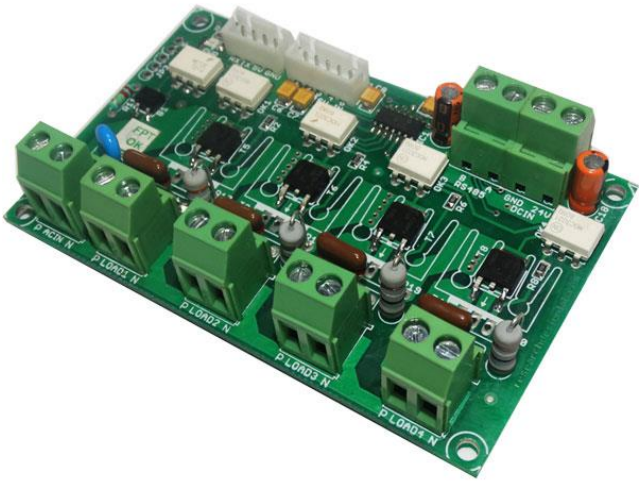
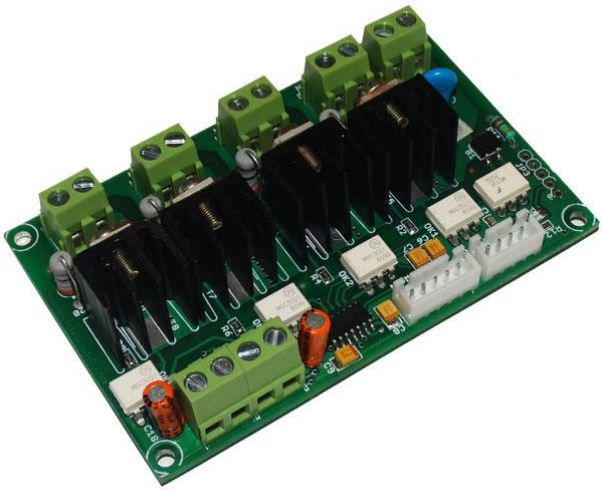
Research
Design Lab





4 Channel Dimmer

Contents

1. Overview

Solid State Relays (SSR) are semiconductor equivalents of the electromechanical relay and can be used to control electrical loads without the use of moving parts. The SSR switch ON / OFF and 0-100% dimming can be controlled using controller , switches and PLC logics .This switch can be used control light , FAN, power socket , Triac dimming enabled LED's and any other remote ON / OFF or dimming application.

2. Features

Fig1: 4A SMD dimmer

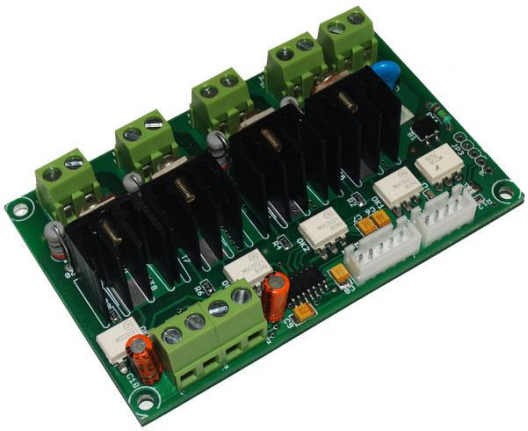


Fig 2: 8A dimmer

4A SSR Dimmer

- **Dimming method : Phase dimming**
- On/Off and dimming control.
- Circuit enabled with snubber.
- Accurate firing angle control and smooth dimming.
- Operating Voltage 12V/24V DC.
- Isolated power section from the input.
- 0-100% dimming.
- Load Capacity 12 Amp AC(Up to 2000 Watt).
- Works from any microcontroller input.
- Serial Control (TTL).

BT136S-600 Triac Features:

- Gate Trigger Current Max (QI), Igt: 70Ma
- Gate Trigger Voltage Max Vgt: 1.5V
- Holding Current Max Ih: 15mA
- No. of Pins: 3
- On State RMS Current IT(rms): 4A
- Operating Temperature Max: 125°C
- Peak Gate Power: 5W
- Peak Non Rep Surge Current Itsm 50Hz: 25A
- Peak Repetitive Off-State Voltage, Vdrm: 600V
- Triac Case Style: SOT-428.

