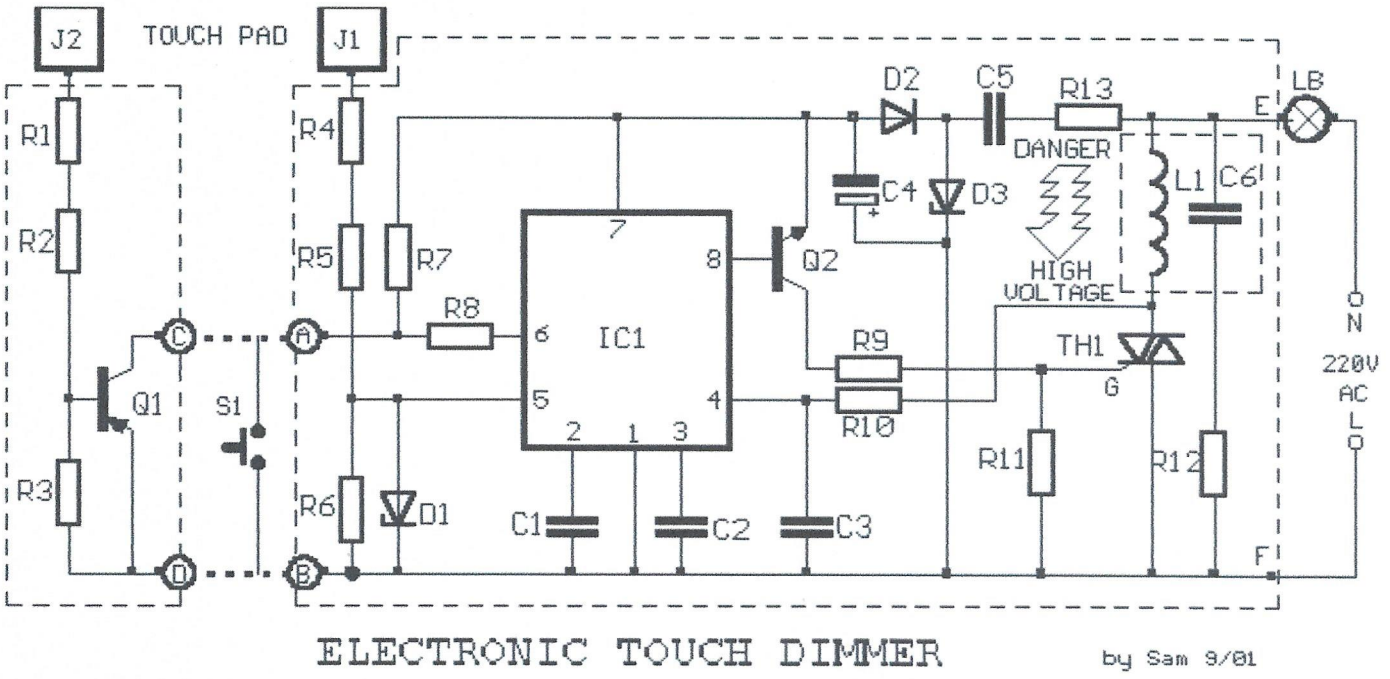
Siemens S566B Electronic Touch Dimmer



R1-2-3= 4M7	D1= 18V 1W	IC1= S566B SIEMENS
R4-5-6= 4M7	D2= 1N40001	Q1= BC212L
R7-8= 470K	D3= 15V 1W	Q2= BC182L
R9= 120R	C1-2= 47nF 250V	TH1= TIC206D
R10= 1M5	C3= 470pF ceramic	S1= Push Button switch
R11= 10K	C4= 100uF 25V	LB= Lamb 220V >300W
R12= 100R (47R)	C5= 220nF 630V	L1= 50 turns 0.5mm up C6
R13= 1K 1W	C6= 100nF 630V	J1-2= Touch Pad

The circuit was designed to create a lamp that incorporates the operation of a touch dimmer using S566B integrated circuit manufactured by Siemens.

