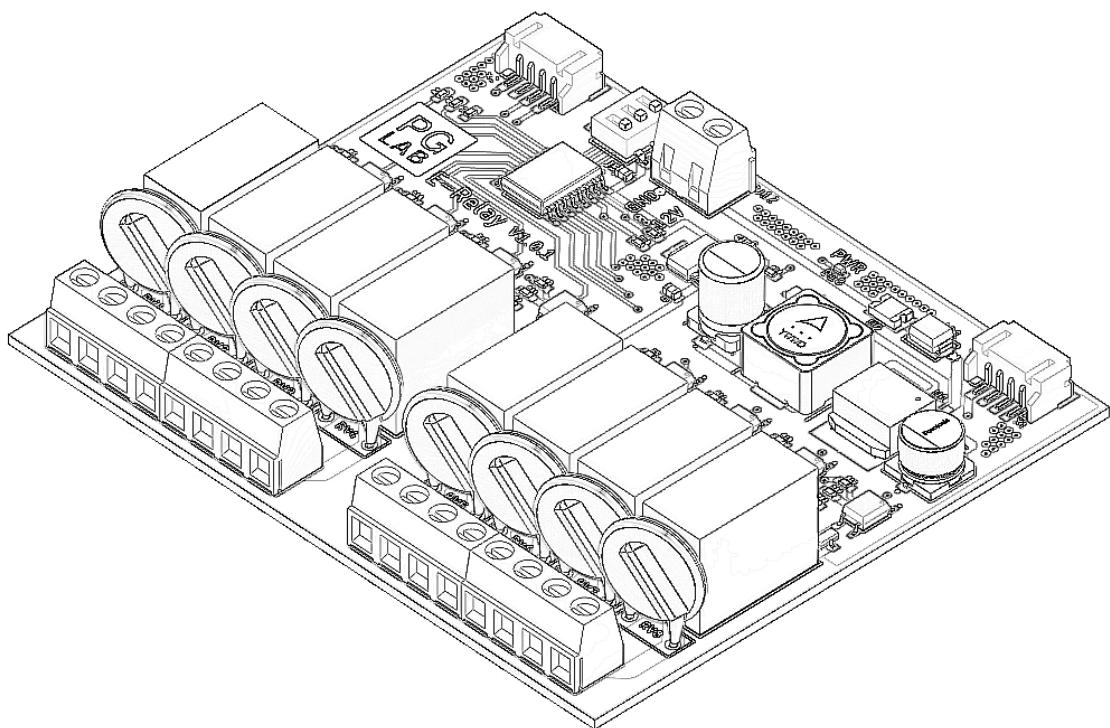




# E-RELAY

V1.0



**PG LAB ELECTRONICS**  
**Chiavari, Italy © December, 2021**

## Description

The E-Relay is a power board device that has been designed for switching eight high powered loads from your E-Board or another microcontroller using I2C. The E-Relay has eight individual Panasonic relays rated up to 10 Amps per channel at 250VAC. Each channel is optically isolated, it has its own LED, and screw terminals with NO clean contacts. On the PCB is possible to solder through hole Varistors, this to protect E-Relay circuitry from high voltage spike of switching inductive loads.

At the heart of the E-Relay is an PCF8574 that takes I2C commands to toggle the eight relays. The I2C address of the E-Relay is configurable by a 3 way DIP switch. This allows a single E-Board to control a daisy chain over 8 E-Relay devices. This mean a single E-Board can control 64 high voltage loads.

E-Relay include many safety precautions onto the PCB including, wide traces designed for high amperage, ground isolation between the relay and other circuitry. E-Relay is a power device for users who are experienced around, and knowledgeable about high AC voltage.

The E-Board is intended to be mounted into a standard switchboard. E-Board can works as standalone Device or as accessory to a home automation controller.

