

## Dual Relay Board for Board Revision 1



### Product Features

- The Dual Relay Board allows digital outputs of the 1018 InterfaceKit 8/8/8, the 1202 Text LCD or the 1203 TextLCD to control larger loads and devices like AC or DC motors, electromagnets, solenoids, and incandescent light bulbs.
- The 3051 contains 2 relays for switching AC or DC power.
- The relays are Single Pole Double Throw (SPDT)
- The Solid State Relay can switch up to 240 V AC at 10 Amps and 100 V DC at 5 Amps.

### Designed to be used with:

- 1018 PhidgetInterfaceKit 8/8/8
- 1202/1203 PhidgetTextLCD with InterfaceKit 8/8/8

# Getting Started

## Installing the Hardware

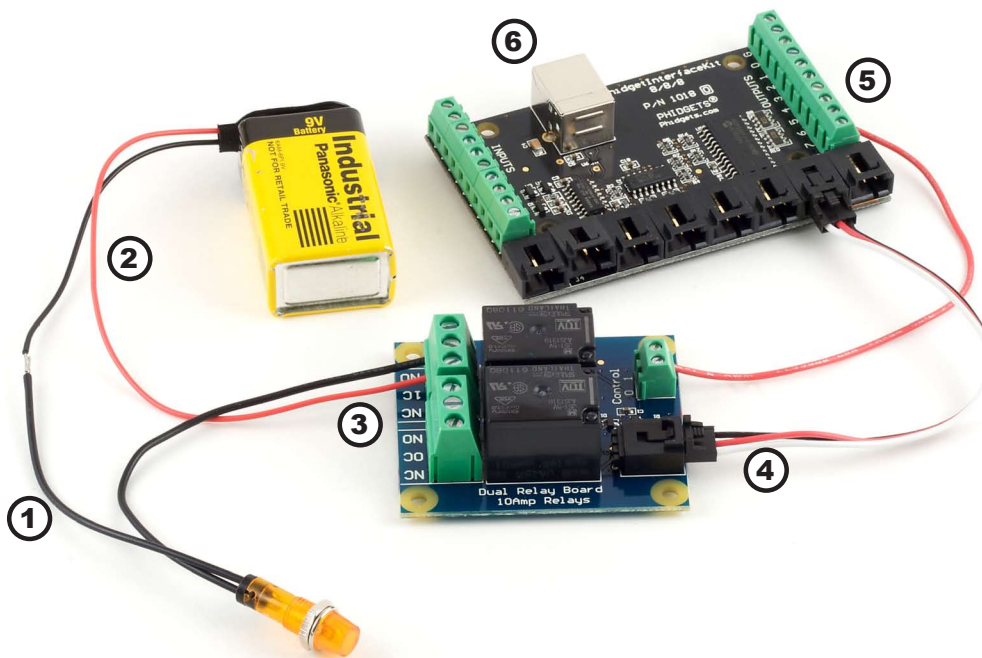
The Kit contains:

- A Dual Relay Board
- A Sensor Cable

You will also need:

- A PhidgetInterfaceKit 8/8/8
- A USB cable
- A 9V battery, a battery connector
- A piece of wire
- An incandescent bulb

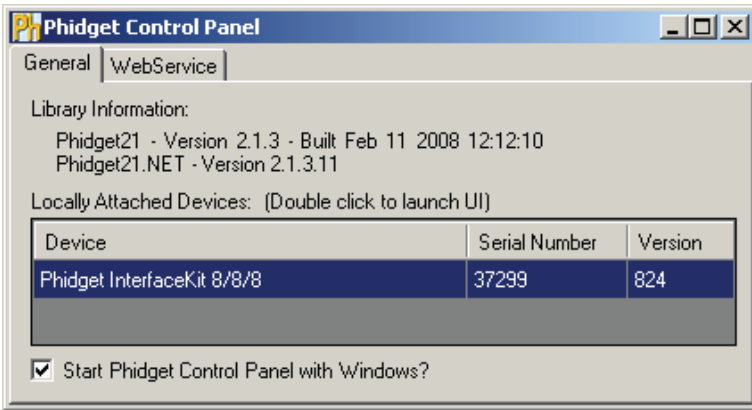
## Connecting all the pieces



1. Connect the black/negative(-) wire from battery connector to one of the bulb wire.
2. Connect the red/positive (+) wire from the battery connector to the 1C (Common) connector on the Dual Relay Board.
3. Connect the other bulb wire to the NO (Normally Open) connector on the Dual Relay Board.
4. Connect the Dual Relay Board to the InterfaceKit 8/8/8 using the sensor cable.
5. Connect Control 1 on the Dual Relay Board to Digital Output 6 on the InterfaceKit 8/8/8 using a piece of wire.
6. Connect the 1018 - PhidgetInterfaceKit to your PC using the USB cable.

