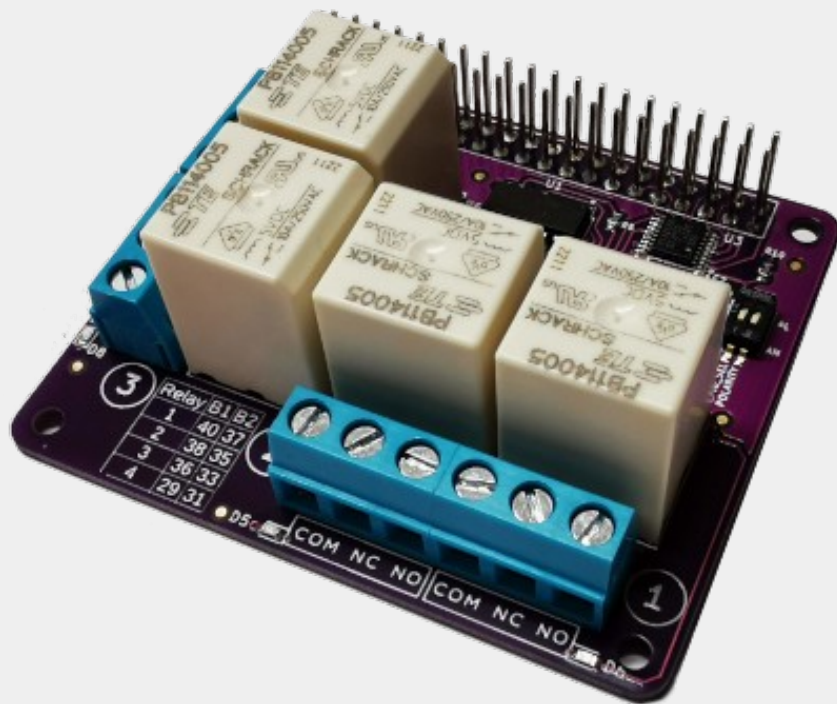

AQEX

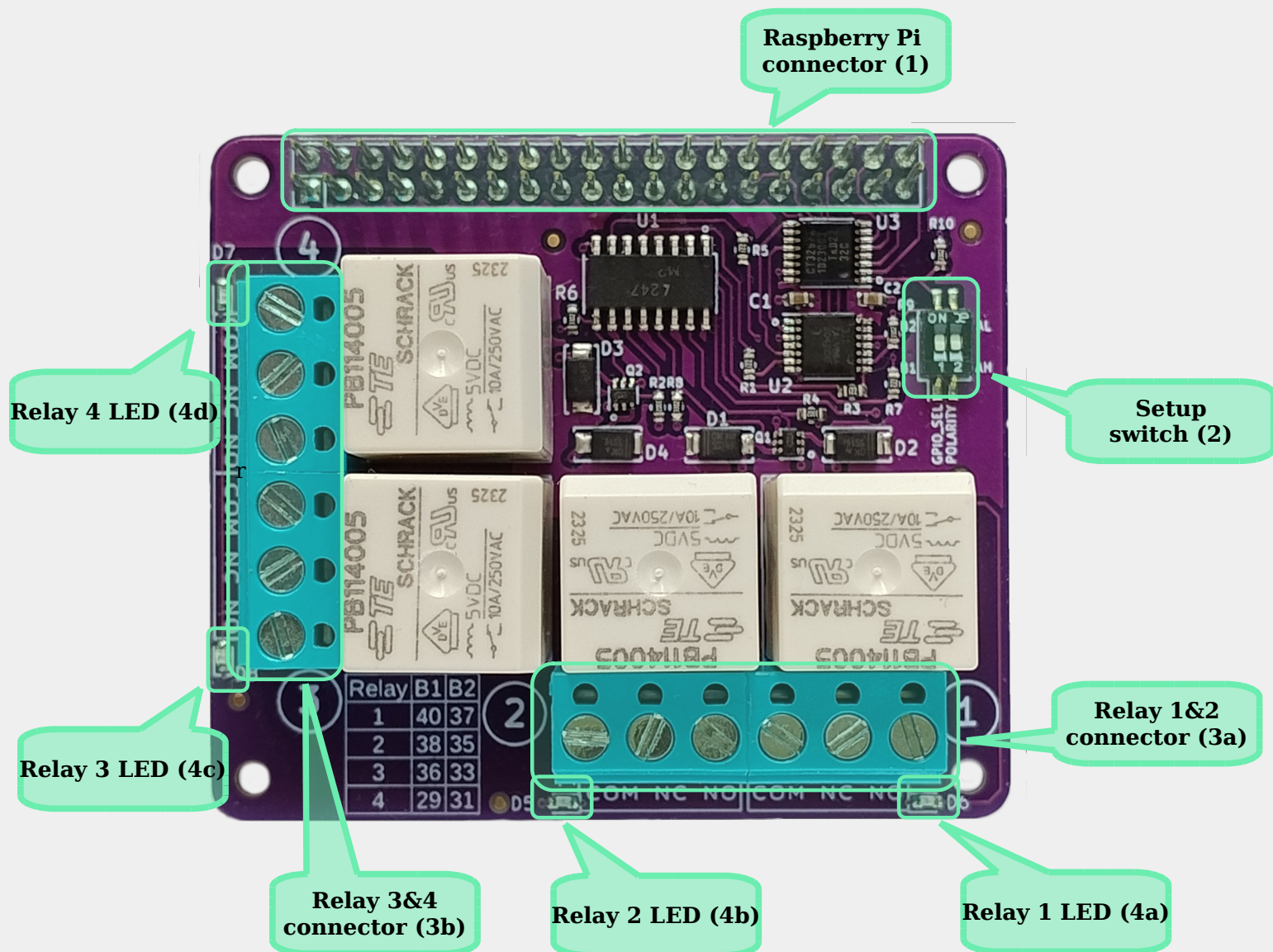


qReCon v2.2 and v2.3

User Manual v1.0
22/7/2025

Please read the instruction manual for safe use and a user experience tailored to your needs.

The qUPS-BC has several connection, setup and feedback points for using it, highlighted in the figure below. For easy identification, the "()" indicates the subsequent reference numbers. The colour and physical size of the connectors may differ from those shown in the figure below. The points of interest for the qReCon user are shown in the figures below.



1 Safety regulations

1.1 Personal safety

The qReCon has no replaceable parts - only the manufacturer or an accredited service centre can carry out repairs and maintenance.

1.2 Product safety



The qReCon product should be protected from too high or too low temperatures, direct sunlight. It should be kept in a dry place for 24 hours before installation.

