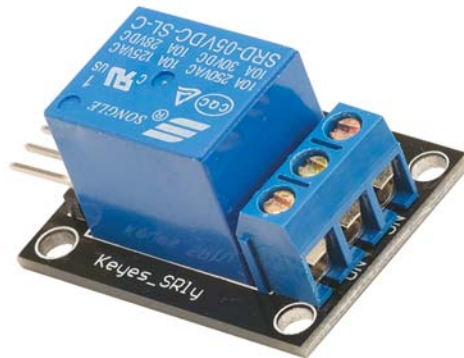


## Single Relay Board (#27115)

The Single Relay Board can be used to turn lights, fans and other devices on/off while keeping them isolated from your microcontroller. The Single Relay Board allows you to control high-power devices (up to 10 A) via the on-board relay. Control of the relay is provided via a 1x3 header – friendly to servo cables and convenient connection to many development boards, such as the Board of Education, Propeller Board of Education, Professional Development Board and Propeller Professional Development Board.



### Features

- Control high-power devices up to 10 A
- Provides isolation between microcontroller and device being controlled
- Screw terminals for relay connections
- 3-pin servo-style header for power/signal interface
- LED indicator

### Specifications

- Power Requirements: 5 VDC @ ~85 mA (Relay Power), 3.3-5 VDC (input signal)
- Communication Interface: Logic High/Low (3.3-5 VDC)
- Operating temperature: -13 to +158 °F (-25 to +70 °C)
- Dimensions: 1.57 x 1.06 x 0.71 in (4.0 x 2.7 x 1.8 cm)

### Application Ideas

- 120 VAC brushless fan/lighting control
- 12 VDC automotive applications

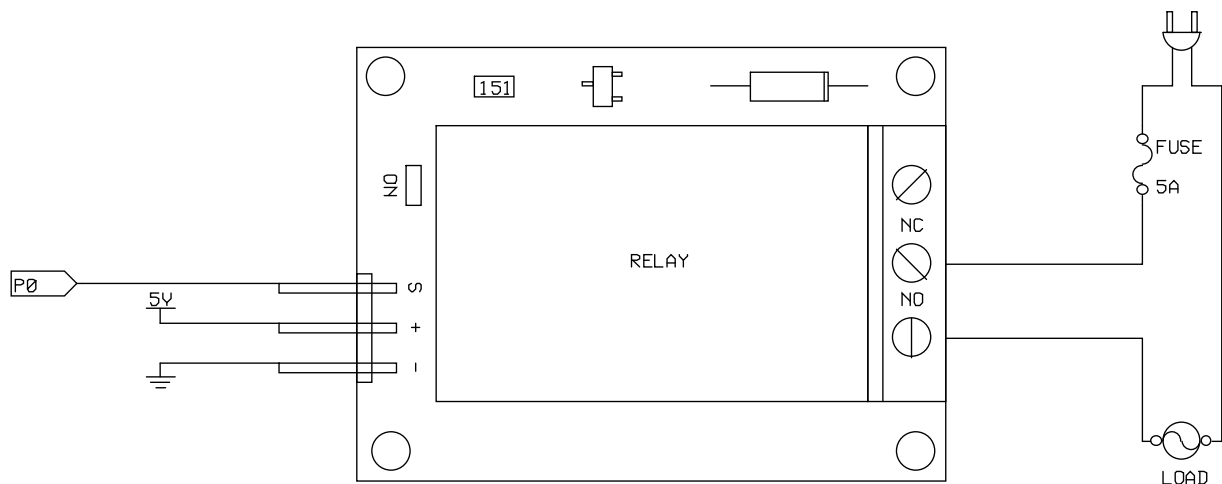
## Precautions

As with any device capable of switching high voltage, precautions should always be taken to avoid damage and/or injury. The following precautions are recommended in addition to any precautions by the manufacturer of any equipment connected to this device.

- Always disconnect main power when connecting circuits to the Single Relay Board.
- When using high-power circuits, mount the Single Relay Board inside a suitable enclosure or electrical panel using standoffs. The board should not be able to move.
- Secure all electrical connections to the board so they cannot move; provide strain relief for any wires extending outside the enclosure.
- Fuse any incoming voltage rails that are to be switched by the relay, prior to entering the Single Relay Board terminal block.
- Always be sure any incoming voltage rails are powered off prior to connecting them to the Single Relay Board.
- Observe Max Switching Current! 10 A @ 250 VAC / 30 VDC.
- While mechanical relays provide electrical isolation from control circuits, it is possible for EMF generated by high-power devices to affect the control circuits. This is especially true if the control wires and/or power leads are longer than 6 inches (~15 cm). Always try to keep wires as short as possible and avoid running high-power leads near or across control lines.

## Quick-Start Circuit

The Single Relay Board has an on-board transistor that switches the relay coil on/off. Diode protection of back-EMF is provided via an on-board diode. Essentially you're providing a common ground, relay supply voltage of 5 VDC and a signal input to activate the relay via the transistor.



**Figure 1: Connection Example**

In the example in Figure 1 the relay is switching a 120 VAC load, such as a lamp or brushless fan. Notice the fuse in the example is 5 A, not 10 A. The fuse should be chosen according to the load, not the max current of the relay. You want the fuse to blow when the device draws more current than it is supposed to. Notice on the input that the "S" input connects to P0 of a BASIC Stamp Module, Propeller chip or any I/O pin from any 3.3 V or 5 V microcontroller.

The order of the 3-pin header makes it compatible with the servo header connections on many Parallax development boards. You could also use pluggable wires to make these connections.

## Resources and Downloads

Check for the latest version of this document from the Single Relay Board product page. Go to [www.parallax.com](http://www.parallax.com) and search 27115.

## Pin Definitions and Ratings

Pin	Name	Type	Function
-	Ground	G	Signal/Coil Ground
+	Supply	P	Relay Coil Supply
S	Signal	I	Signal Input

Pin Type: P = Power, G = Ground, I = Input, O = Output

## Specifications

Symbol	Quantity	Minimum	Typical	Maximum	Units
S	Signal Input Voltage	3.3	5	—	V
+	Relay Supply Voltage	—	5	—	V
—	Relay Supply Current	0	85	—	mA
—	Max Switching Current	—	—	10	A

## BASIC Stamp<sup>®</sup> Example Code

This program uses the BASIC Stamp Editor software. The software is a free download from [www.parallax.com/basicstampsoftware](http://www.parallax.com/basicstampsoftware).

```
' 27115-BS2SourceCode.bs2
' Toggles relay on/off every second

' {$STAMP BS2}
' {$PBASIC 2.5}

RLY1 PIN 15

DO
  HIGH RLY1
  PAUSE 1000
  LOW RLY1
  PAUSE 1000
LOOP
```

## Propeller™ P8X32A Example Code

Note: This application uses the 27115-P8X32ASourceCode.spin object. It toggles the relay on/off every second. The Propeller Tool is available from the Downloads link at [www.parallax.com/Propeller](http://www.parallax.com/Propeller).

```
{{27115-P8X32ASourceCode.spin  
Toggles relay on/off every second  
}}
```

```
CON
```

```
  _clkmode = xtal1 + pll16x  
  _xinfreq = 5_000_000
```

```
  RLY      = 14
```

```
PUB Toggle
```

```
  dira[RLY]~~
```

```
  repeat  
    !outa[RLY]  
    waitcnt(clkfreq + cnt)
```