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Maximum Demand Control through Smart Energy

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Abstract :- Maximum demand is the greatest demand of the load on the Power station during a given period. Hence, it is important to control maximum demand. Controlling the maximum demand at substation level requires a lot of planning and execution based on the requirements. So, one way to meet the problem is to control the maximum demand at consumer end. We are presenting the system that will solve the problem of maximum demand. Whenever the demand crosses the set maximum demand, it will be sensed by the sensor and will give signal to microcontroller. The microcontroller shifts the non-vital load from MSEB to Smart energy rather switched off. Hence we achieve maximum demand control without having power cut to non-vital loads.

Keyword's:-

Maximum Demand, Smart Energy, Demand Control, Footstep, Energy Generation.

Introduction: -

High tension consumers (Industries) use large loads for their production purposes. They are allotted with the maximum demand from the electricity board. Industries are allotted with the maximum demand from the electricity board. It is their responsibility to maintain their consumption within limits. If they fail to do so, they are subjected to heavy penalties. It is difficult to monitor the consumption manually and it may lead to errors, resulting in additional charges in bills, which is very large.

Maximum Demand is the highest amount of power drawn from the grid by the consumer during any 30 minutes of the billing period. It is their responsibility to maintain their consumption within limits. If they fail to do so, they are subjected to heavy penalties. It is difficult to monitor the consumption manually and it may lead to errors, resulting in additional charges in bills, which is very large. Thus it is very essential to control the maximum demand. For this maximum demand control, the loads in the industry were categorized as vital and non-vital loads. We are presenting the system that will solve the problem of maximum demand. Whenever the demand crosses the set maximum demand, it will be sensed by the sensor and will give signal to microcontroller AT 89s52. The microcontroller shifts the non-vital load from

MSEB to Smart energy. Here the system will switch the non-vital load to smart energy rather to switch it OFF. In our project we are making use of smart energy. The smart energy is generated from the footstep generation. Hence we achieve maximum demand control without having power cut to non-vital loads. The microcontroller shifts the non-vital load from MSEB to Smart energy. Here the system will switch the non-vital load to smart energy rather to switch it OFF. In our project we are making use of smart energy. The smart energy is generated from the footstep generation. Hence we achieve maximum demand control without having power cut to non-vital loads.

OBJECTIVES :-

- To maintain the maximum demand within limits.
- To monitor the maximum demand in real time.
- To design and implement maximum demand control system through use of smart energy.
- To develop system to store the energy generated through footsteps.

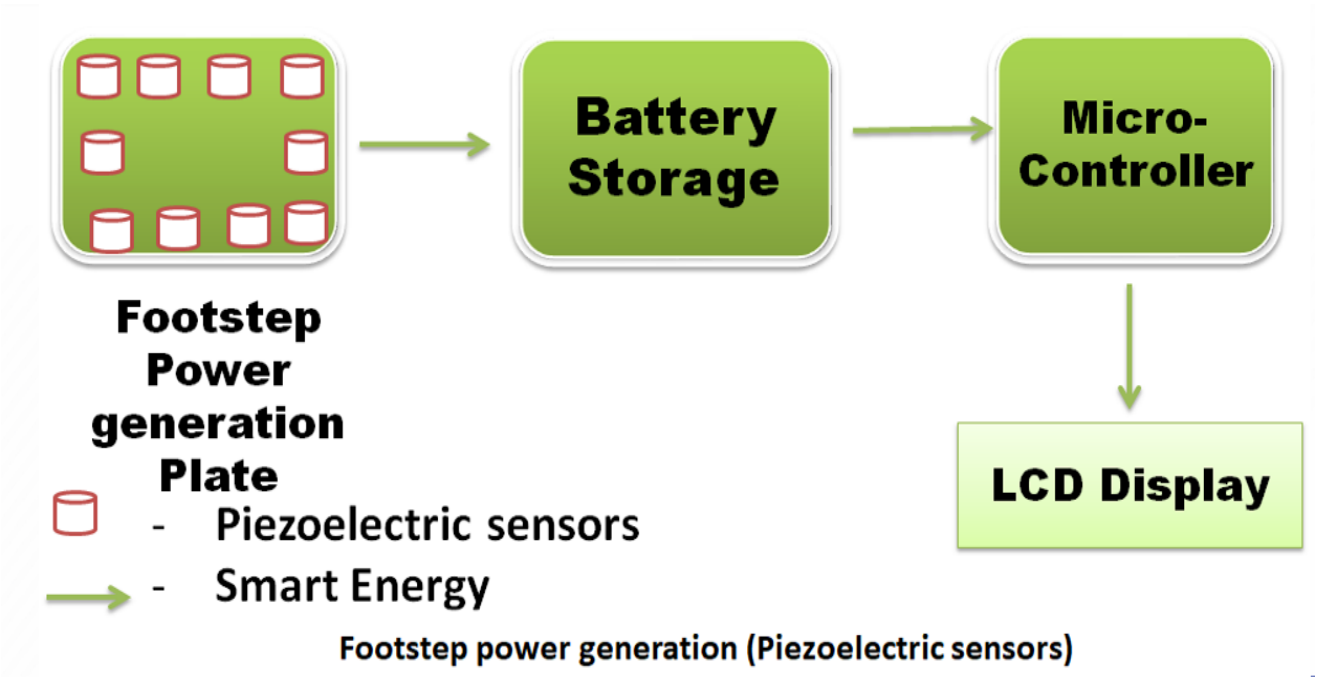
METHODOLOGY:

