

Power Saving Device

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Abstract- PSD is an effective approach to reduce power consumption without significantly degrading performance. PSD saves power by shutting down idle devices.

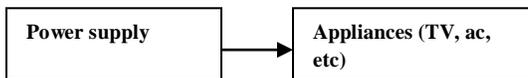
Keywords- Power Saving, Standby power.

I. INTRODUCTION

Power saving means reduction of power consumed by any electronic device. Standby Power is an electrical power that consumes electricity when not in present use, but plugged into a source of power and ready to use. The electronic devices in the houses when kept in standby consume 67.3 units of power per month. Thus we have come up with an idea of reducing the standby power completely with the device called PSD. PSD automatically cuts off the power supply to the appliance when not use.

II. GENERAL METHOD

The current method is to directly give the power supply to the appliances



In this method the appliances gets the power even when the appliances are in standby mode. The standby power consumption of an appliance adds up to the overall power consumption and increase the electricity bill.

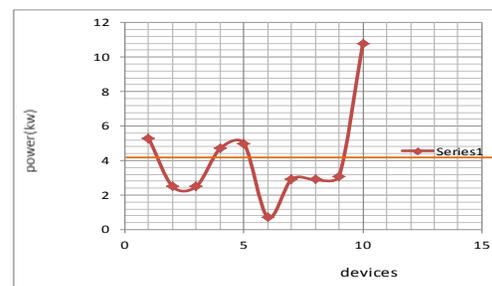
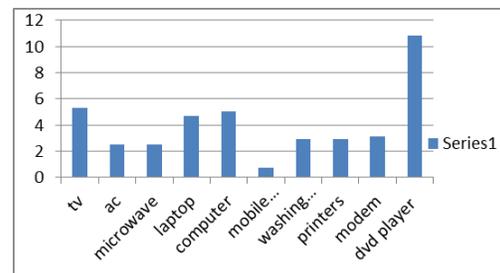
III. SURVEY REPORT

- General home appliance on an average use is 67.3 units per month.
- On average electricity board charges 1unit = 4rs Therefore 67.3 units = 269.2rs, this is for one home.
- On 2011 estimation, Indian population is around 1,21,01,93,422. Approximately there are 30, 25, 48,355 homes. On an average if we consider, 20% of homes which does not have all the Appliances then, the number of homes is 24, 20, 684, and 38.
- Considering the urban and rural, the average consumption of power in units is 1.19035×10^{10} units and in rupees it approximates to 4.16×10^{10} rs.
- Considering for Karnataka, the total population in 2011 is 6, 11, and 30,704. Therefore the total cost of power consumption by a single home is 1, 52, 82,676*4 = 761130704rs

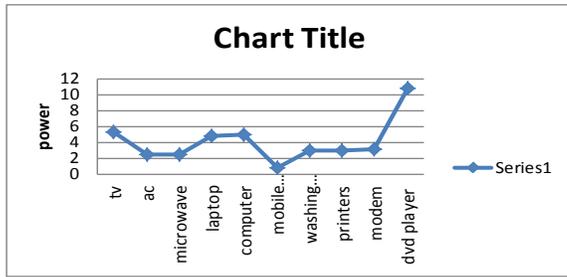
- All the above calculation done is for domestic.
- For commercial the unit rate is 8-16rs. Thus we have come out with the idea of saving the power by turning off the equipments when they are in standby.

devices	Standby power (kwh)
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TV	5.3
Ac	2.5
Microwave	2.5
Laptop	4.7
Computer	5
mobile charger	0.72
washing machine	2.9
Printers	2.9
Modem	3.1
DVD player	10.8
avg threshold vtg	4.042

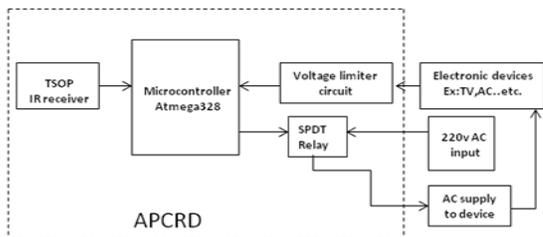


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Electricity bills are getting higher and higher today. We must know the different means of minimizing our electricity bills by updating our knowledge with the right use of electrical equipments we use. PSD is the device which will avoid the standby power consumption. PSD automatically cuts off the power supply to the appliance when not used, i.e. when the appliance enters standby mode.

IV. NEW POWER SAVING METHOD



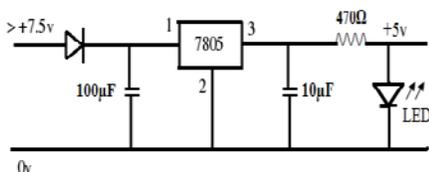
PSD mainly depends on switching of power supply, i.e. the ac supply which is usually given to the appliances directly will now be passing through a relay (switch). This switch performs the switching action. PSD contains TSOP, Microcontroller, SPDT relay, and a voltage limiter circuit. The TSOP is a universal receiver which receives the signal from the transmitter (here considering TV remote) and at this instant based on the conditions written in the microcontroller the relay decides whether to allow the 220v supply or not to the appliance (TV).

V. HARDWARE IMPLEMENTATION

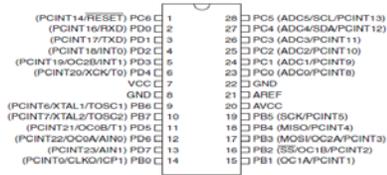
As previously observed from the block diagram, the hardware module consists of:

- Power supply
- Atmega328 microcontroller
- TSOP IR receiver (1738)
- SPDT relay

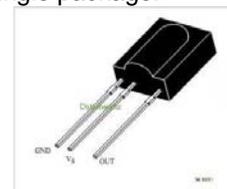
▪ **Power Supply:** A power supply is a device that supplies power to another device, at a specific voltage level, voltage type and current level.



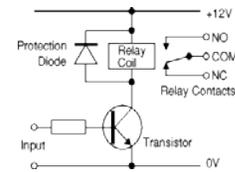
▪ **Atmega328 Microcontroller:** Atmega328 is a high performance, low power 8bit controller. It is a 28 pin IC. The operating voltage of the controller is 1.8-5v; the input voltage is between 7- 12v. The DC output current per I/O pin is 40mA. Low power consumption at 1MHz, 1.8v.



▪ **TSOP IR Receiver:** The TSOP 1738 is a member of IR remote control receiver series. This IR sensor module consists of a PIN diode and a pre amplifier which are embedded into a single package.



▪ **SPDT Relay:** A relay is an electrically operated switch. Relays are used where it is necessary to control a circuit by a low-power signal or where several circuits must be controlled by one signal.



VI. APPLICATIONS

1. Computers, digital monitors and printers
2. Timers, motion sensors, light sensors and
3. automatic sprinklers
4. Programmable thermostats
5. Uninterruptible Power Supply (UPS)
6. Devices with "Instant on" functions, with remote control receivers, or waiting for the user to interact
7. Devices with a stand-by light or clock
8. Power adapters whether they are powering a device or not Power supplies, transformers and inefficient electronic devices Microwave ovens
9. Cordless phones and answering machines
10. Security systems and fire alarms and door bells.
11. VCRs, DVD players and most audio systems.

VII. CONCLUSION

This method of completely cutting off the standby power in any electronic device when it enters to standby mode is not been implemented in any system till date. The circuit designed is simple in construction and cost effective. If this project is implemented successfully on any electronic device which enters into standby mode, it becomes one of the most feasible products to the user. The PSD reduces standby power, which in turn reduces electricity bill and help the user not to spend more money on it.

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