Smart Plug for Electricity Control

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Abstract
The aim of this research is to design and develop a Most of appliances in home get its power through power plug which is given on switch board hand extension boards several time we plug device in the circuit and simultaneously several times to switching operation and due to negligence we face different problems in terms of our loss and damage of devices so to protect this electrical devices and to reduce human error we thought to control the power output from socket in which mainly this electrical devices are plugged the purpose of this project is to create energy conserving power outlets for Electrical devices which been categorized as follows
1. Continuous power needed devices
2. Short duration power needed devices
3. Charging devices.
Which have different power consumption periods such as continuously operating one need only one time on of operation where devices for short duration power consume me and charging need several time login in the circuit and simultaneously several time switching operation and due to human negligence.
Keywords: Smart Home, Electricity Control, Smart Socket.

I.   INTRODUCTION

The rapid development of the technology, the demand for energy will continuously increase for making everything connected with technology works.

1.1 OPERATION AND EXPERIMENTAL WORK OF SMART SOCKET

The smart socket starts operation when the plug is inserted in socket, the presence of socket is sensed by infrared sensors mount on the socket and the sensor will send signal to the microcontroller which will turn on the led display on which there will be provision for selection of mode, the operation of smart socket is mainly dependent on these modes.

1. Manual mode
2. Timer mode
3. Smart charger mode

When the respective mode is selected the relay will get signal from microcontroller and the supply will be on operation will start.

1.2 OPERATION AT MANUAL MODE

When the manual Operating mode is selected by user by pressing PUSH button switch no I, a get again pressed manually and supply will This operation is similar to normal conventional socket and this mode is useful for loads such as refrigerator, load where the continuous supply is necessary.

1.3 OPERATION AT TIMER MODE

When the timer operating mode is selected by user by the device will ask to enter the operating time of load, with the help of increment and decrement switches the value of operating time.

1.4 SMART CHARGER MODE
Smart charger operating mode is Energy saving of charging is achieved.

II.   DEVELOPMENT
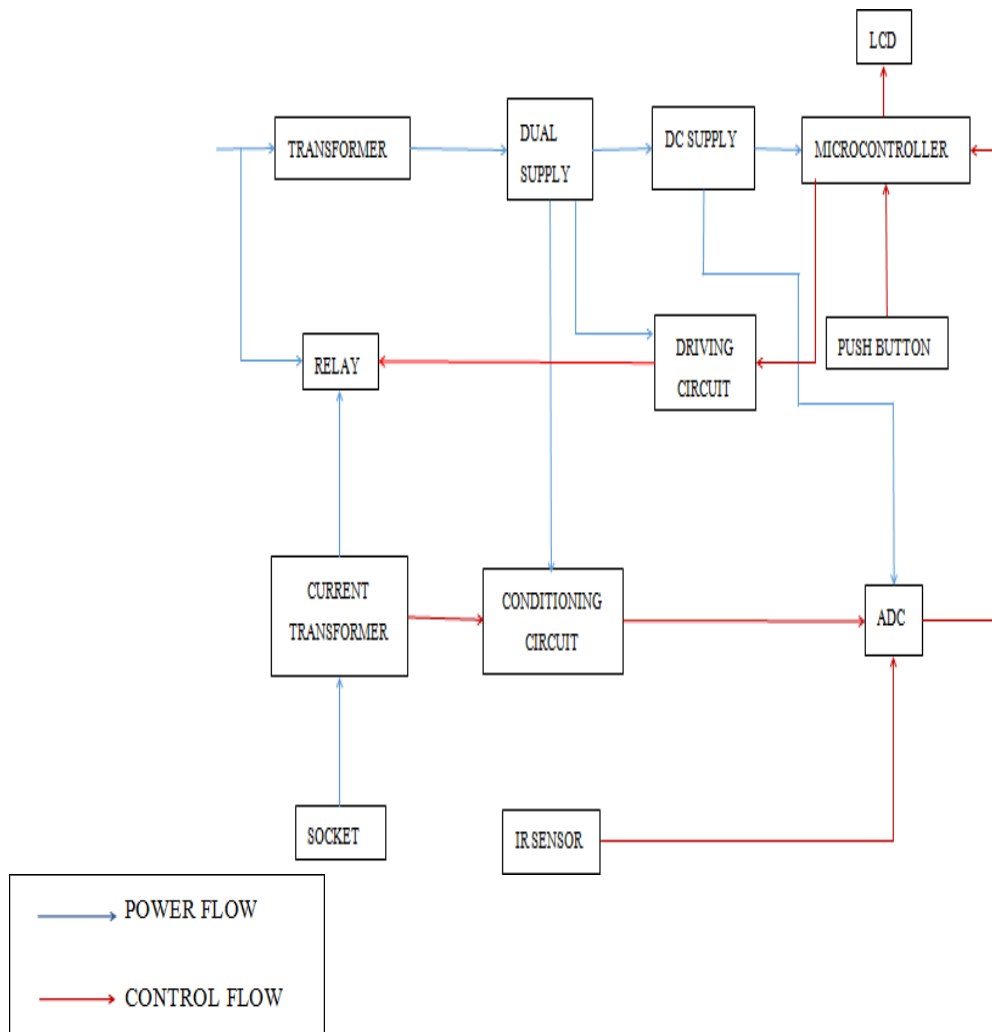The working process flow of the smart socket system will be shown in Fig 1.

Fig. 1. Smart Socket System Workflow

The smart socket server functions as a provider for smart socket device and smart socket application.