# Specification

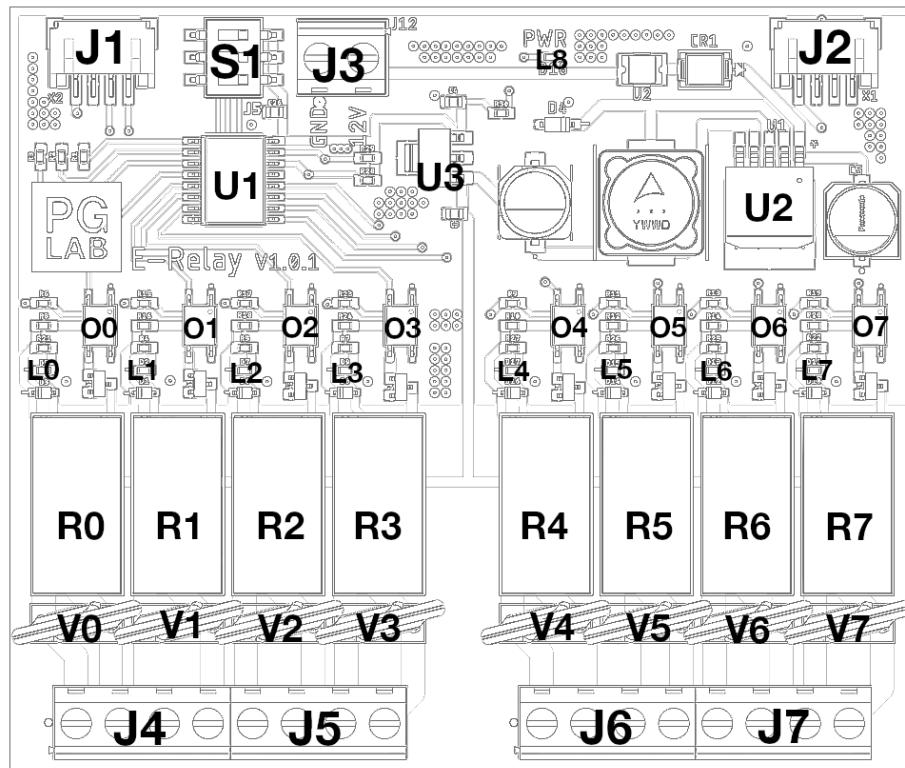
- Eight Output Power Relay Panasonic ALQ305
- PCF8574 for I2C control power relays
- I2C address by DIP switch
- I2C IN an OUT port for daisy chain connection
- Power Supply: 12Volt DC via Terminal Block Connector, input minimum 500mA
- Clean output NO contacts opto-isolated
- PCB space for soldering Varistors to protection from spike in switching inductive loads
- DIN rail mountable, 6 module footprint

# Contents

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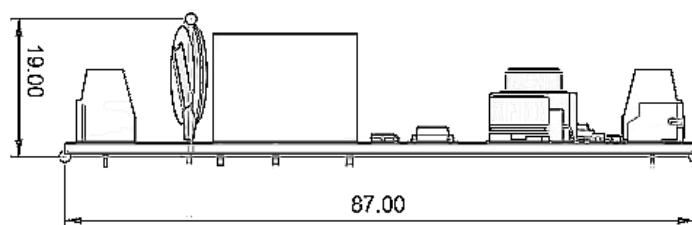
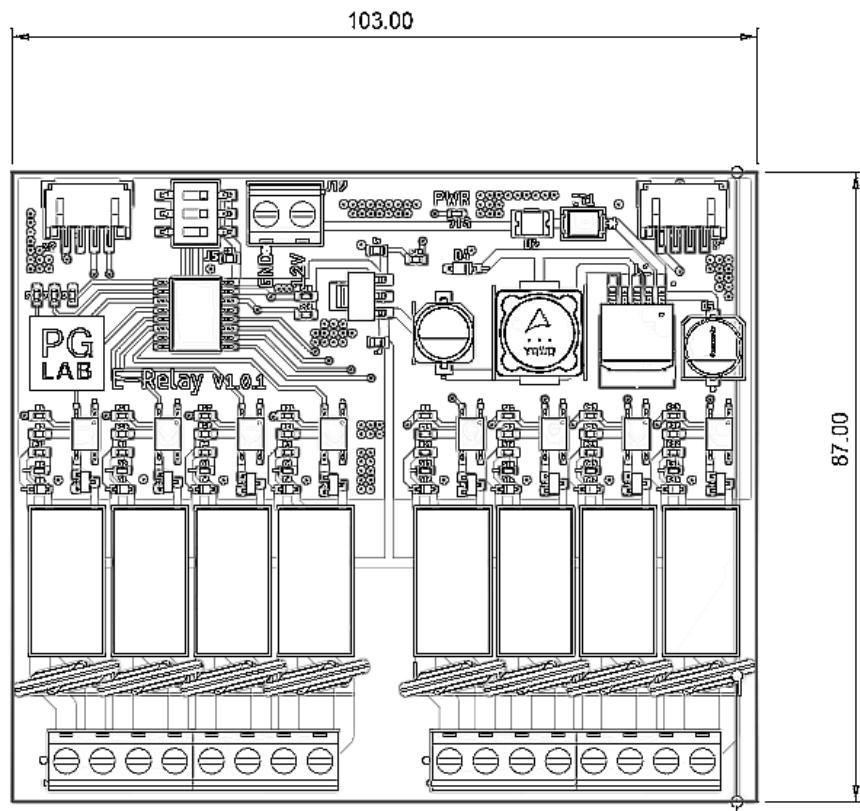
## Board Topology