8A SSR Dimmer

- On/Off and dimming control.
- Enabled with snubber circuit.
- Accurate firing angle control and smooth dimming.
- Operating Voltage 5V DC.
- Isolated power section from the input.
- 0-100% dimming.
- Inbuilt power supply.
- Typical Power handling upto 1800Watts.
- Maximum power handling 2760Watts *.
- High quality PCB FR4 Grade with FPT Certified.

BTA12 Triac Features:

- Blocking Voltage to 800 V
- On-State Current Rating of 12 A RMS at 25°C
- Uniform Gate Trigger Currents in Three Quadrants
- High Immunity to dV/dt − 1500 V/s minimum at 125°C
- Minimizes Snubber Networks for Protection
- Industry Standard TO-220AB Package
- High Commutating dI/dt − 1.5 A/ms minimum at 125°C
- Internally Isolated (2500 VRMS)
- These Devices are Pb−Free and are RoHS Compliant*

3. Application

This switch can be used to control light, FAN, power socket, Triac dimming enabled LED's and any other remote ON / OFF or dimming application.

Energy saving:

Uses triac technology to decrease the power consumption.

……..Compared traditional switches SSR switches can save power. Dimmer switches restrict the current flowing to a light bulb through the use of CL or TRIAC technology, allowing for a low lighting range.

Longer lifespan of light bulbs:

Adds longevity to bulbs thereby increasing the lifespan.

……Using dimmers adds longevity to your light bulbs by lowering the time your light bulbs are at the highest point of energy exertion.

Adjustable ambience:

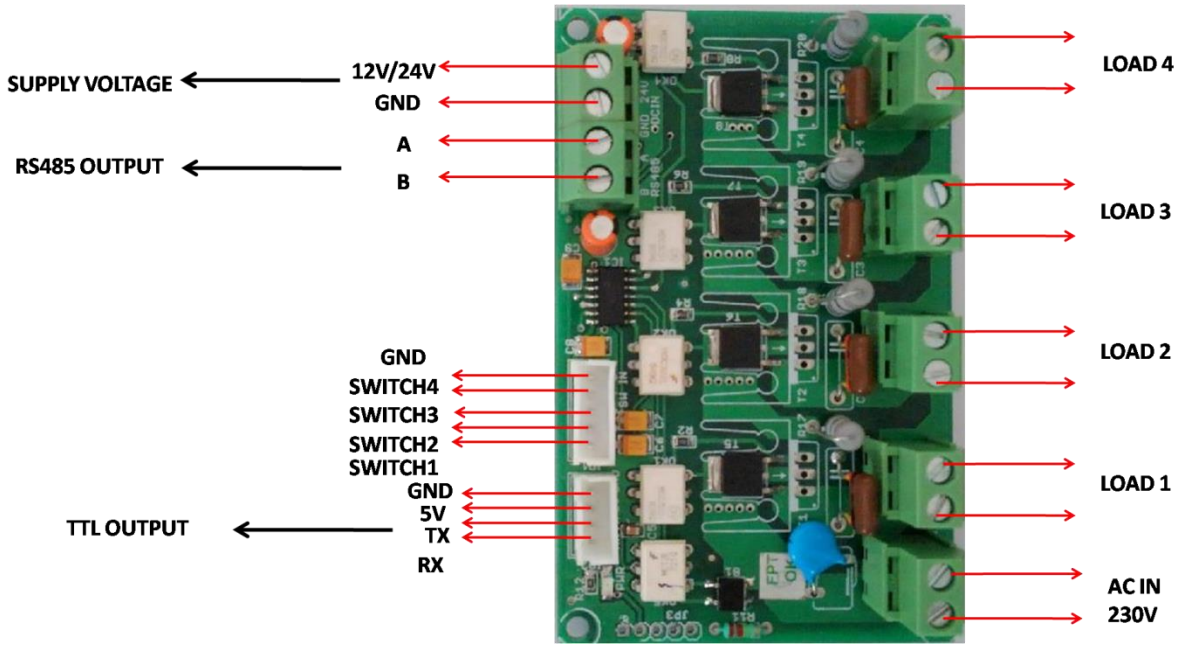
Adjustable ambience control for hotels and apartments.

…..Dimmer switches are a cost effective way of offering multiple lighting levels in rooms that have limited amount of lighting arrangements.