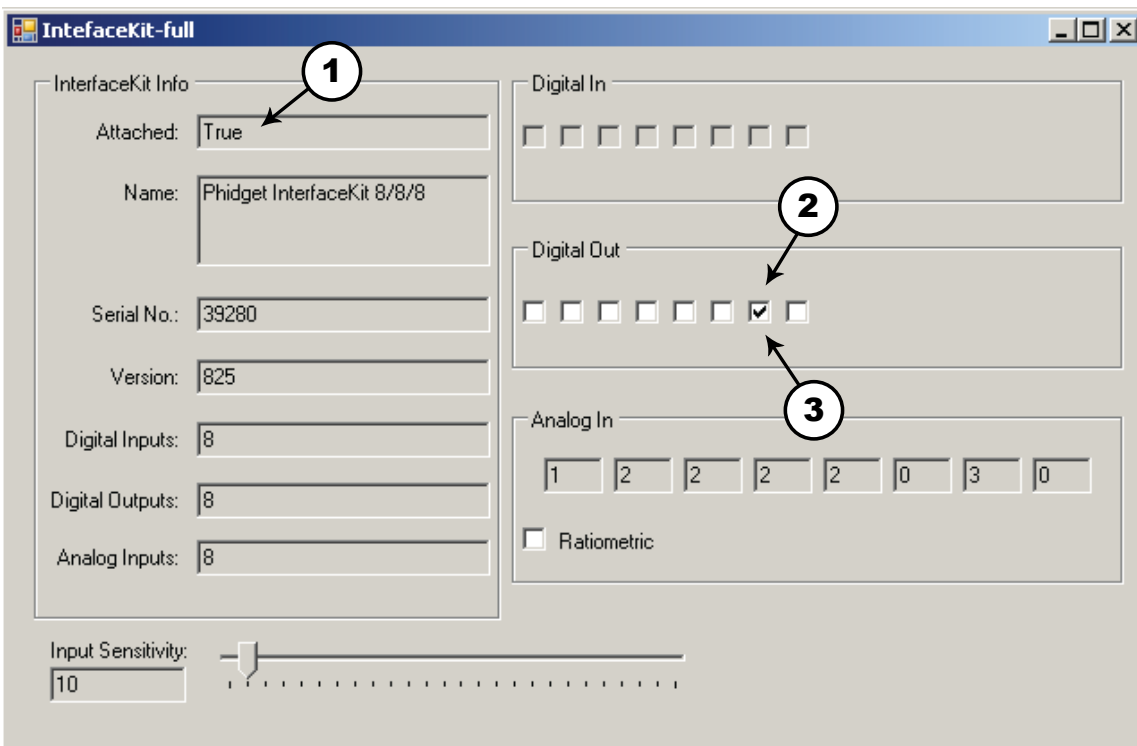
# Testing the Dual Relay Board connected to an InterfaceKit 8/8/8

## Using Windows 2000/XP/Vista



Double Click on the  icon to activate the Phidget Control Panel and make sure that the **Phidget InterfaceKit 8/8/8** is properly attached to your PC.

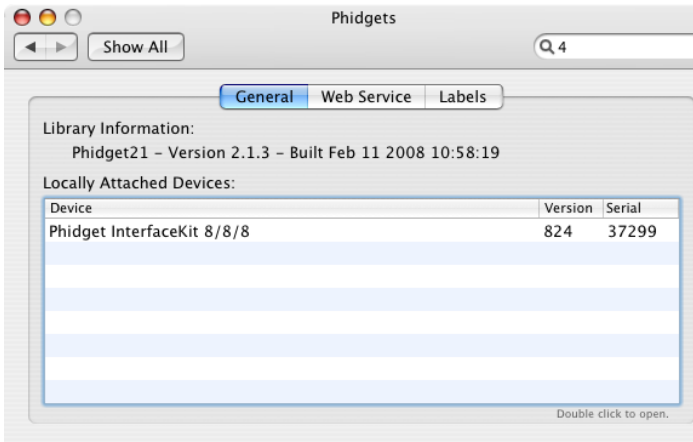
1. Double Click on **Phidget InterfaceKit 8/8/8** in the Phidget Control Panel to bring up InterfaceKit-full and check that the box labelled Attached contains the word True.



2. Click on the Digital Out box. A tick mark appears in the box and the bulb lights up. Click on the box again. The tick mark goes away and light goes out. If you unplug the Dual Relay Board while the light is on, it will go off.
3. Move the bulb wire from NO to NC (Normally Closed). Now the light is on when there is no tick mark and off when there is. If you unplug the Dual Relay Board when the light is on, it will stay on.

