**Prepaid electricity billing automation**

**Abstract**

The main aim of this project is to make electricity bills to the concerned person or electricity department. We will connect hardware kit i.e. microcontroller to the energy meter. This hardware kit consists of RTC (real time clock) .We have to calculate electricity bill every end of the month .So, Microcontroller will find the end of the month by using this real time clock. In the end of the month it automatically calculates the units of electricity used and the bill is displayed using LCD. In the microcontroller program we have to include calculation of units into rupees formulas.

**Block diagram:**

**LCD**

 **8051 microcontroller**

**Energy meter**

**Real time clock**

## Hardware Used:

* 89c51 Microcontroller
* RTC
* LCD
* Energy Meter

## SOFTWARE USED:

1. **Keil u-Vision**

Keil Software is used provide you with software development tools for 8051 based microcontrollers. With the Keil tools, you can generate embedded applications for virtually every 8051 derivative. The supported microcontrollers are listed in the µ-vision.

1. **PRO51 Programmer Software**

This application is in the area of embedded systems.

An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular function

Since the embedded system is dedicated to specific tasks, design engineers can optimize it reducing the size and cost of the product and increasing the reliability and performance. Embedded systems are controlled by one or more main processing cores that is typically either a [microcontroller](http://en.wikipedia.org/wiki/Microcontroller) or a [digital signal processor](http://en.wikipedia.org/wiki/Digital_signal_processor) (DSP). Embedded systems control many devices in common use today.

The Keil C51 C Compiler for the 8051 microcontroller is the most popular 8051 C compiler in the world. It provides more features than any other 8051 C compiler available today. The C51 Compiler allows you to write 8051 microcontroller applications in C that, once compiled, have the efficiency and speed of assembly language. Language extensions in the C51 Compiler give you full access to all resources of the 8051.

The C51 Compiler translates C source files into relocatable object modules which contain full symbolic information for debugging with the µVision Debugger or an in-circuit emulator. In addition to the object file, the compiler generates a listing file which may optionally include symbol table and cross reference information.

Embedded C is an extension for the programming language C to support embedded processors, enabling portable and efficient application programming for embedded systems

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel’s high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pinout. 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.