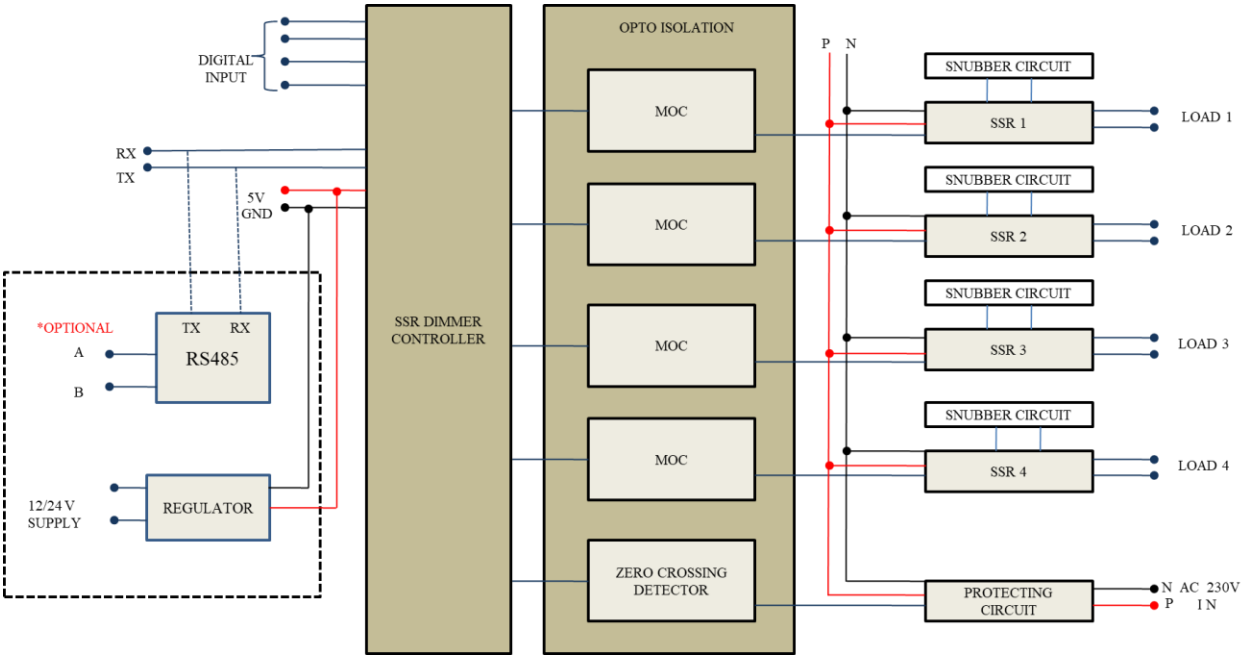
4. Advantages

- Unlike electromechanical relays, there are moving parts in a solid state relay.
- Complete electrical isolation between input and output contacts.
- No contact bounce issues.
- AC loads can be easily controlled with a low current DC voltage using a solid state relay providing long life and high switching speeds.
- Zero voltage turn-on and zero current turn-off eliminating electrical noise and transient.
- Ability to switch OFF AC loads at the point of zero load current, thereby eliminating the arcing, electrical noise and contact bounce.
- LED light dimming.

