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# An Innovative Device for Automatically Controlled USB Power Switch

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**ABSTRACT:** The primary concept is to give a circuit which involves the USB port of electronic gadgets as a programmed switch to control the info supply to that gadget. Energy wastage is one of the most extreme issues confronted these days. The wastage of energy from home machines or electronic gadgets plays a significant job in this issue. All electronic gadgets accompany at least one USB port. The circuit utilizes these USB port to control the info supply. At the point when TV or some other electronic gadgets is switched off utilizing remote, its SMPS will consume a modest quantity of power which prompts the wastage of energy. This circuit gives a solution for such issue. In this manner, when the gadgets get switched off utilizing remote, the whole supply to the gadget gets switched off and saves energy. The gadget can again be switched on by squeezing the press button in the circuit. The circuit shields the electronic gadgets from hurtful beginning floods.

**KEYWORDS:** USB, SMPS, Decision Making Section and Supply Unit.

## I. INTRODUCTION

Energy wastage is one of the most extreme issue confronted these days. Regardless of mindfulness crusade, this issue is as yet expanding because of user's carelessness by not switching off gadgets after use. Backup power, additionally called vampire power, vampire draw, apparition load, or spilling power alludes to the electric power consumed by electronic and electrical apparatuses while they are switched off (yet are intended to draw some power) or in a reserve mode. This only happens in light of the fact that a few gadgets professed to be "switched off" on the electronic interface, yet are in an alternate state from switching off at the fitting, or disconnecting from the power point, which can tackle the issue of reserve power totally.

Truth be told, switching off at the power point is sufficiently viable, there is compelling reason need to disconnect all gadgets from the power point. Whatever gadgets offer controllers and computerized clock highlights to the user, while different gadgets, like power connectors for disconnected electronic gadgets, consume power without offering any highlights (in some cases called no-heap power). In the past, reserve power was generally a non-issue for users, power suppliers, makers, and government controllers.

In the principal ten years of the twenty-first 100 years, familiarity with the issue developed and it turned into a significant consideration for all gatherings. Up to the center of the 10 years, reserve power was much of the time a few watts or even many watts per machine. Backup power is electrical power utilized by apparatuses and hardware while switched off or not filling their essential role, frequently ready to be enacted by a far off controller. That power is consumed by inside or outside power supplies, controller receivers, text or light shows, circuits invigorated when the gadget is connected in any event, when switched off, and so forth. To keep away from this sort of energy wastage in apparatuses having USB port, a plan is proposed called Automatic USB Controlled Power Switch.

## II. PROPOSED SYSTEM

Figure 1 shows the block diagram of the programmed USB controlled power switch. The different components in the system are portrayed beneath.

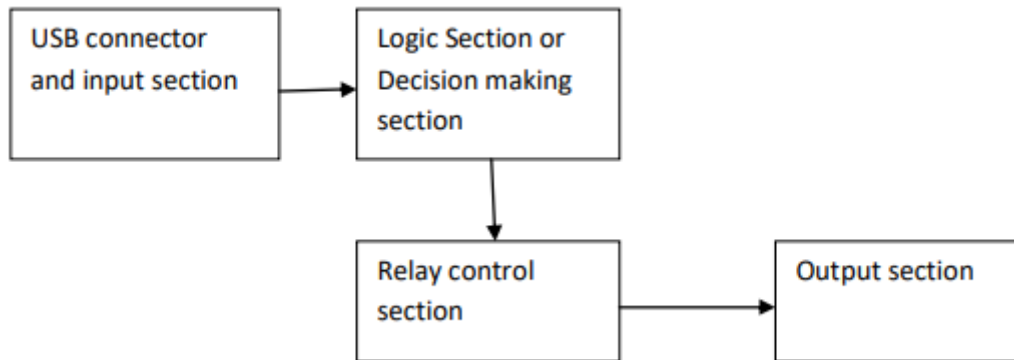


Figure.1 Automatic USB Controlled Power Switch

The blocks in the block diagram are USB connector and Input Section, Logic Section or Decision Making Section, Relay Control Section and Output section. The USB connector and information section basically consist of a USB port (male) which gets the approaching 5V from the USB port (female) of electronic gadgets like TV, Set Top Box, which is given as the contribution to the circuit. The Logic Section or Decision Making Section consists of a Transistor which will control the relay section. The semiconductor makes the relay ON when it identifies the 5V at its base. At the point when there is a shortfall of 5V in its base, it will make the relay to OFF state. The Relay Control Section holds a 12V relay which goes about as a switch between the 230V supply. 230V AC mains power supply connector is connected between N/O contacts of the Relay and Neutral line. The Output Section has an attachment to which the electronic gadgets are connected. The Relay is at first at OFF state and there is no result in the result section so there is a shortfall of 5V coming from the gadgets which drives the Transistor to make the Relay in OFF state.

To make the Relay ON, a press button is utilized to give a 5V supply to the foundation of the Transistor. Whenever the switch is squeezed, a 5V supply is given to base of the Transistor which will make the Relay to ON state and result (230V AC Supply) is gotten at the result section. Power supply to the electronic gadgets like TV, S.T.B, D.V.D player and so on are taken from this result section. When the gadget is switched on, a 5V supply will be gotten at the foundation of Transistor from the USB port through the USB connector. This will lead the semiconductor to make Relay to continue in ON state. Whenever the gadget is switched off utilizing far off the 5V from the USB port of gadget is disconnected, and drives the semiconductor to make the Relay to OFF state and result (230V AC) to the gadgets get disconnected accordingly saving the energy.