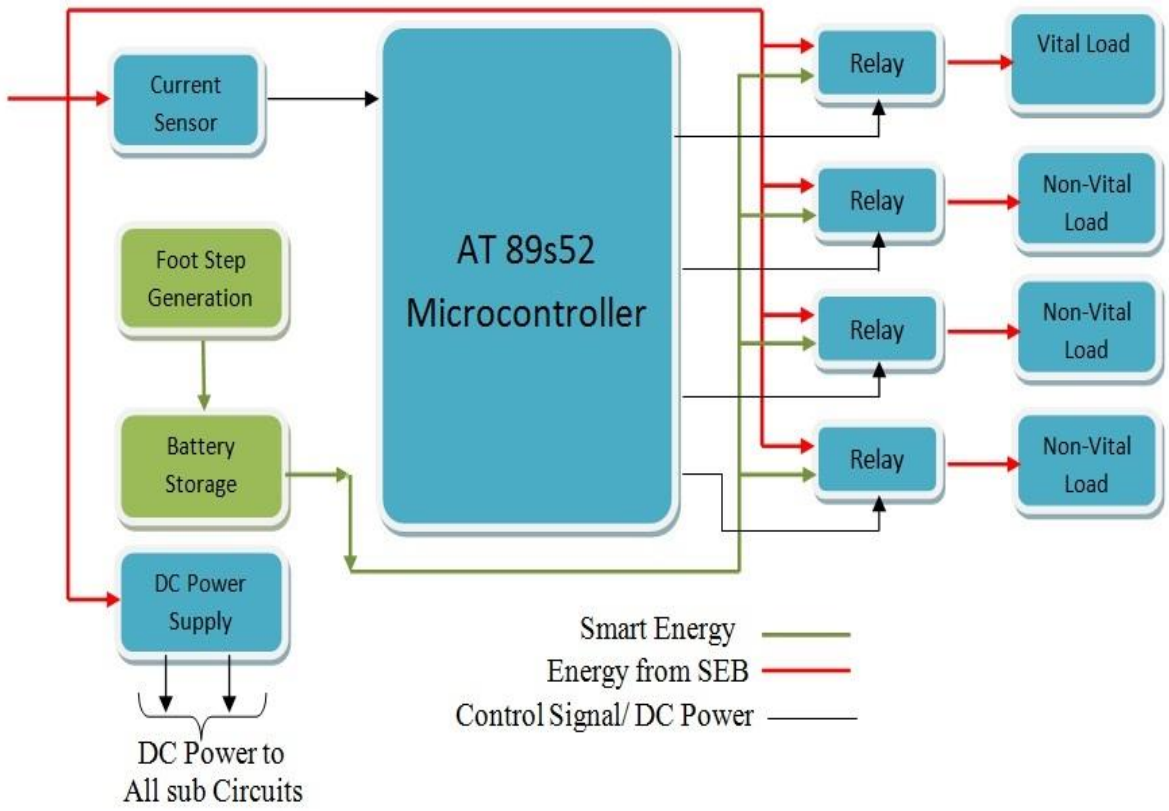
- Define the problem and accordingly define system specification.
- According to specification generate list of required inputs and outputs to the system.
- Develop a c program code for title of projects on keil µVision5
- Simulate and develop it on Dip Trace Design Tool.
- Implement design according to specification.
- Test of design for the expected result.