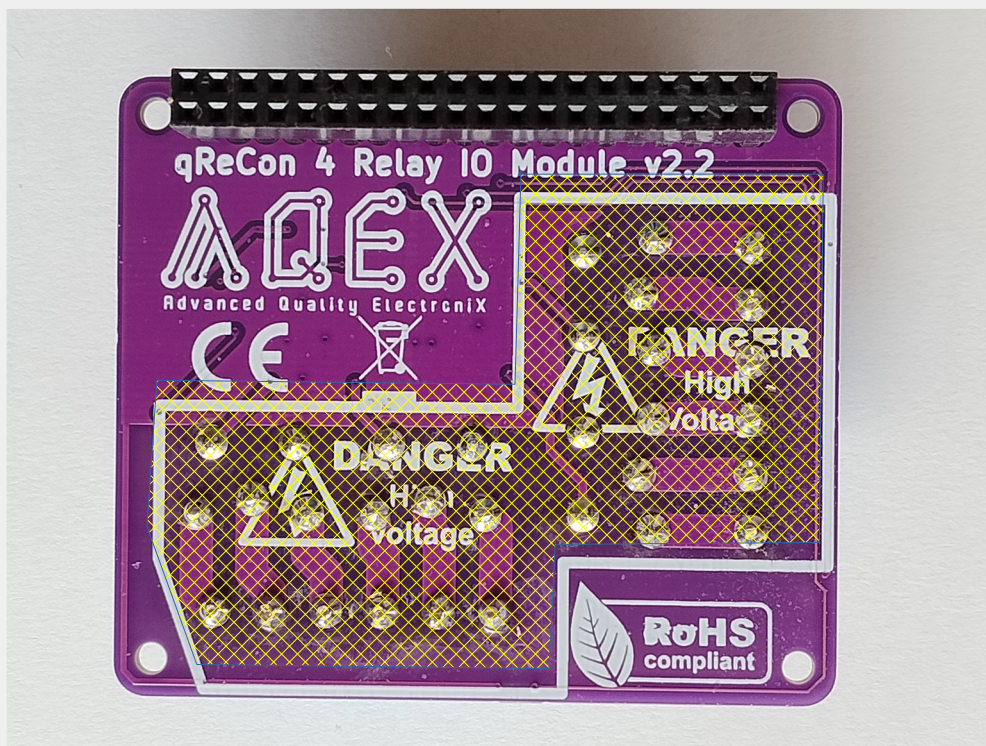
Conductive liquids, plastic materials may cause short circuiting and permanent product damage, therefore avoid installation in such environments.

1.3 Precautions

The system operates from 5V, which is low voltage, so it is protected from electric shock in a life-safety sense. In case of short circuits caused by foreign matter, the contacts may heat up and cause injury!



The relays are suitable for switching voltages up to 250 VAC. If the device is used to control a high voltage device, touching the relay outputs or the (3) terminals is life-threatening. This section is marked with a yellow outline in the diagram below.



2 Introduction

Thank you for choosing AQEX qReCon to control your electronic devices!

The qReCon has been carefully and thoroughly designed to provide the most efficient way to ensure smooth operation in a wide range of conditions, to meet a wide range of user requirements.

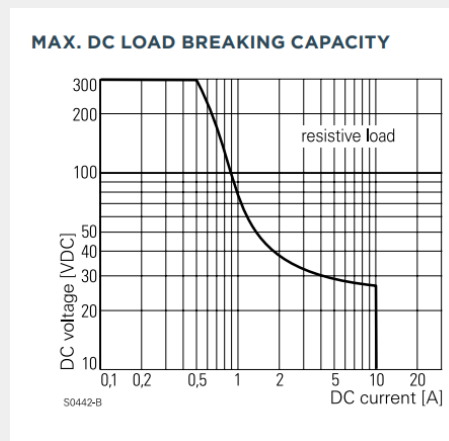
By default, Raspberry Pi compatible microcomputers can only control devices with 3.3V DC, max. 16mA input current consumption via the GPIO port. With qReCon, they are also capable of switching higher voltages, current loads, and external electronic devices with alternating current (AC).

3 Technical details

The high power is switched by 4 high quality relays, which operate 4 independent circuits in parallel. The relay output acts as a toggle switch. The “COM” pin is the common point, which is connected to the „NC” (Normally Connected) pin in the normal state and to the “NO” (Normally Open) pin when current is applied on the relay input. The ON status of the relays is indicated by a LED (4).

The low voltage logic controls the relays according to the settings of switch (2). Opto-isolators between the logic and the relays isolate the 2 systems from each other and the relay input is completely isolated from the output circuit (double isolation).

The maximum voltage that can be switched by the relays is 250V for AC load, in case of DC it is load dependent, see the graph below:



Graph 1. – Max. DC load according to the manufacturer datasheet

The maximum current in NO position is 10A, in NC position is 3A.

The qReCon uses 4 GPIO pins on the 2x20 pin connector for control. For flexibility, 2 groups of 4 pins can be selected. Details in section [4.3.1.1.1](#).

