1-Wire Relay Card

User Manual

February 2015

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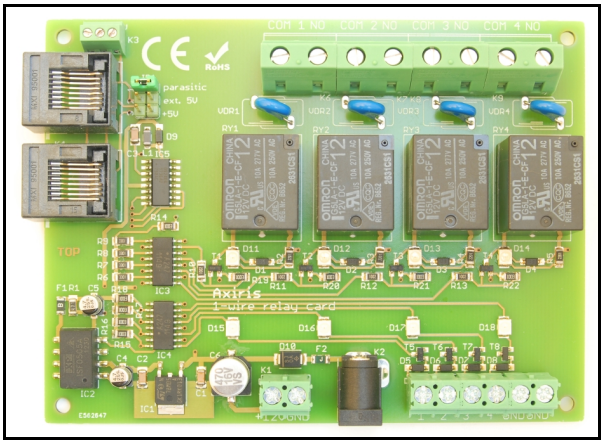
Revision History

Date	Authors	Description
2013-07-28	Peter S'heeren	Initial release.
2015-02-17	Peter S'heeren	Added section about 1-Wire Automation Server software support. Second release.

1 Features



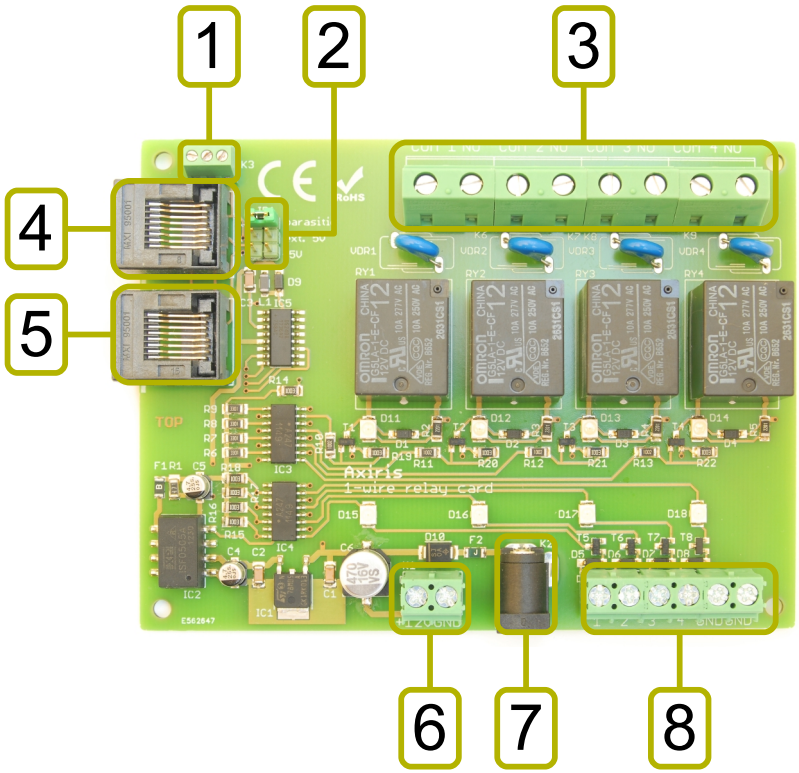
- 4 relay outputs capable of switching 4 A at 230 V AC.
- 4 opto-isolated digital inputs 5-30 V DC 10 mA max.
- Power supply 12 V DC 200 mA max.
- Power connection via coaxial DC plug or screw terminals.
- 1-Wire interface is galvanically isolated from the main power supply to avoid ground loops.
- 1-Wire connections via standardized RJ45 jacks or screw terminals.
- The 1-Wire slave chip can be powered parasitically, using an external 5 V line or using the on-board 5V supply.