SPECIFICATIONS:

- System is implemented on 8051board
- Current sensor is used to be used to sense the maximum demand.
- Charge controller circuit is to be used for battery charging.

BLOCK DIAGRAM



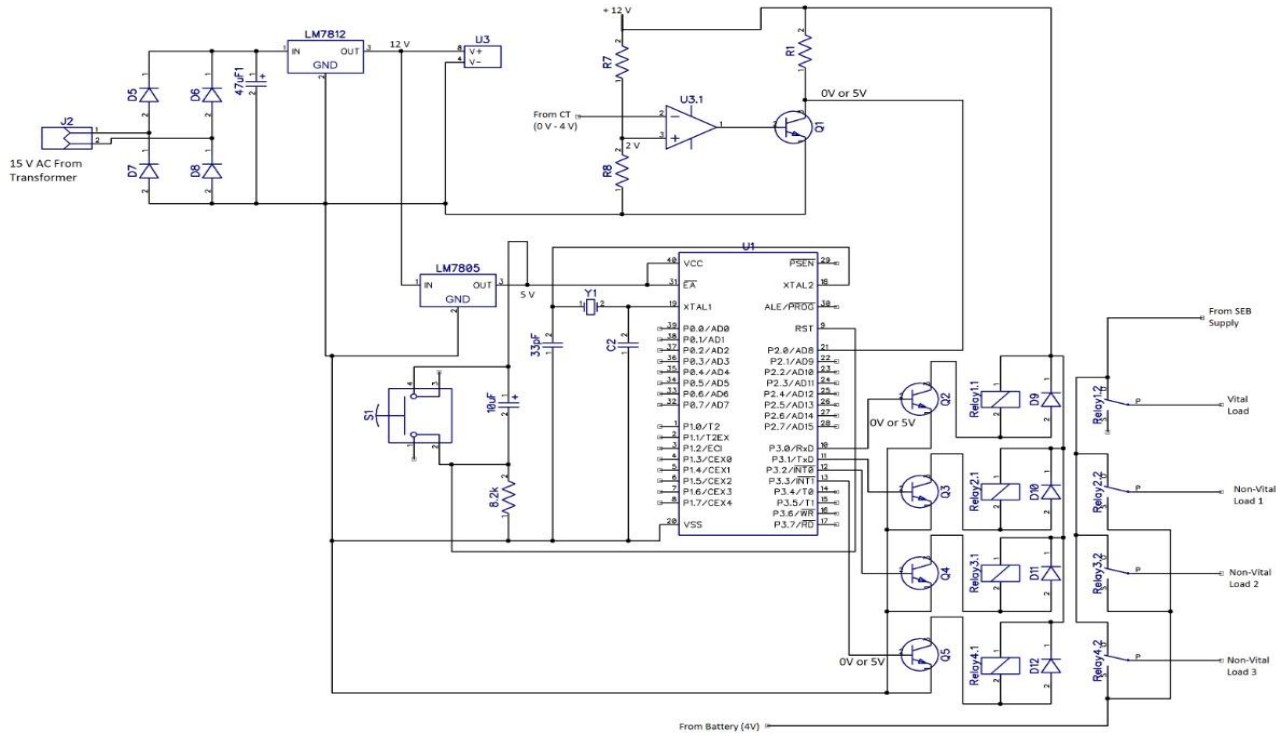


BLOCK DIAGRAM EXPLANATION

The incoming supply is given to all loads through CT. The priority loads are controlled through relays connected to port P2. The maximum demand is sensed with the help of CT. The output of CT is interfaced with the microcontroller at pin P1.1. The inbuilt ADC converts the analog output of CT into digital. If the CT output exceeds the set value, the Load1 connected to pin P2.0 is shifted on smart energy. The microcontroller then again compares CT output to the set value of maximum demand. If it finds the maximum demand greater than set value then, Load2 connected to pin P2.1 is shifted on smart energy. The process is carried out continuously. If the maximum demand is greater than set value after shifting of load4 then, microcontroller trips the critical load itself. If microcontroller finds that the CT output is less than set value of maximum demand then, the loads connected to port P2 are turned according to reverse priority. In this project the list of hardware components used are given below:

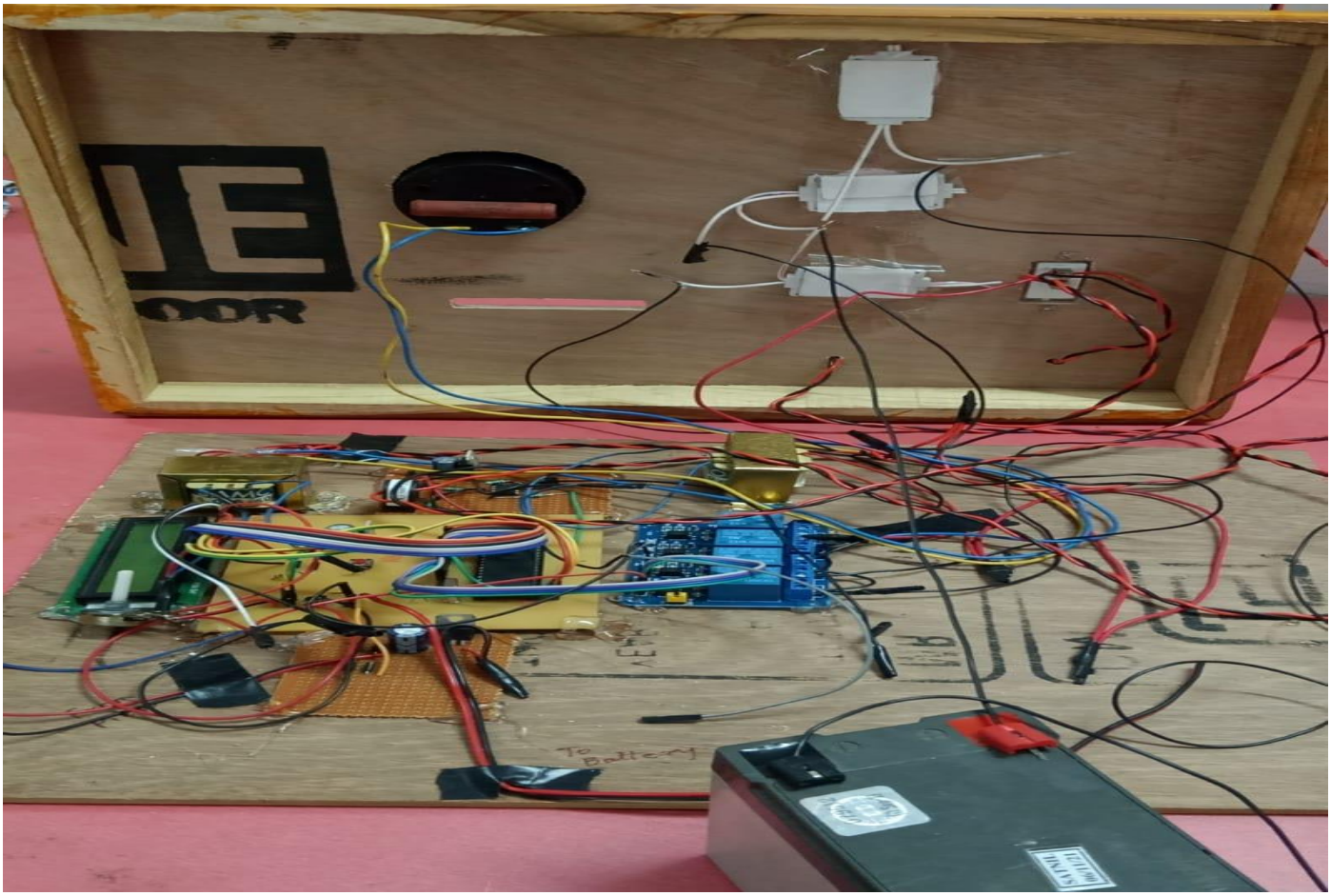
- Microcontroller
- Transformer
- Bridge Rectifier
- Voltage Regulator
- Light Dependent Resistor
- IR Sensors
- Relay
- Diodes
- Resistors
- Capacitors
- Transistor

