer and receive buffer at the same location.

Timing Registers-There are three 16-bit timing registers in 89S52.The 16-bit timer register can be accessed as their lower and upper bytes.

Timing and Control Unit-The timing and control unit generates all the necessary timing and control signals required for the internal operation of the microcontroller. This unit also generates necessary control signals ALE, PSEN, RD and WR to control the external system bus.

RAM-This block provides internal 256 bytes of RAM.

Program Address Resister-This is an on-chip EPROM and a basic circuit mechanism to internally address it.

RAM Address Register-The RAM address register is used to generate address of RAM internally.

ALU (Arithmetic and Logic Unit)-The ALU performs 8-bit arithmetic and logical operations when the operands are held at the temporary registers.

SFR (Special Function Registers)-This register bank is a set of register, which can be addressed using their respective addresses in the range of 80h to FFh.

IV. DTMF DECODER

In the DTMF decoder circuit we utilize one DTMF decoder circuit to interface the versatile unit with this task. We dial the quantity of the telephone associated with the vitality meter at that point telephone is programmed on and no we press a catch 1 or catch 2 to enter an estimation of 50 to 100 Rs in the meter. For this reason, we should require a portable interface circuit without venture. In this interface circuit we utilize one principle IC 8870. This IC 8870 decipher the dtmf beats into bcd beat. This bcd beats is additionally changed over into decimal unit with the assistance of bcd to decimal decoder circuit. For the bcd to decimal decoder circuit we use IC 74154 to decipher the bcd sign to decimal sign.

to decimal signal.

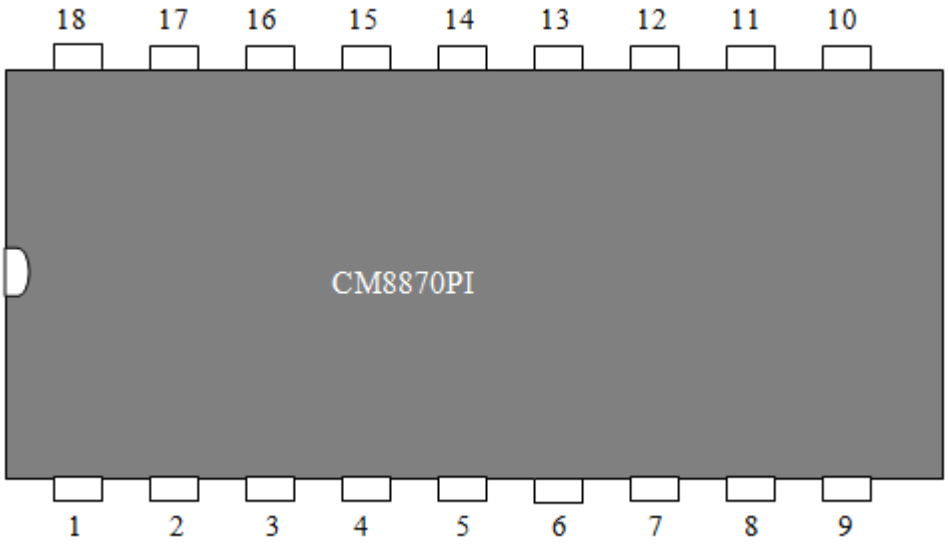

Fig.2: Pin Diagram of DTMF 8870

Features:

- Low control utilization
- Dial tone concealment
- Single 5-volt control supply
- Adjustable obtaining and discharge times
- Central office quality and execution

LCD (Liquid Crystal Display)

Diagram:

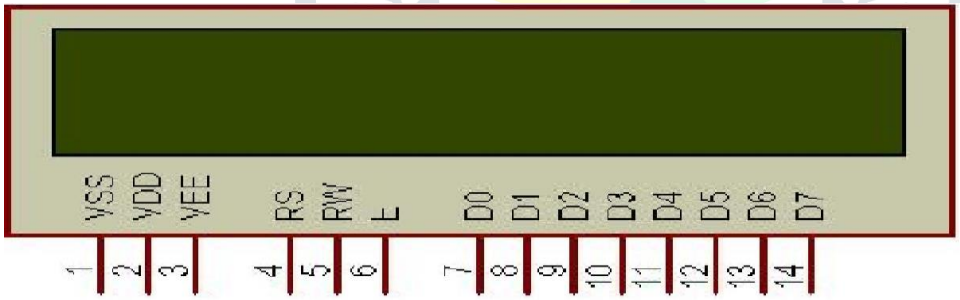

Fig.3: LCD Diagram

LCD is called fluid precious stone presentation. This is appeared in different sort contingent on arrangement. Above outline is indicated i.e 16×2 LCD .16×2 lcd implies it can show 32 characters in 16 characters in each column. It additionally shows character with ASCII esteems going from 0 to 255.It incorporates 16 pin All the pin having diverse capacity.

V. Global framework for portable (GSM SIM 900)

Overview:

GSM is called Global System for Mobile communication.it is advanced gadget which depends on cell innovation for transmitting and receiving voice and information. This GSM framework created in chime research centres in 1970. The idea of GSM was originated from cell based portable radio framework. Institutionalization bunch is known as GSM which set up in 1982 to distort a comman European cell phone standard. GSM is the immense territory in the field of media transmission standard and it is actualized in entire over the world. It works on versatile correspondence band i.e 900 MHZ and 1800 MHz.but in this venture we

are utilizing 900 MHZ.also in US for the most part utilizing 850 MHZ and 1900 MHZ.this GSM circuit exchanged partitions the each 200 KHz into 25 KHZ time – openings. It uses narrowband Time innovation for transmittion of the data signals. This framework has capacity to convey the information paces of 64kbps to 120 Mbps. It additionally being able to utilize wandering help which imply that we would we be able to utilize GSM telephone in other GSM arrange.

VI. Architecture of GSM

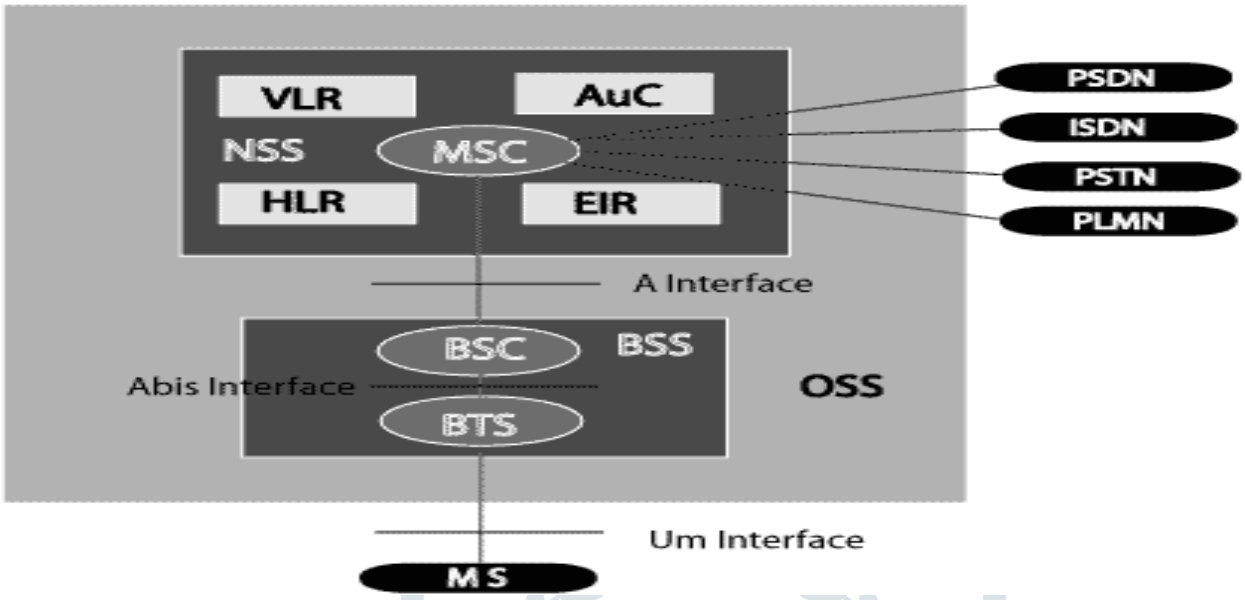

Fig.4: Architecture of GSM

It comprises of numerous useful units. Every single utilitarian unit are clarified beneath –

