IoTextra Relay2

Relay Module

Module **IoTextra Relay2** (Rev. 3.02) has four Panasonic ALQ105, Omron G5Q-14, HF33F/005-ZS3 or TE PE014005 relays. Contact form – **SPDT (1 Form C).**

Switching Voltage: 250 VAC, 30 VDC. Contact Current Rating: 10A.
All channels have individual galvanic isolation with a dielectric strength 4000Vrms (for one minute between the coil and the contacts) and 750Vrms (for one minute between the opened contacts). Surge resistance between coil and contacts 8000V.
The module provides an indication of the relays' state.

There are two modes for using the **IoTextra Relay2** module:

- ***GPIO Mode***. In this mode, the relay channels are controlled via the **AP0-AP3** signals in the **HOST-P** connector.
- ***I²C Mode***. In this mode, the relays are controlled via the **I²C** bus using the I/O expander installed on the module (TCA9534 or a compatible one). Up to 16 modules can be connected to one **I²C** bus.

Combined Use: It is also possible to use the **AP0-AP3** signals for some channels through the **HOST-P** connector and for the rest via the I/O expander.

Main Applications of the Module:

- Industrial Applications
- Smart Home
- Lighting
- Heating, Ventilation, & Air Conditioning (HVAC)
- Field Devices and PLC
- Consumer electronics
- DC motor control
- Power On / Off Switching

FEATURES:

- Compatibility with major known microcontrollers
- Module power supply is 5VDC, which feeds a 3V3 regulator for powering the logic section
- 3V3 Indicator LED
- Protection against reverse power supply polarity
- 4 **SPDT (1 Form C)** type relays
- Switching Voltage: 250VAC/30VDC
- Contact rating (resistive):

Relay	NO	NC
Panasonic ALQ105	10A 125VAC 5A 250VAC 5A 30VDC	3A 125VAC 2A 250VAC 1A 30VDC
Omron G5Q-14	10A 125VAC 5A 250VAC 5A 30VDC	3A 125VAC 3A 250VAC 3A 30VDC
HF33F/005-ZS3	10A 125VAC 5A 250VAC 5A 30VDC	3A 250VAC 3A 30VDC
TE PE014005	5A 240VAC 5A 30VDC	

- Rated operating current is less than 80mA
- Coil resistance - 63Ω
- The dielectric strength of the insulation:
  - 4000Vrms for one minute between the coil and the contacts
  - 750Vrms for one minute between the opened contacts
- Surge resistance between coil and contacts is 8000V
- When working with the module: logical "1" (2.4-5V) – this turns off the relay (NC)
  logical "0" (0-0.9V) – relay activation (NO)
- The module features LED indicators for the relay status: LED lights up when the relay is on
- The relay is controlled using **AP0-AP3** signals (**RL1-RL4**) via the **HOST-P** connector and/or over the **I²C** serial bus via an I/O expander
- The I/O expander used in the module is a **TCA9534** or a compatible one
- The expander's **I²C** address (**A2-A0**) is set using jumpers **JP1, JP2** and **JP3** on the bottom-side of the module:

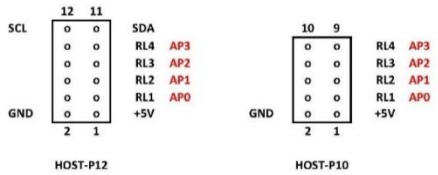
TCA9534	0	1	0	0	A2	A1	A0	x
TCA9534A	0	1	1	1	A2	A1	A0	x

- The default address on the **I²C** bus is 0100111x (for **TCA9534**) or 0111111x (for **TCA9534A**)
- Connection to the module via the **I²C** bus is done through **Qwiic©** connectors or through pins 11 (**SDA**) and 12 (**SCL**) of the **HOST-P12** connector
- Transient suppression and electrostatic discharge protection (ESD protection) of signals on Qwiic connectors is done using a TVS diode assembly
- Module size is 47x56 mm. The module has mounting holes, allowing it to be installed in the base module or on a Raspberry Pi

HOST-P CONNECTOR:

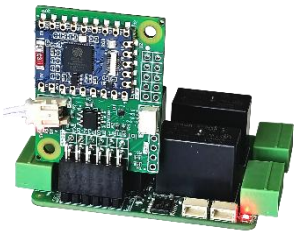
Depending on the version of the **IoTextra Relay2** module can have either a 12-pin (**HOST-P12**) or a 10-pin (**HOST-P10**) connector.