5. Module Description

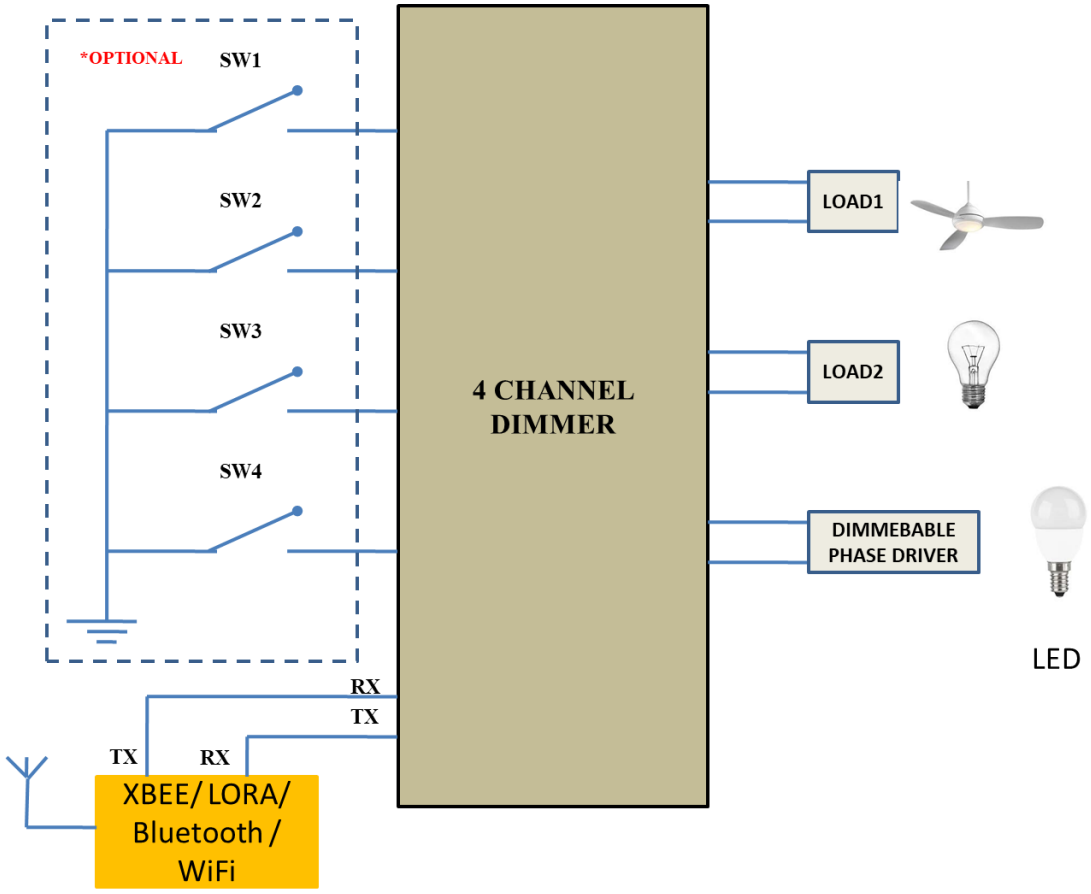


6. Functional block diagram



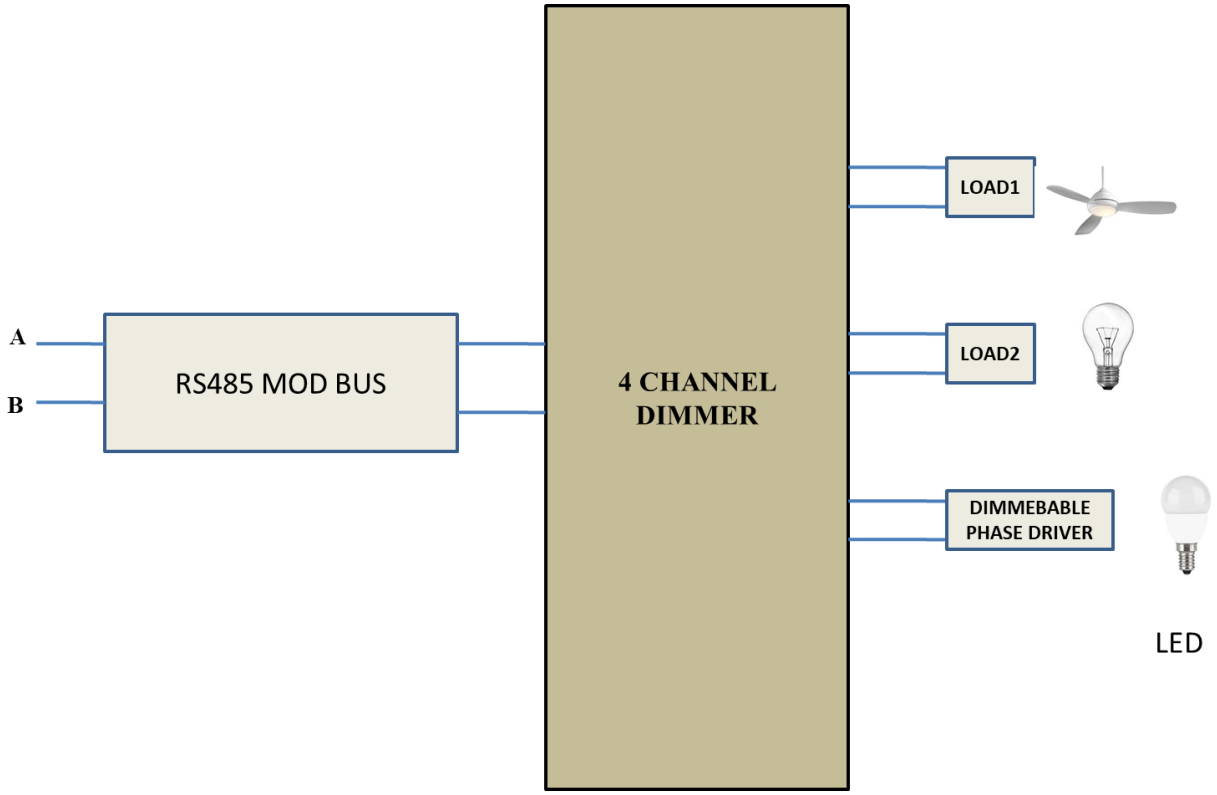
7. Application wiring

Use case 1



Sample Program

Use case 2



Sample Program

8. Dimensions

9.5cm

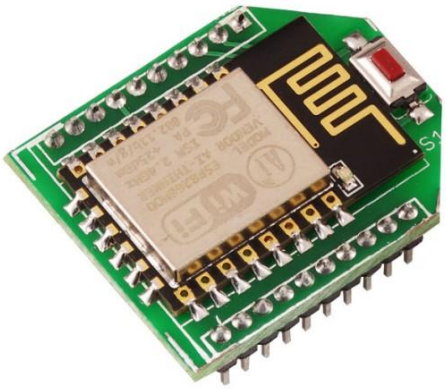
6 cm

9. Accessories

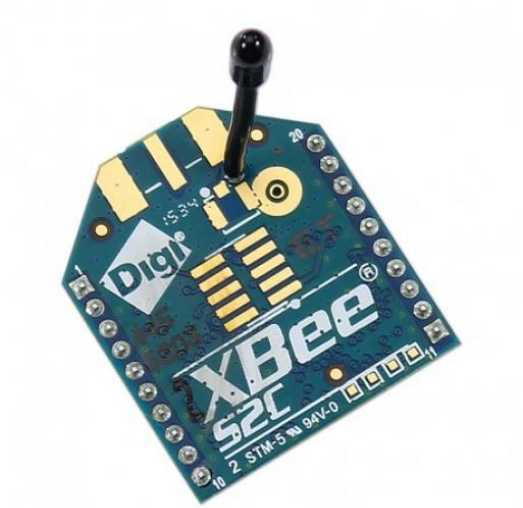
1. **Power supply**

2. **Bluetooth breakout board**

3. **ESP8266-12, ESP8266-32 breakout board**



4. **Xbee**



10.Order information table

11. Do’s and Don’ts

1. Avoid placing circuit boards on a metal surface
2. Avoid placing circuit boards on your palm
3. Avoid holding circuit with component
4. Use anti static gloves

12. FAQ

Question 1: I'm very interested in the dimmer board but I'm wondering if you know anything about the dimming technology (PWM / phase control)? I want to dimmer LED light bulbs with it; do you know if that will work?

Answer: This board working phase dimming. If you want to control the LED, you have to make sure that LED driver support for phase dimming.

Question 2: Is it possible connect all the six units to a Raspberry Pi and be able to control all 18 outputs separately from each other. This would require that all six controllers are separately addressable or else they will need to be connected to a different digital output on the Raspberry Pi.

Answer: You can connect six units of the Serial 3 Channel Dimmer to Raspberry Pi by interfacing 8 Channel Multiplexer (74HC4051) with Raspberry Pi.

Question 3: Does this module works with node mcu on mqtt protocol? How to connect this module with node mcu?

Answer: This module is designed to control using four analog input pins. If you want to control the dimmimg over WiFi, the firmware of the device need to be updated.

13. References

1. http://www.onsemi.com/pub/Collateral/MOC3023M-D.PDF
2. http://pdf.datasheet.live/datasheets-1/fairchild_semiconductor/MOC3021-M.pdf
3. http://www.onsemi.com/PowerSolutions/product.do?id=MCT2EM
4. http://ww1.microchip.com/downloads/en/DeviceDoc/40001291H.pdf

14. Online buying information