❖   **MATERIAL REQUIRED:-**

1. Switches.
2. IR sensor.
3. Step down transformer.
4. Current transformer.
5. 89s51Microcontroller.
6. ADC 0808.
7. 16*2 LCD Display.
8. LM 555C TIMER.
9. ESD relay.
10. Buzzer. 11.Power Supply.
12. Capacitors
13. Resistors
14. Wires.

15. Connectors.
16. Copper Cading Plate.
17. Socket Board.
18. AC main cord.
19. Push Buttons.
20. LCD Display.

❖   **Microcontroller (AT 89s51)**
Microcontroller is the heart of this unit. It holds the control on whole circuitry. Here the microcontroller used is 89s51 which is the intel 0*51 family
The AT 89S51 is low power high performance CMOS 8-bit Micro computer with 4 kilobytes of flash programmable and erasable read only memory the device is manufactured using Atmel's high density nonvolatile memory technology is compatible with the industry standards MCS-510 instruction set and pinout the on chip flash allows the program memory to be reprogrammed in system or bio conventional nonvolatile memory programar. By combining a versatile 8 bit CPU with flash on a Monolithic chip Atmel AT89s51 is a powerful micro computer which provides a highly flexible and cost-effective solution to many embedded control application the block diagram is shownin figure and pin diagram is also shown in figure.

❖   **Features of microcontroller**
1.   4 KB in system reprogrammable Flash Memory endurance 1000 wright / erase cycle.
2.   3 level program memory lock
3.   128*8 bit internal Ram
4.   Fully static operational 0-24MHz
5.   32 Programmable I / o lines
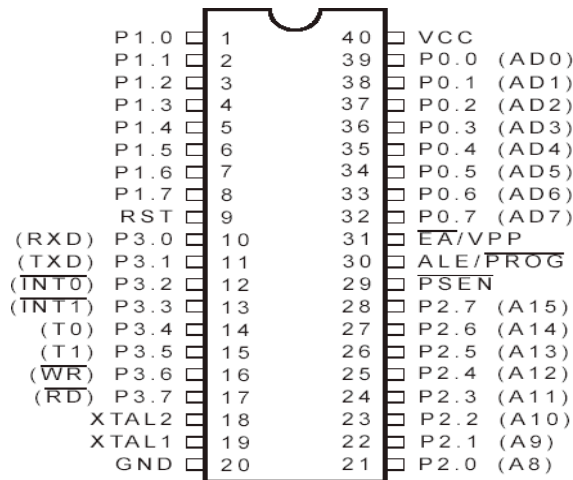6.   Two 16 bit timer / counters
7.   6 interrupt sources

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          P1.0  □ 1        40 □  VCC
          P1.1  □ 2        39 □  P0.0 (AD0)
          P1.2  □ 3        38 □  P0.1 (AD1)
          P1.3  □ 4        37 □  P0.2 (AD2)
          P1.4  □ 5        36 □  P0.3 (AD3)
          P1.5  □ 6        35 □  P0.4 (AD4)
          P1.6  □ 7        34 □  P0.5 (AD5)
          P1.7  □ 8        33 □  P0.6 (AD6)
          RST   □ 9        32 □  P0.7 (AD7)
    (RXD) P3.0  □ 10       31 □  EA/VPP
    (TXD) P3.1  □ 11       30 □  ALE/PROG
    (INT0) P3.2 □ 12       29 □  PSEN
    (INT1) P3.3 □ 13       28 □  P2.7 (A15)
    (T0)  P3.4  □ 14       27 □  P2.6 (A14)
    (T1)  P3.5  □ 15       26 □  P2.5 (A13)
    (WR)  P3.6  □ 16       25 □  P2.4 (A12)
    (RD)  P3.7  □ 17       24 □  P2.3 (A11)
          XTAL2 □ 18       23 □  P2.2 (A10)
          XTAL1 □ 19       22 □  P2.1 (A9)
          GND   □ 20       21 □  P2.0 (A8)
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Fig :- Microcontroller (AT 89s51)

❖   **CURRENT TRANSFORMER**
It convert the current flowing through the circuit to proportional voltage. And instrumentation stage convert the voltage to the dc voltage which can be fed to the ADC. Rating of CT 0-5 amps AC.

Fig :- CURRENT TRANSFORMER   *Fig :- TRANSFORMER*

❖ **TRANSFORMER**

Here we have used center tapped step down transformer. The rating of this transformer 230/12v. its step down the voltage to dual power supply +12v -12v from which 0-12v dc supply is given to liner regulator which regulates supply to +5v dc and fed to microcontroller. Another supply of +5v is fed to the ADC through OP-AMP.

Advantages:-
❖ More energy saving
❖ Power losses reduction
❖ Generation cost reduction
❖ Time saving for power distribution
❖ plug quality improvement
❖ Consumer satisfaction

Disadvantages:-
❖ Increases the human efforts.
❖ Extend time of operation .

Applications:-
❖ Ups.
❖ mobiles.
❖ batteries of electric vehicles.
❖ In case of charging can be very useful. use of smart socket .
❖ In case of unusual load, such as refrigerator, the normal operation is needed, to achieve this there is provision of manual mode, which acts as conventional plugs.

III. CONCLUSION

From the data studied, and respective calculations and results shown by smart socket we can conclude that smart socket can give more energy saving, and reduce unnecessary operation of device by proper switching which is beneficial for device. As saving one unit in consumption can save six units at generations, smart socket will save sufficient amount of energy, cost of generation.

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