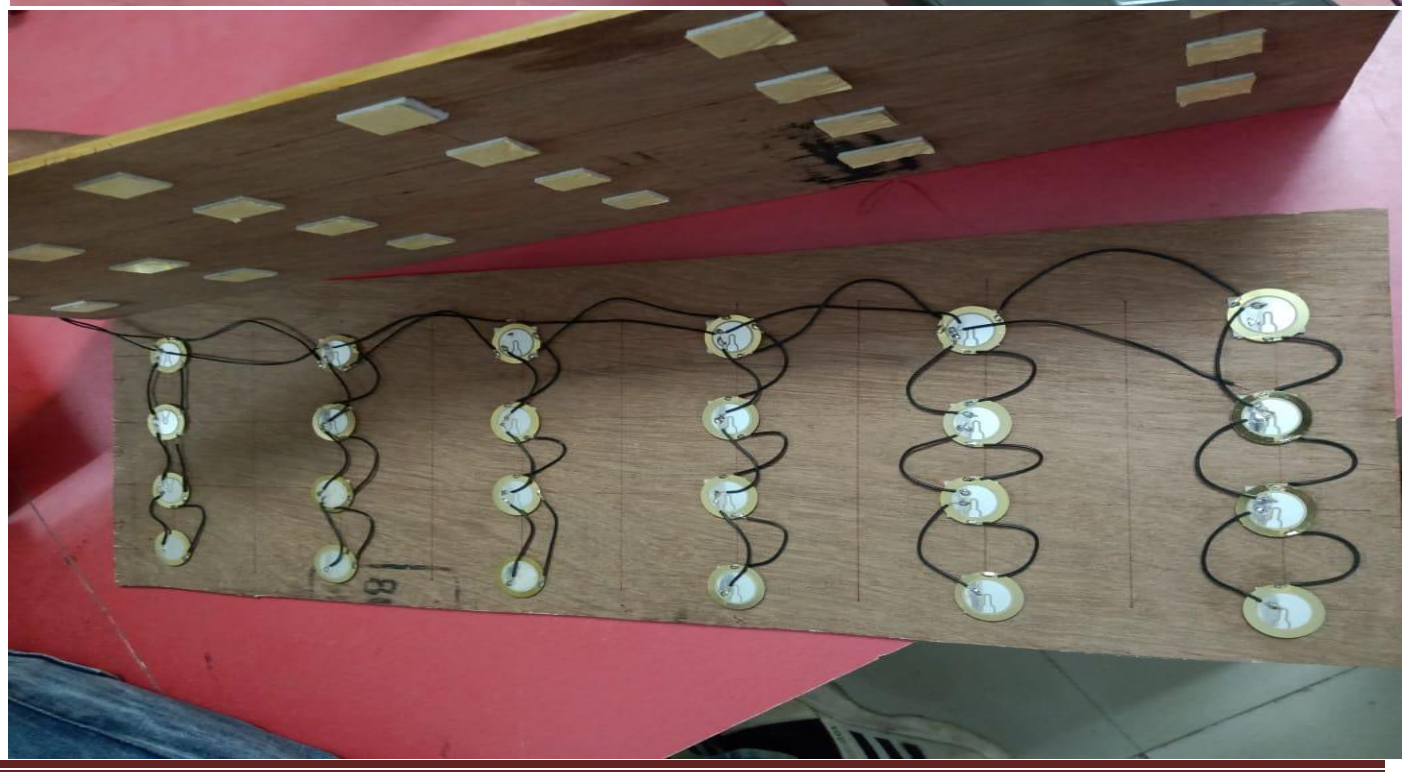
Circuit Diagram :-



Hardware Module

Piezo-Electric Plate





PROPOSED SYSTEM

Automation, Power consumption and Cost Effectiveness are the important considerations in the present field of electronics and electrical related technologies. In recent times the life in the society has become very luxurious, that is the use of electronic goods and equipment's has increased. This has resulted in the rise of electrical power demand, whereas the production of electricity remains same. It has resulted in a very huge gap between the generation and consumption. To balance the system the conventional method is to cut the loads for long time during the peak hours i.e. load shedding. This leads to inconvenience of the consumers. Only the option left to overcome the burning problem is to use the available electrical power more effectively and efficiently. Electrical energy is a form of energy that cannot be effectively stored in bulk, it must be generated, distributed and consumed immediate. When the load in the system approaches the maximum generating capacity, network operators must either find additional supply of energy or find ways to curtail the load. Hence load management, if they are unsuccessful then system will become unstable and blackouts can occur. Load management is the process of balancing the supply of electricity on network with electrical load by adjusting or controlling the load rather than power station output. Because of poor energy management in systems there is tremendous energy loss occurred. So for improving the stability of the system and improving the load management the latest technology of priority load management is introduced in this project. In demo model, four loads (electric bulbs) are taken as an essential load (critical load which needs the power all the time). Four priorities are given to four loads. When the load will increase beyond the set limit the low priority load will turn off automatically in order to maintain the demand in within the limit. If the load is further increased above the set limit the next priority load will be tripped. No matter what the loading conditions are the highest priority load (critical load) will remain ON. When the loading conditions are within the limit then the loads which where tripped OFF will auto restore according to reverse priority (first out last in).