- **Home area register (HLR)** – It is kind of database which is utilized for capacity and the executives of memberships. It is the probably the most datum base which stores lasting information about supporters and furthermore endorser's administration profile, area and furthermore dynamic status. All the data are enlisted in HLR.
- **Versatile help exchanging focus (MSC)** – It is called primary part of the system subsystem. It plays out the undertaking of exchanging of calls between the portable and versatile system clients. It likewise plays out the administration of versatile administrations, for example, area, call steering, enrolment and so forth all MSC is distinguished by its exceptional id.
- **Guest area register (VLR)** - I t is additionally a database which assemble every one of the supporters brief data i.e required by MSC .it is constantly incorporated by the MSC. At the point when a portable system is in other system region i.e. in wandering then VLR is strongly connected with the MSC which will demand and load consumers information about the versatile station from the HLR.and when the versatile system station have a consider then the VLR have required all the data for consider arrangement without grill the HR each time.
- **Confirmation focus (AUC)** – It is an ensured information base which perform uncommon errand .it stores the mystery key of each duplicate of supporter's sim card.it go about as security base i.e spare from various sort of misrepresentation.
- **Gear personality register (EIR)** – It is likewise a database which contains all the rundown of portable hardware on the system. i.e called IMEI (universal versatile hardware character). Which recognizes every MS.
- **The activity bolster subsystem (OSS)** – It contains the every one of the activities and support focus which associated with all the hardware in exchanging framework and BSC.it play out the job of organization and business activity, arrange design, security the executives and furthermore the upkeep task. It is a useful unit from which all the system administrator are monitor and control the system. The primary reason this OSS is client assistance in the respect of financially savvy support for concentrated, territorial and nearby operation.it likewise give new alright view and bolster the upkeep exercises.

VII. Features of Talking Energy Meter

- It is dual band GSM /GPRS 900 /1800 MHZ.
- It is configurable baud rate.
- It is built in the area of LED status network.
- It is the one of the most important access control devices.
- It is the step process or we can say that supply chain management.

VIII. Applications of Talking Energy Meter:

- **Reduce billing error and operation cost**–It's the cost effective that its operation cost is very less with the help of this we can reduce the billing error. There is no need of billing of calculation is done by employee. It is also helping the reduced the employer.
- **Facilitate handicapped user** –This project is boon for handicapped person. The person who is blind they can listen the meter reading and also know about the how much balance is left in the meter.
- **Greater data accuracy** –There is no need of employer to note the data. It is just storing all information in processor and send the message to the user.
- **Allow frequent reading** –It is one of the most important application that user have no doubt in meter reading regarding load.
- **Improved billing and customer services** –With the help of this there is no error will come during billing. Just system will calculate bill that how much user used load.
- **More timely energy profiles** –Earlier consumer get the bill after 2 or 3 months but now they get in on time in particular date.
- **Consumption trends updates** – The consumer earlier they don't know about how much they are using load and how much consumption is going on but know they get update on time with the help of GSM.
- **More convenient for user with busy lifestyle** –Now days that we all know how much time is precious in our life. Person they don't know about electricity bill and when one time is come their facility of getting electricity is shut down. So, with the help of this system send the information to consumer time to time.
- **Highly facilitation to physically disable persons** –The person who is living in rural areas mostly person uneducated and they are unable to read the bill. So, by this system person can listen the how much bill will happen.

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