Board Topology Top View

Ref.	Description	Ref.	Description
J1	I2C Input Connector	L0, L7	Power Relay Status LED
J2	I2C Output Connector	00, 07	Photocouplers, TLP2301
J3	Input Voltage	L8	Power Red LED
J4	Screw Terminal for R0, R1	U1	PCF8574 I2C Remote I/O
J5	Screw Terminal for R1, R2	U2	Linear Regulator 12V to 5V
J6	Screw Terminal for R3, R4	U3	Linear Regulator 5V to 3.3V
J7	Screw Terminal for R5, R6	S1	DIP Switch, I2C Address
R0, R7	Power Relay, Panasonic 305	V0, V7	Optional Varisitors

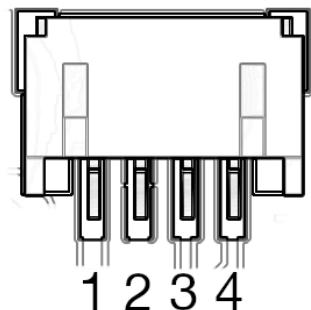
## Mechanical Information



## Operating Conditions

Description	Min	Max
Input Voltage	11.0V	13V
I2C Voltage	3.3V	3.3V
Power Consumption(all power Relays ON)	220mA	180mA
Power Consumption(all power Relays OFF)	10mA	8mA
Conservative thermal limits for the whole board:	-40 °C (-40°F)	85 °C ( 185°F)
Operating Temperature	0 °C (32°F)	50 °C ( 122°F)

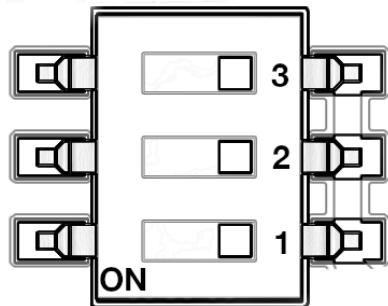
## I2C Connector



I2C Input/Output Ports Top View

Ref.	Description
1	+3.3V Reference Voltage
2	Common Ground
3	I2C SDA (Serial Data Line). The line for the I2C master and slave to send and receive data.
4	I2C SCL (Serial Clock Line). The line that carries the I2C clock signal.

## I2C Address



DIP Switch for I2C Address

The DIP Switch S1 is used to set the I2C address for E-Relay device. It's important that every E-Relay connected to the same I2C daisy chain has a different I2C address. It's responsibility of the user to change the pin of S1 to achieve the right i2C address. The following table show the pins mapping, the I2C address and the E-Board relay mapping.

Pins Status			I2C Write Address	E-Board Relay Mapping
1	2	3		
OFF	OFF	OFF	64 (decimal)	0..7
OFF	OFF	ON	66 (decimal)	8..15
OFF	ON	OFF	68 (decimal)	16..23
OFF	ON	ON	70 (decimal)	24..31
ON	OFF	OFF	72 (decimal)	32..39
ON	OFF	ON	74 (decimal)	40..47
ON	ON	OFF	76 (decimal)	48..55
ON	ON	ON	78 (decimal)	56..63

## Setup And Use

**Important:** Before beginning the installation, please read carefully and completely the documentation. Failure to follow recommended procedures could lead to malfunction, danger to your life or violation of the law. PG LAB Electronics is not responsible for any loss or damage in case of incorrect installation or operation of this device!

**Warning:** Do not allow children to play with the device. Keep the device away from children.

**Warning:** Be sure to use the right power supply and to connect the positive and the negative wires in the right order. Failure to follow the recommendation can seriously damage the E-Relay device.

**Caution:** Use E-Relay device only with power grid and appliances which comply with all applicable regulations. Short circuit in the power grid or any appliance connected to the E-Relay may damage the Device.

**Caution:** Do not connect the Device to appliances exceeding the given max load!

**Caution:** Connect the E-Relay only in the way shown in these instructions. Any other method could cause damage and/or injury.