ADVANTAGES AND DISADVANTAGES

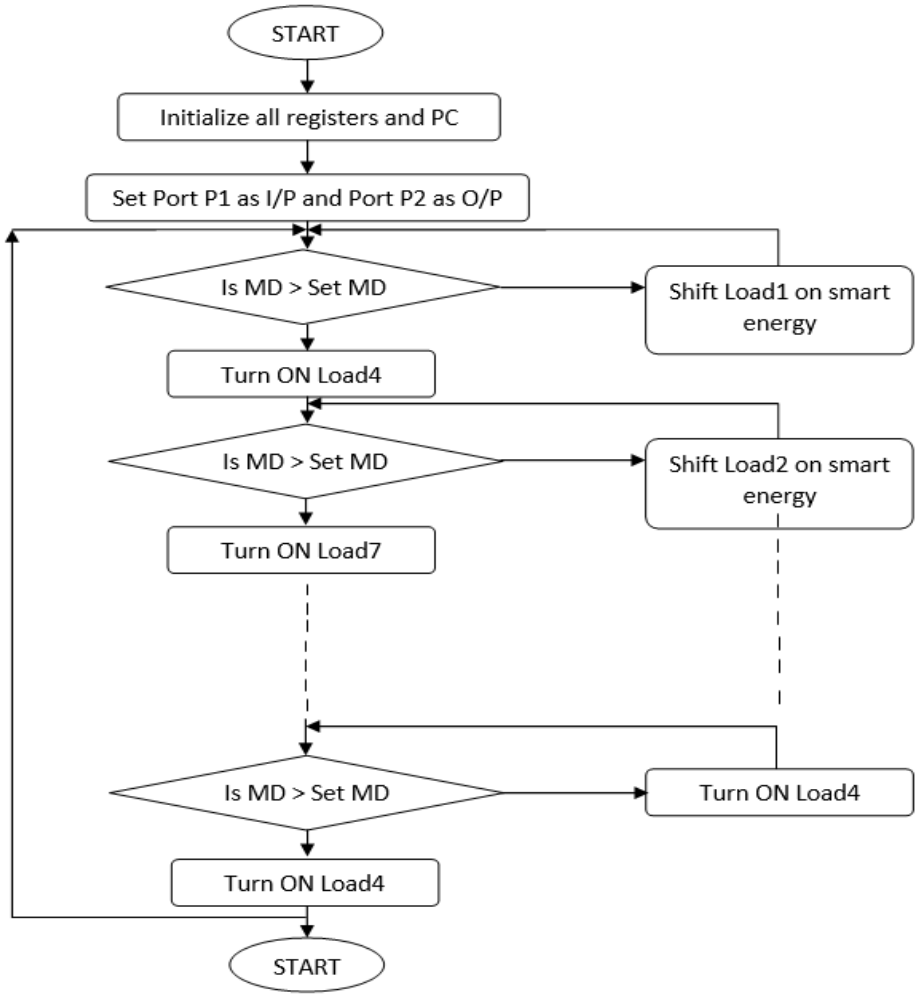
ADVANTAGES

- The system maintains the Maximum demand within limit, without turning OFF the non-vital loads
- The system works automatically.
- The system maintains regular supply to the critical load.
- Due to priorities assigned we can manage all the loads.

DISADVANTAGES

- The system needs to remain ON all the time.
- To maintain the supply to critical load it may turn OFF all the low priority loads.

FLOWCHART



CONCLUSION

The aim of this project was to design and implementation of Priority based load management system using AT 89s51. It senses the maximum demand with the help of Current Transformer, and maintains the continuous supply to the critical load by turning OFF low priority loads. The system is applicable at the firms and organisations where two part tariff is applied.

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