Wireless Arm-Based Automatic Meter Reading & Control System (WAMRCS)

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Abstract:

The advantages of remote meter reading and spot billing are well recognized by the various electricity boards in the country today. Not only does spot billing lead to much greater revenue-collection efficiency and better decision systems, it also brings intangibles like transparency and better customer service to the system. Though there exist various devices in the market that aid in spot-meter billing, none has become either an industry standard or widely prevalent. The reasons range from limited computing power and lack of customizability to high price and absence of local technical support.

Existing system

Here one need to go to each and every individual's house and manually the technician will give a bill in the form of small receipt which can be paid in E-seva / online by taking the reading from the meter which is installed.

Draw back

Man power is utilized.

Proposed system

Remote electricity billing is a unique concept, in which the electricity board can collect the consumed units data from consumer on mobile phone using GSM network. Each consumer is provided with a unique energy meter, which is having a GSM modem, microcontroller unit and a display unit internally. A SIM card is required for communication. Whenever this system receives an SMS from electricity board, it calculates the number of units consumed and billing amount on slab rate, displays on LCD for user interface. This system also sends the same message to the electricity board for departmental information and database.

The unique feature of this system is, the electricity board can disconnect or reconnect the connection from remote place through the mobile phone. As this project works on GSM network, the system can be controlled from any part of the world.

This project uses two power supplies, one is regulated 5V for modules. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

Block Diagram
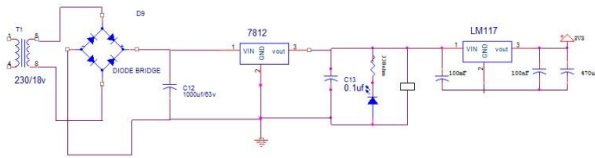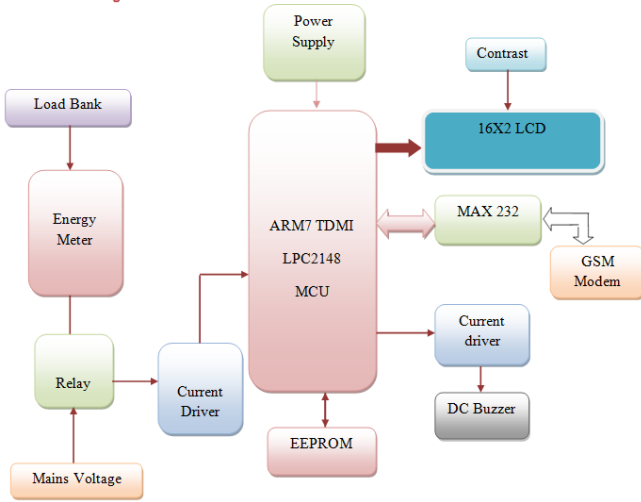
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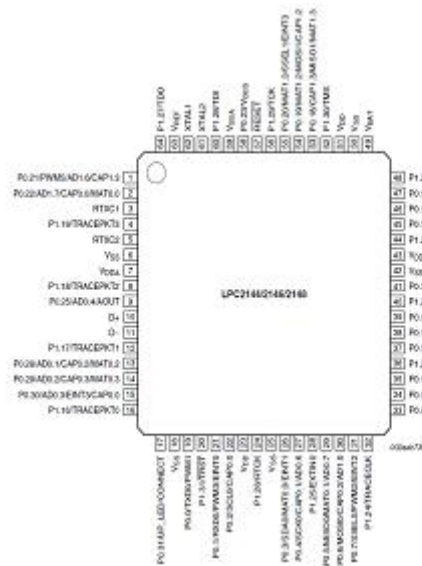
Pin diagram

ARM7TDMI Processor Core

- Current low-end ARM core for applications like digital mobile phones
- TDMI
  - o T: Thumb, 16-bit compressed instruction set

  - o D: on-chip Debug support, enabling the processor to halt in response to a debug request
  - o M: enhanced Multiplier, yield a full 64-bit result, high performance
  - o I: Embedded ICE hardware
- Von Neumann architecture

GSM
MODEM SPECIFICATIONS:

The SIM300 is a complete Tri-band GSM solution in a compact plug-in module.

Featuring an industry-standard interface, the SIM300 delivers GSM/GPRS900/1800/1900Mhz performance for voice, SMS, data and Fax in a small form factor and with low power consumption.

The leading features of SIM300 make it deal fir virtually unlimited application, such as WLL applications (Fixed Cellular Terminal), M2M application, handheld devices and much more.