2 Technical Specifications

Weight	98 g
Dimensions	117 mm x 86 mm x 19 mm (W x D x H)

3 1-Wire Relay Card

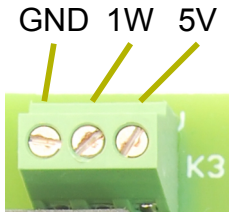
Board Overview



Mark	Label	Description
1	K3	1-Wire bus terminal block connector
2	JP1	Power selection
3	K6, K7, K8, K9	Relay contacts
4	K5	1-Wire bus RJ45 connector
5	K4	1-Wire bus RJ45 connector
6	K1	12V power supply
7	K2	12V power supply
8		Digital inputs

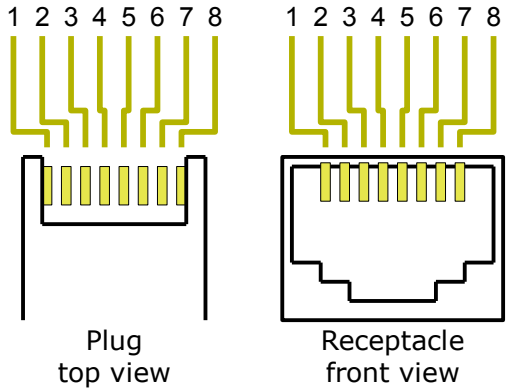
1-Wire Terminal Block Connector (K3)

Mark	Description
GND	Ground
1W	1-Wire DQ line (data)
5V	5 V supply



1-Wire RJ45 Connectors (K4, K5)

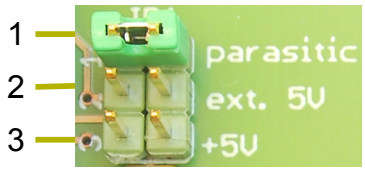
Mark	Description
1	Unassigned
2	+5 V power
3	Unassigned
4	1-Wire DQ (data)
5	1-Wire ground
6	Unassigned
7	Unassigned
8	Unassigned



All eight pins are routed between the two connectors. The relay card doesn't use the unassigned lines.

1-Wire Slave Chip Power Selection (JP1)

Mark	Description
1	Parasitic power
2	External power
3	Power derived from 12V



This jumper determines how the 1-Wire slave chip is powered:

- Parasitic power: the 1-Wire slave uses an internal capacitor as its power source. The capacitor is charged during idle time (DQ line held high) and provides power during bus activity. The 5 V line (K3, K4, K5) is not applicable.
- External power: the 1-Wire slave draws power from the 5V line. Be sure the voltage is provided to one of the 1-Wire connection points (K3, K4, K5).
- Power derived from 12 V: The 5 V for the 1-wire slave chip is derived from the 12 V power supply (K1 or K2).

See the 1-Wire specification for more information about parasitic power.

Power Connector (K1)

Mark	Description
12V	12 V input
GND	Ground

If you connect the 12 V power source to this connector then you must not connect a 12 V power source to K2. The corresponding pins of K1 and K2 are interconnected.

Power Connector (K2)

Polarity


If you connect the 12 V power source to this connector then you must not connect a 12 V power source to K1.

Relay Contacts (K6, K7, K8, K9)

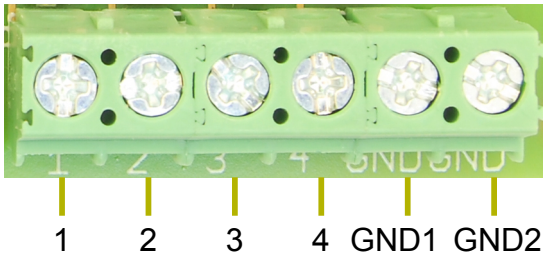
Mark	Description
COM	Common contact
NO	Normally open contact

These connectors are wired to the contacts of the relays.

Each relay can switch at most 4 A at 230 V AC.

Digital Inputs

Mark	Description
1	Input 1
2	Input 2
3	Input 3
4	Input 4
GND1	Ground
GND2	Ground



GND1 and GND2 are interconnected.