The pinouts for these connectors are shown in the image below:



The **HOST-P** connector is used differently depending on how the microcontroller interacts with the **IoTextra Relay2** module:

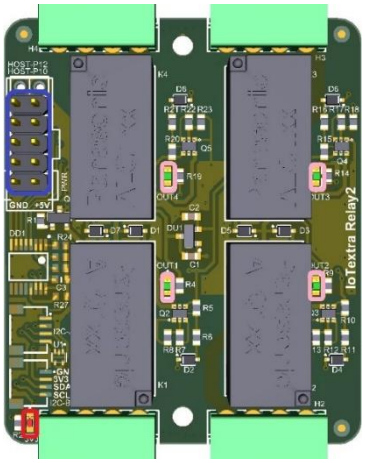
1) ***Standalone Use:*** In this mode, relay control signals are transmitted through the **HOST-P10** (**HOST-P12**) connector or via the **I²C** bus using an I/O expander.
2) ***Smart Use:*** In this mode, an **IoTsmart** microcontroller module is vertically inserted into the **HOST-P12** connector. Relay control and the 5V module power supply is done through the **HOST-P12** connector. Power is supplied from the **IoTsmart** module. Below is a photo of the **IoTextra Relay2** module with the **IoTsmart ESP32-S3** module installed:



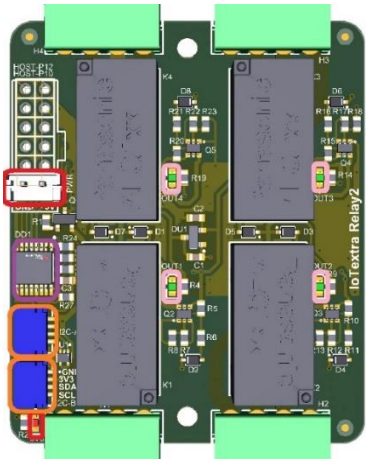
3) ***Mezzanine Use:*** In this mode, the **IoTextra Relay2** module is installed in the base module. Relay control and the 5V module power supply are done through the **HOST-P12** connector.

COMPONENT LAYOUT:

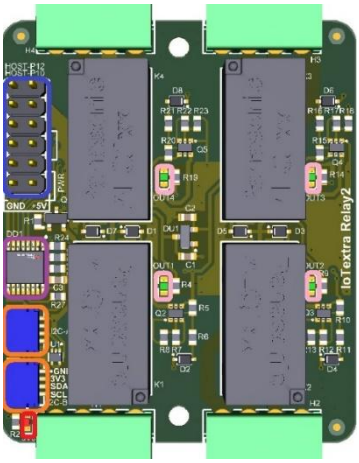
There are three versions of the **IoTextra Relay2** module, and accordingly, each with a different **top-side** component layout



HOST-P10



PWR and Qwiic©

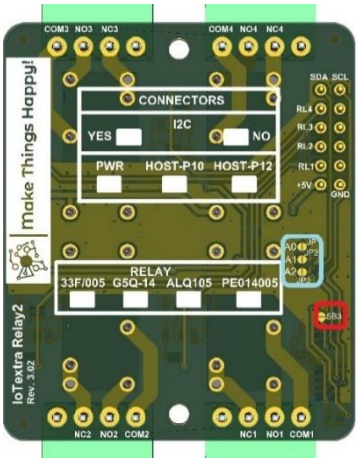


HOST-P12 and Qwiic©

It is possible to control **K1-K4** relays via connector **HOST-P** (highlighted in blue).
The **Qwiic©** connectors are highlighted in orange.
The I/O expander is highlighted in purple.
The relay status indicators are also on the **top-side** and are highlighted in pink.
If the module does not have a **HOST-P** connector, the 5VDC power for the module is supplied via the **PWR** connector. There is a 3V3 power indicator. The **PWR** connector and power indicator are highlighted in red in the **top-side** image.

JUMPERS:

The image below shows the component and marking layout on the **bottom-side** of the **IoTextra Relay2** module:



The ***I/O expander addresses*** are set on the **bottom-side** of the **IoTextra Relay2** module using jumpers **JP1, JP2** and **JP3** (highlighted in blue in the figure), setting the value **A2-A0**:

					A2	A1	A0	
TCA9534	0	1	0	0	JP3	JP2	JP1	x
TCA9534A	0	1	1	1	JP3	JP2	JP1	x

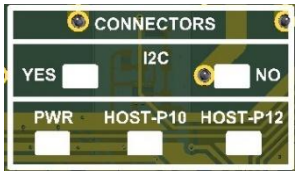
By default, the jumpers are open and the address on the **I²C** bus is 0100111x (for **TCA9534**) or 0111111x (for **TCA9534A**).
There is a jumper (highlighted in red in the figure), on the **bottom-side** of the **IoTextra Relay2** module that allows it to power devices connected via the **Qwiic©** connector. Highlighted in red. By default, the jumper is not installed.

CONFIGURATION TABLES:

The **bottom-side** also provides information about the relay model installed in the **IoTextra Relay2** module.
Possible relay models:

- **HF33F/005-ZS3**
- **Omron G5Q-14**
- **Panasonic ALQ105**
- **TE PE014005**

It also provides information on whether the following connectors are installed:



- **Qwiic©** connectors for **I²C**
- **PWR** power connector
- **HOST-P10** or **HOST-P12** connector for relays control

EXTERNAL SIGNALS CONNECTION:

Removable terminal blocks with a 3.5mm pitch are recommended for the **H1-H4** connectors on the module. The pin layout is marked on the **bottom-side** of the module.

ACCESSORIES:

The following accessories may be required for using the module:

- A set of four removable terminal blocks with a 3.5mm pitch for terminal blocks **H1-H4**
- Cable for the **HOST-P10** connector
- Cable for the **Qwiic©** connector
- Cable for the **PWR** connector