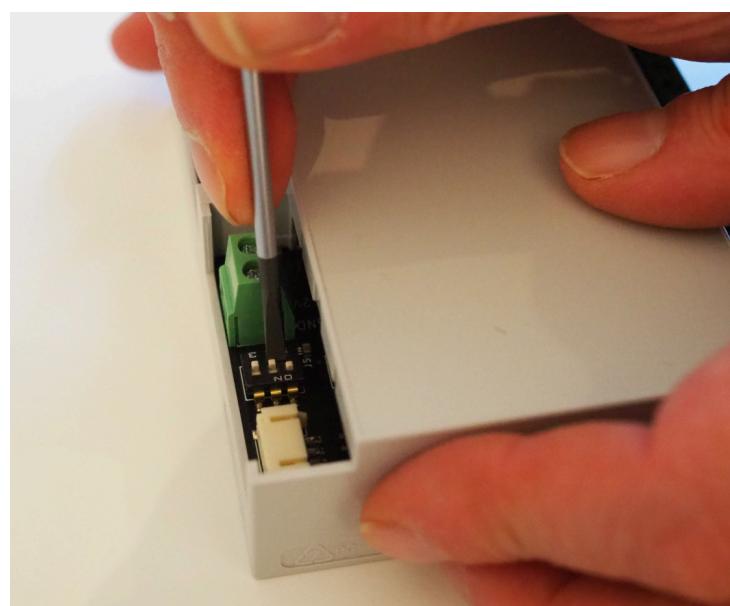
**Caution:** E-Relay is a power device for users who are experienced around, and knowledgeable about high AC voltage. Danger of electrocution. Mounting the E-Relay device to the power grid has to be performed with caution. The mounting/installation of the Device should be done by a qualified person (electrician).

**Caution:** Even when the E-Relay is turned off, it is possible to have high voltage across the screw terminals. Every change in the connection of the wires connected to the screw terminals has to be done after ensuring all local power is powered off/ disconnected.

In your package, you will find the enclosure of E-Relay electronic device as show in the following figure. The enclosure needs to be attached to a standard DIN bar in the switchboard. Attach E-Relay as show in the figure, be sure that the screw terminals and the black hook of the body enclosure is pointing down. You can use a screw driver to better engage the hook in the DIN bar.

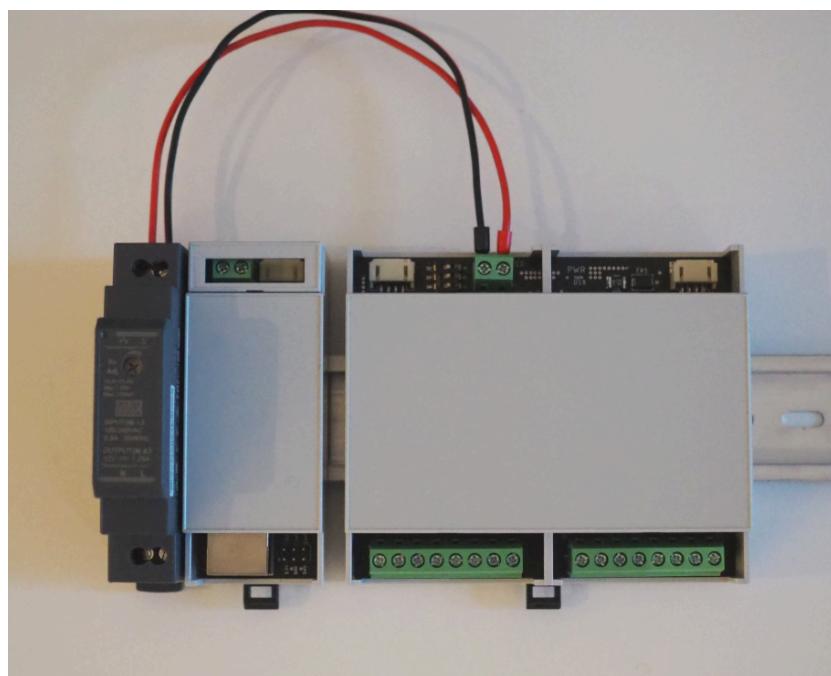


With an help of a small screw driver set the DIP switch pins to the needed I2C address.