It is also possible to set the “Active level”. Details in section [4.3.1.1.2](#).

4 Commissioning

The qReCon product is ready for use immediately after preparation and unpacking. For computers using a Raspberry PI compatible 40 pin header, the connection is plug-and-play based, while in other cases the two pin +/- connection and the chosen 4 pins can be used.

4.1 Power supply

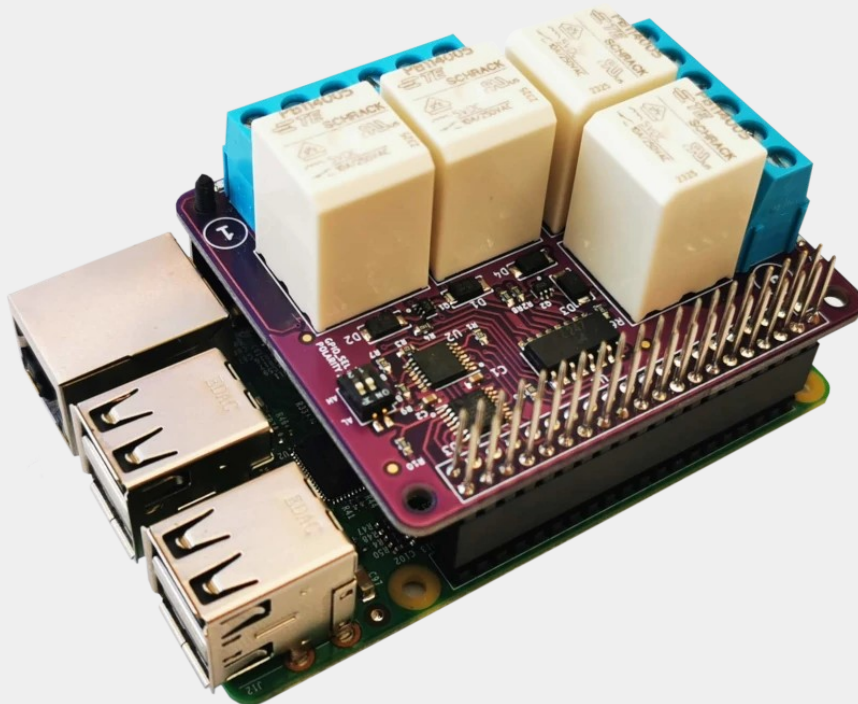
The qReCon is powered by the corresponding 5V legs of the 40 pin connector (1).

4.2 Connections

The controlling device can be connected to the qReCon product in different ways.

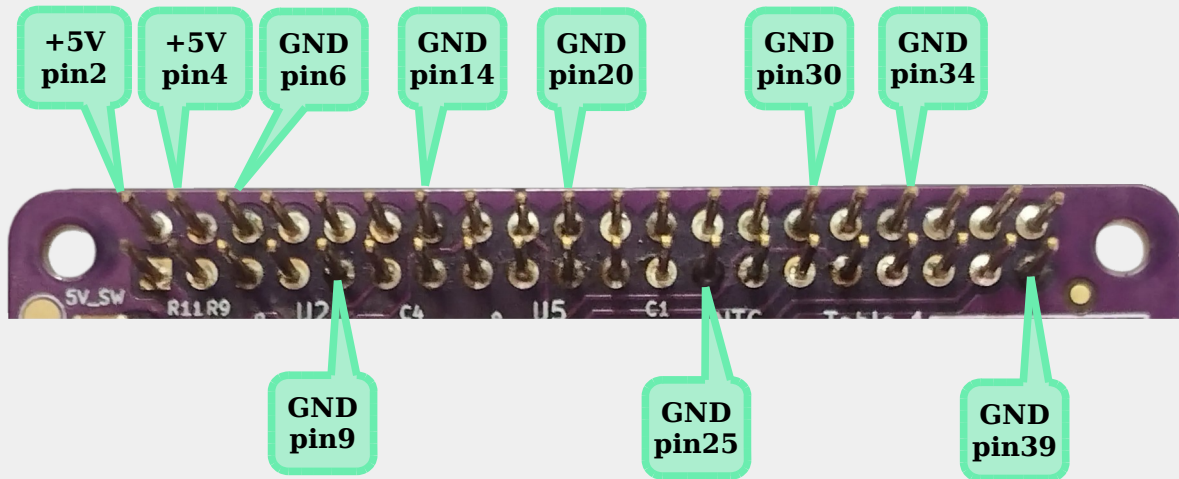
4.2.1 Single board computers (SBC)