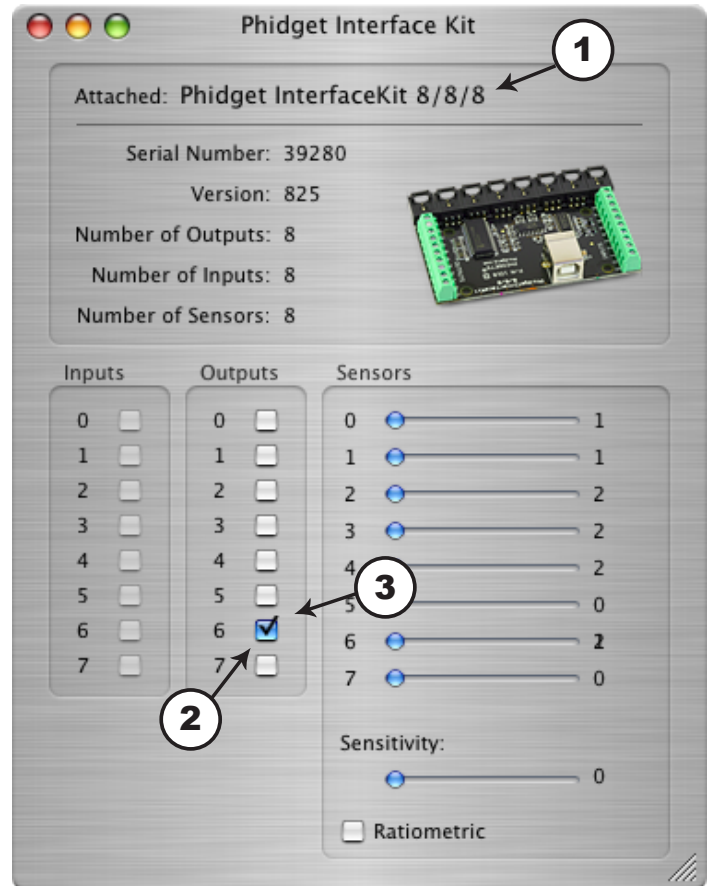
# Testing the Dual Relay Board connected to an InterfaceKit 8/8/8

## Using Mac OS X



Click on System Preferences >> Phidgets (under Other) to activate the Preference Pane. Make sure that the **Phidget InterfaceKit 8/8/8** is properly attached.

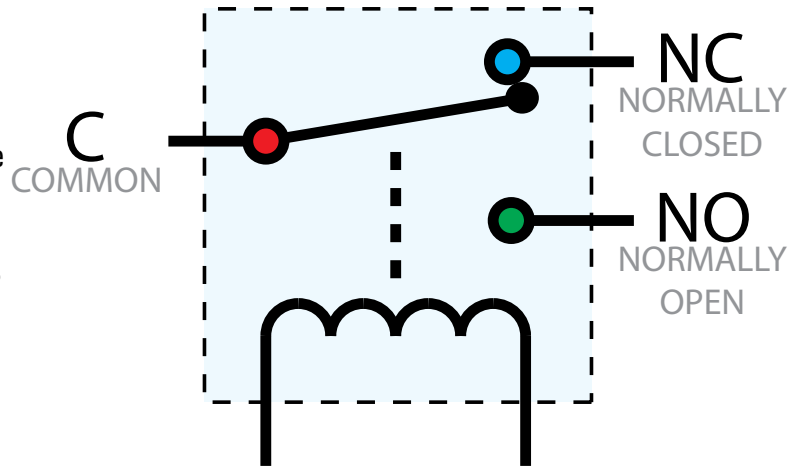
1. Double Click on **Phidget InterfaceKit 8/8/8** in the Phidget Preference Pane to bring up the Phidget Interface Kit Example and check that the Phidget InterfaceKit 8/8/8 is attached.
2. Click on the Outputs box. A tick mark appears in the box and the bulb lights up. Click on the box again. The tick mark goes away and light goes out. If you unplug the Dual Relay Board while the light is on, it will go off.
3. Move the bulb wire from NO to NC (Normally Closed). Now the light is on when there is no tick mark and off when there is. If you unplug the Dual RELAY Board when the light is on, it will stay on.



# Technical Information

## Relays

A relay is an electrically-controlled switch. Although many types of electrical switches exist, a relay's mechanical nature gives it the advantage of reliability and current-switching capacity. The main disadvantage to using mechanical relays is their limited life-span, as opposed to solid state relays who do not suffer from this drawback.