- S566B – a lamp dimmer integrated circuit produced by Siemens which has a feature of touch conditioning circuitry
- TIC206 – a Silicon sensitive gate triac with glass passivated wafer, 4 A RMS, maximum gate current of 5 mA, and off-state voltage of 400 V to 800 V
- BC182L/BC212L – a PNP complementary Silicon planar epitaxial transistor used in AF small signal amplifiers and drivers, as well as in low power universal applications
- Thyristor – a solid state semiconductor integrated circuit that is used to control the applied electrical power to a load by having four layers of alternating N and P-type material

An integrated circuit is incorporated with a touch dimmer switch for controlling a dimming circuit utilizing a thyristor. It has a touch control attached to high impedance, a filter circuit for filtering out unwanted electrical noise, and unidirectionally conducting circuit. To prevent the polarity of connection to the power source from becoming critical, the touch control is separated from the AC power source. The thyristor type lamp dimmers are in common use where some of them energize a triac or other types of thyrisors through the signals created from an IC. The commercially available IC from Siemens Corporation is the S566B. To control a triac dimmer circuit, it uses an MOS circuit. The triac couples the line voltage to a load to provide the DC power for operating the integrated circuit.

Two different types of touch control circuits can manipulate the integrated circuit model S566B. One type of control circuit uses a touch sensor that is connected to one input of the IC by high impedance. The touch sensor must be located near to the IC because of the high impedance of the circuit. This is to prevent faulty procedures due to transient noise. The other type of control circuit makes use of a transistor that is connected in series between one side of the AC power line and another input of the IC through its emitter and collector. Between the ground and base of the transistor is where the touch sensor is connected. The touch sensor and transistor may be located away from the IC because the collector and emitter terminals of the transistor make up a low impedance circuit. Doing this will not lead to an undesirable effects on the circuit. On the other hand, because of the high impedance of the touch sensor circuit, the touch sensor must maintain its close position to the transistor. In either versions of the control circuit, the touch sensor can still be subjected to transient electrical noise even if located remotely from all the other equipment. Proper operation of the control circuit depends upon a specific polarity of the line circuit. The control circuit will not function if the line plug is inserted incorrectly into its holder.

In this circuit, the intensity of the light in a bulb can be varied by means of a touch. The touch control circuit is operated by the S566B IC that processes the information of duration of touch. It verifies the luminance of the lamp based on the information. By touching the lamp for a small period of time at about 60 ms to 400 ms, the lamp will change its state form being ON or OFF. If the length of time is more than 400 ms upon touching the lamp, the intensity changes from dark to luminous or the other way around. A complete and peak intensity of the lamp would require around 7 seconds of touch contact. The level of intensity will remain constant upon releasing the touch contact. The selected intensity will be saved by giving a short contact although it will turn OFF the lamp. But once a new short touch is provided, the lamp will turn ON with the last saved level of intensity. From the level that has been stored, the control of intensity will start at this level.

The lamp can be controlled from a distance using an external touch circuit or by pressing a push buttor switch S1. It can be place in parallel with different points, far from the lamp. The circuit is designed to blend well with modern designs of home wirings where the switches or dimmers are connected in the line of phase and the lamps are connected in the neutral line. Otherwise, the operation is performed by pressing the switches if the lamp is connected in phase and switches are connected in the neutral line. The phase conduction of a thyristor is controlled by the touch sensitive dimmer control. The thyristor is a triac type which is connected in series with a source of AC power and a load. The triac is a 3-terminal device that functions as a bidirectional alternating current switch.

The circuit can take a power rating of about 300 W, but the presence of high voltage in the circuit will require much attention for the manufacturer. The insulation should be very good on this type of high voltage design. The addition of inductor L1 and capacitor C6 together with resistor R12 will provide the suppression of such high voltages. The inductor L1 is wound with 50 turns of copper wire in a diameter of 0.5 mm up to the capacitor C6 and is insulated properly. The presence of unwanted noise can be decreased by the use of resistor 47R.

Thyristors are made of various types which include triacs, silicon controlled rectifiers (SCRs), sidacs, and diacs. They are of ten used as a device for carrying the overcurrent because of the fundamental nature of the related sensing circuit. Devices for large capacity power switching ar utilizing thyristors for the low ON-state voltage characteristics. While conforming to demanding power loss requirements large amounts of power are necessary to be controlled by semiconductor switches. These types of switches are currently used in uninterrupted power supplies, induction heating, motor control systems, and other high power applications. The switching of large currents at high voltages is permitted by the well known power semiconductor thyristor. They can be found in several consumer and industrial products such as motor speed controllers, heater controllers, and light dimmers.

Sources: Touch Dimmer