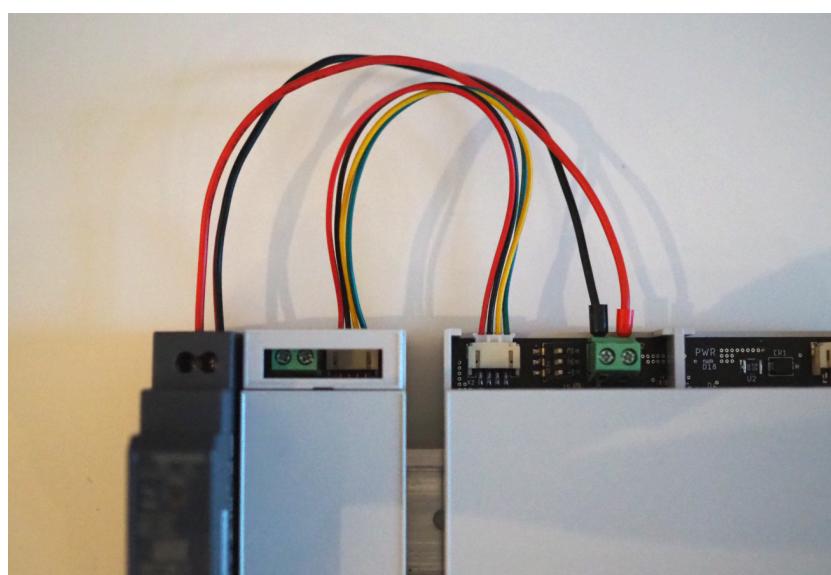


**Warning:** Be sure that every E-Relay device connected to the I2C daisy chain has a different I2C address. Two or more E-Relay devices with the same I2C address can cause malfunction and unpredictable behaviour.

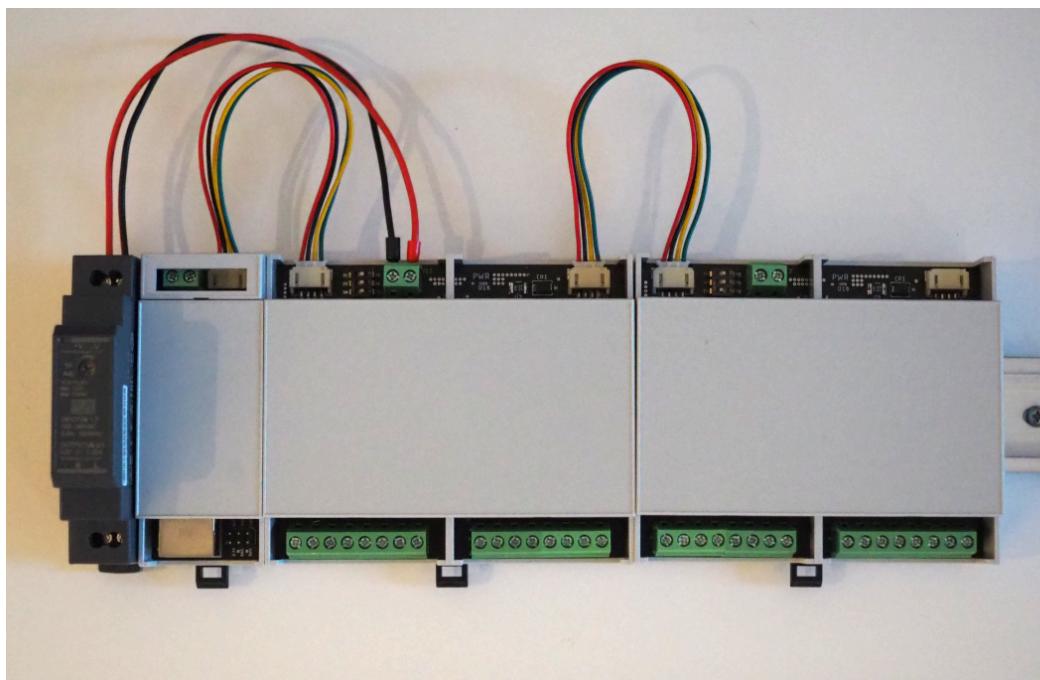
Connect the input voltage respecting the E-Board power supply specification. Be sure to connect the power lines respecting the polarity as show in the following figure.



Connect the I2C port to the E-Board I2C port using the 4 pin cable.



If you need more E-Relay devices, connect in a daisy chain way the I2C 4 pin cable as show in following figure. Be sure that every E-Relay devices is also connect to the power supply.



Using the screw terminal connect the loads that E-Relay need to be pilot.