### 2.1 Hardware Description

A transformer is an electrical gadget that moves electrical energy between at least two circuits through electromagnetic induction. Transformers convert AC voltage starting with one level then onto the next level with a little loss of power. Transformer has chiefly two curls, essential and secondary. A transformer works on the chiefs of "electromagnetic induction", as common induction. The transformer utilized here is a stage down transformer with the goal that it very well may be straightforwardly convert 230v AC to 12v AC.

Relays are components which permit low power circuit to work high current application circuits. It is an electrically worked switch and is utilized where it is important to control a circuit by a low-power signal with complete electrical isolation among control and controlled circuits, or where a few circuits should be controlled by one sign. The relay utilized here is an electromagnetic kind which works in 12v.

USB (Universal Serial Bus) characterizes the links connectors and communication conventions utilized in a transport for connection, communication and power supply among PCs and electronic gadgets. The figure 3.5 shows the male USB port. USB was intended to normalize the connection of PC and electronic peripherals. The terminals of USB port are

- V+
- Data+
- Data-
- GND

Semiconductor BC547 is a NPN Bi-polar Junction Transistor (BJT). A semiconductor, represents move of obstruction, is commonly used to intensify current. A little current at its base controls a bigger current at gatherer and producer terminals. Along with other electronic components, for example, resistors, loops and capacitors, it tends to be utilized as the dynamic component for switches and enhancers. Like any remaining NPN semiconductors, this type has a producer terminal, a base and an authority terminal. In a commonplace configuration, the ongoing moving from the base to the producer controls the authority current. BC547 is predominantly utilized for amplification and switching purposes. It has a greatest current increase of 800. The figure 3.6 shows a BC547 Transistor and figure 3.7 shows the pin outline of BC547 Transistor.

A solitary stage rectifier utilizes four individual redressing diodes connected in a shut circle span configuration to deliver the ideal result. The primary benefit of this extension circuit is that it doesn't need an extraordinary focus tapped transformer, subsequently diminishing its size and cost. The single secondary winding is connected to one side of the diode span network and the heap to the opposite side. The scaffold rectifier converts the 12V AC to 12V DC which is the necessary power supply for the circuit.

A press button (likewise spelled pushbutton) or just button is a basic switch component for controlling some part of a machine or a cycle. Buttons are commonly made from hard material, normally plastic or metal. The surface is typically level or formed to oblige the human finger or hand, to be effectively discouraged or pushed. Buttons are most frequently one-sided switches, however even numerous un-one-sided buttons (because of their actual nature) require a spring to get back to their un-pushed state.

The semiconductor BC547 requires 5V supply while the relay requires a 12 V supply. An extension rectifier connected to the mains produce DC 12V result usable for the relay and this voltage is additionally gone through resistors bringing about a 5V DC yield usable for the semiconductor.

## 2.2 Connections

The bridge rectifier circuit is connected straightforwardly to the supply which gives a result of 12V DC. A LED along with a resistor is connected in the heap side of rectifier to supply show the power. A press button is connected to the positive terminal of 12V DC supply to give a 5V supply to the foundation of semiconductor BC547 at the underlying stage. A resistor of 10K is likewise connected between the press button and semiconductor to give a 5V supply. The loop terminals of the 12V relay is connected between the positive terminal of 12V DC and the gatherer of semiconductor BC547. Stage or Neutral of 230V AC supply is given to the COMMON terminal of relay. Stage or Neutral of the gadget with USB port is connected to the ordinarily shut terminal of relay. The other terminal of 230V AC supply (Neutral or Phase) is connected straightforwardly to corresponding terminal of gadget. Semiconductor BC547 is demanded to control the switching of relay.

The V+ terminal of USB port is connected to the foundation of semiconductor BC547 through LED, resistor and a capacitor of 1000 $\mu$ F. The GND terminal of USB port is connected to the producer of semiconductor and the



negative place of capacitor. A diode IN4007 is connected between +V terminal of USB port and base of semiconductor, and between the curl connection of relay to forestall the progression of opposite current. The USB port of circuit is connected to the USB port of the gadget. Whenever the supply is given, the relay is in OFF state, the press button is squeezed which stores the charge in capacitor 1000 $\mu$ F what begins to release by giving a 5V supply to the foundation of semiconductor which makes the relay ON and the gadget get supply which makes the gadget ON. This outcomes in giving a 5V supply from the USB port of the gadget to the foundation of semiconductor which permits the relay to continue in ON state. At the point when the gadget is switched off utilizing distant the 5V from USB is disconnected which makes the relay OFF what slice off the supply to the gadget.

### III. RESULTS AND DISCUSSION

Figure 2 address the finished system of programmed USB controlled power switch. It is demonstrated as connecting a USB charger with a red LED to show the result supply.



Figure.2 Automatic USB Controlled Power Switch System

### IV. CONCLUSIONS

To foster a proficient circuit in a more straightforward way, doing a venture on Automatic USB Controlled Power Switch has been chosen. Despite the fact that this circuit consists of more straightforward electronic components it can roll out extraordinary improvements in power consumption. The primary application of the circuit is in apparatuses with USB port. It is created to assist with saving energy during reserve mode.

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