If the SBC is equipped with a Raspberry PI compatible 40 pin header, the qReCon product is suitable for HAT connection. Simply plug the qReCon's connector (1) onto the computer's pin header as shown in the picture below.



4.2.2 Other devices

Any device, that can supply 5V DC, can be connected to the qReCon product using the appropriate contacts on the 40-pin header (1).



4.2.3 GPIO pins

The relays can be controlled via the corresponding pins of the connector (1).

All pins of connector (1) can be accessed on the top side of qReCon. All but the 4 GPIO pins selected on [switch \(2\)](#) are free to be used for any other purpose.

If the product is not controlled by a Raspberry compatible device, the relays can be controlled by 3.3V or 5V logic connected to the selected GPIO pins.

4.3 Setup

4.3.1 Hardware setup

The properly connected system will work under normal conditions with default settings. The Setup switch (2) allows for alternative modes of operation.

4.3.1.12 circuit „Setup switch” (2) - DIP switch

The qReCon product has a 2-circuit two-position switch, which controls 2 system parameters:

- Control pin assignment (GPIO_SEL). Details in [section 4.3.1.1.1](#).
- „Active level” setup (POLARITY). Details in [section 4.3.1.1.2](#).

4.3.1.1.1 Control pins selection

The qReCon product uses 4 GPIO pins to control the Raspberry Pi in a flexible and configurable way.

The 4 selected pins are determined by the position of the GPIO_SEL switch as shown in the table below:

DIP switch position	GPIO BCM / BOARD pin (40 pin connector (1))			
GPIO_SEL	Relay 1	Relay 2	Relay 3	Relay 4
OFF (B1)	GPIO21 / Pin 40	GPIO20 / Pin 38	GPIO16 / Pin 36	GPIO5 / Pin 29
ON (B2)	GPIO17 / Pin 37	GPIO19 / Pin 35	GPIO13 / Pin 33	GPIO6 / Pin 31

Table 2.

By default, when controlled by Raspberry Pi, relays 1-2-3 are inactive at boot phase, but relay 4 (GPIO5 and GPIO6) are active due to weak pull-up resistance.

This operation can be modified by configuring the Raspberry OS boot process. The boot configuration file (/boot/firmware/config.txt) can be set using the following GPIO configuration commands: `gpio=X=mode,state`

For example, to change GPIO 5 to low (inactive): `gpio=5=op,dl`

4.3.1.1.2 “Active level” setup

When the dip switch is in the “OFF” position, the relays are set to “Active high” and when it is in the ‘ON’ position, the relays are set to “Active low”. See the table below for the relay contacts associated with each setting.

DIP switch position	GPIO level	
POLARITY	0 (False)	1 (True)
OFF (AH)	COM-NC	COM-NO
ON-(AL)	COM-NO	COM-NC

Table 3

4.3.2 Software settings

The operating system or program running on the control device can be prepared to switch the relay outputs of the qReCon product via the GPIO connectors corresponding to the configured footprint.

For more information and C and shell based utilities can be found on the <https://github.com/aqexhu/qReCon> page.

4.4 Troubleshooting

Symptom	Cause of error	Solution