1. Tri-band GSM/GPRS module with a size of 40x33x2.85
2. Customized MMI and keypad/LCD support
3. An embedded powerful TCP/IP protocol stack
4. Based upon mature and field proven platform, backed up by our support service, from definition to design and production.
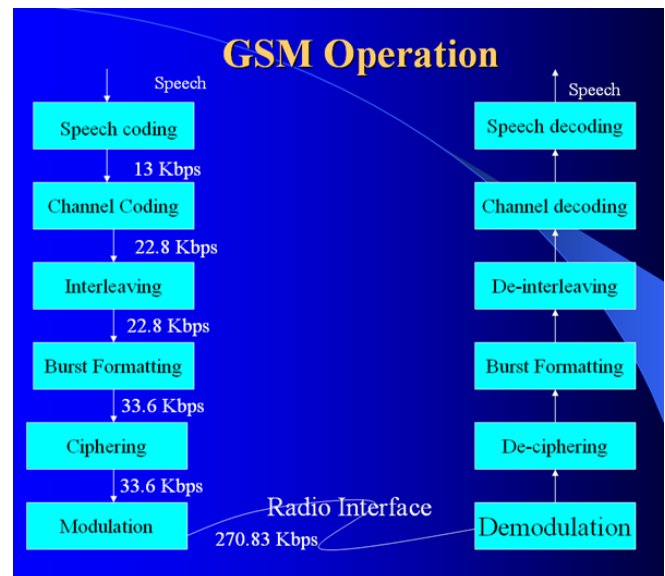
LIQUID CRYSTAL DISPLAY

LCD stands for **L**iquid **C**rystal **D**isplay. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
4. Ease of programming for characters and graphics.

LCD Pin diagram
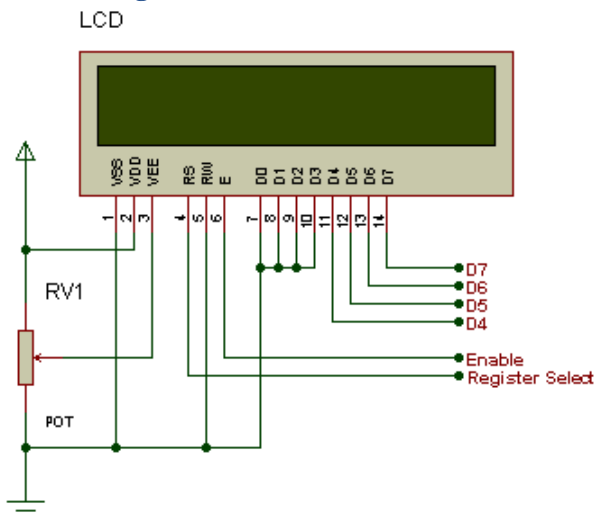
These components are "specialized" for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.
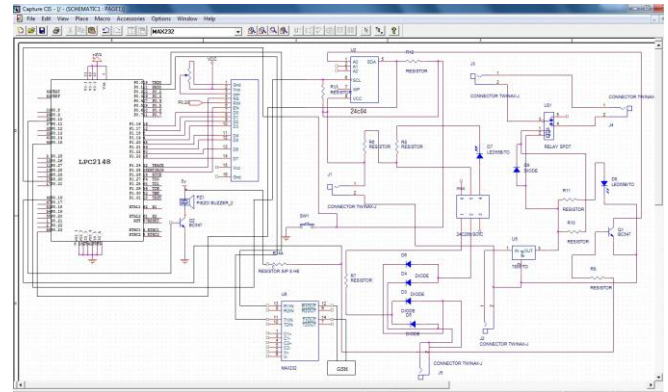
Advantages:

Billing Automation

Revenue Collection Efficiency

Transparency in distribution

Better customer Service

Zero man-made errors

Applications:

Electricity Department, Organization staff quarters

Interfacing Diagram

Scopes for Advancements:

Power theft indication concept can be extended to this project by using the LDR circuit.

CONCLUSION

In this project work, we have studied and implemented a complete working model using a Microcontroller. The programming and interfacing of microcontroller has been mastered during the implementation. This work includes the study of **GSM modem**

GSM network operators have roaming facilities, user can often continue to use there mobile phones when they travel to other countries etc..

Hence this project provides a best solution for the users to know how much amount of power is consumed in their day- to- day life and also the amount of power consumed is also under the user control. so by using this project the department can save the time also.

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