## Using a Digital Output Relay

Relays have a connection scheme determined by the arrangement of contacts within the relay. Because relays are a type of switch, they are defined in the same way other electromechanical switches are defined.

In switch schemes, the number of poles represents the number of common terminals a switch has, and the number of throws represents the number of switchable terminals that exist for each pole. The relays used in the Dual Relay Board are SPDT relays: single pole, double throw. The internal construction of this type of relay is depicted in the diagram above. Many other types of relays exist: SPST, DPDT, and DPST, to name a few.

In an SPDT relay, one of the throw terminals is labelled Normally Closed (NC), and the other is labelled Normally Open (NO). As the name indicates, the normally closed terminal is the terminal connected to common when the relay coil is not powered. When the relay coil is energized by the relay control circuit, the electromagnetic field of the coil forces the switch element inside the relay to break its contact with the normally closed terminal and make contact with the normally open terminal. The switch element would then connect the normally open terminal and the common terminal.

## Wetting Current

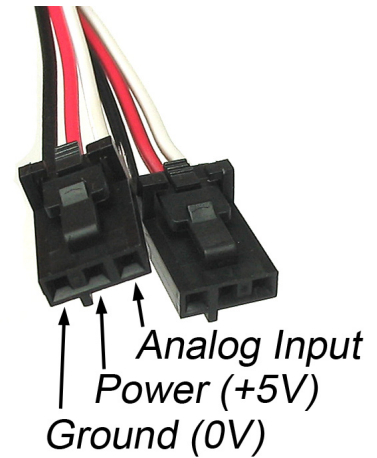
When a relay is in one switch position for a period of time, oxidation of the open contact(s) can occur. Depending upon the internal coating material of the contacts, oxide films of varying density will be displaced upon the surface of open contacts; this film acts as an insulator to current flow. When the relay is switched, a certain amount of current flowing through the contacts, known as the wetting current, is required to remove the film of oxides and ensure proper conduction. Because of this requirement, these relays are not reliable for signal switching. See the device specification on page 10 for detailed requirements.

## Load Noise

If highly inductive loads are used with the Dual Relay Board, it is recommended that a noise limiting component be used to prevent damage to the device. An MOV, TVS diode, or kickback diode (for DC applications) shunted across the load will assist in dissipating voltage transients.

# Analog Input Cable Connectors

Each Analog Input uses a 3-pin, 0.100 inch pitch locking connector. Pictured here is a plug with the connections labeled. The connectors are commonly available - refer to the Table below for manufacturer part numbers.



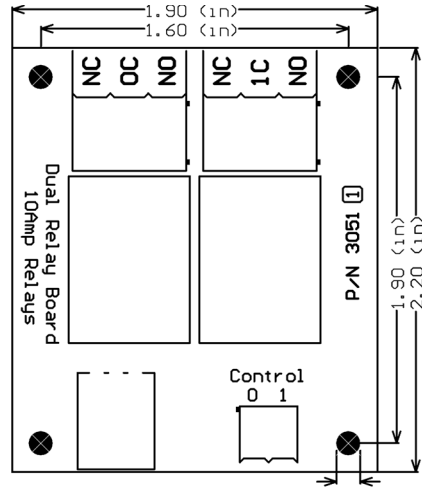
Cable Connectors		
Manufacturer	Part Number	Description
Molex	50-57-9403	3 Position Cable Connector
Molex	16-02-0102	Wire Crimp Insert for Cable Connector
Molex	70543-0002	3 Position Vertical PCB Connector
Molex	70553-0002	3 Position Right-Angle PCB Connector (Gold)
Molex	70553-0037	3 Position Right-Angle PCB Connector (Tin)
Molex	15-91-2035	3 Position Right-Angle PCB Connector - Surface Mount

Note: Most of the above components can be bought at [www.digikey.com](http://www.digikey.com)

Device Specifications	
Contact Resistance (max)	0.1 ohms
Minimum Switching Current (Wetting Current)	100 mA @ 5 VDC
Maximum DC Switching Voltage	100 VDC
Maximum DC Switching Current	5 A
Maximum AC Switching Voltage	250 VAC
Maximum AC Switching Current	10 A
Minimum Switching Current (Wetting Current)	100 mA @ 5 VDC
Maximum Operating Speed (Contacts Per Minute)	20 cpm
Operate time	10 ms
Recommended Terminal Wire Size	12 - 24 AWG
Terminal Wire Strip Length	5 - 6mm (0.196" - 0.236")

# Mechanical Drawing

1:1 scale



# Product History

Date	Product Revision	Comment
October 2007	n/a	Product Release
September 2008	Board Revision 1	Bigger Connectors, Bigger Board