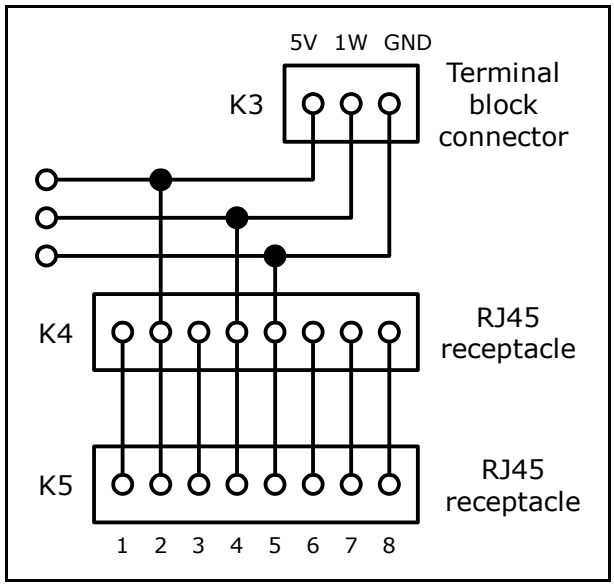
The max. values for each input are 5-30 V DC 10 mA.

1-Wire Connectivity

The relay card provides three connection points for 1-Wire cabling and wiring.

The terminal block connector is typically used for wiring the relay card to an AbioWire or another 1-Wire adapter.

The RJ45 receptacles provide a means to set up a 1-Wire bus in daisy chain using UTP cables.



Communications Protocol

The 1-Wire slave function on the relay card is a Maxim DS2408 chip.

See the Maxim DS2408 datasheet for more information about the 1-Wire slave chip.

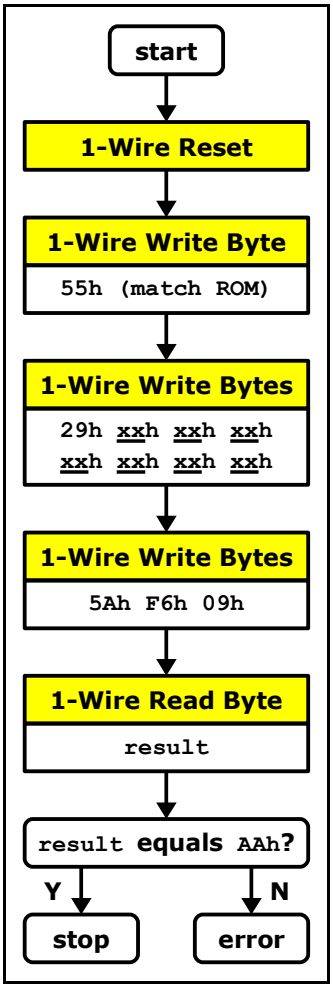
The family code of the DS2408 is 29h. Since the family code alone doesn't uniquely identify a 1-Wire Relay Card device, the host system must associate the full 8-byte ROM code with the device.

The host system is expected to use Standard speed when communicating with the relay card over the 1-Wire bus.

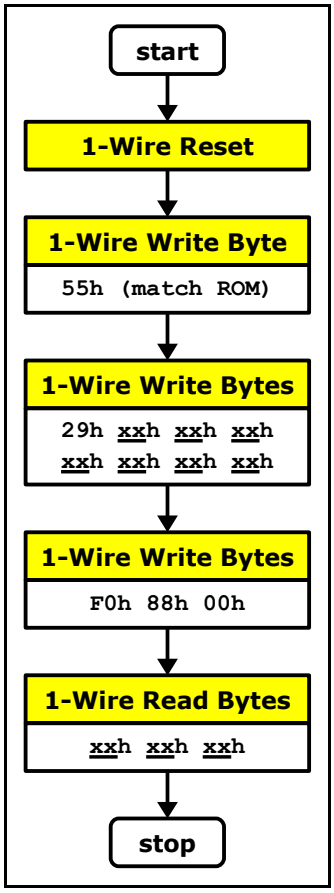
PIO channels 1-4 of the DS2408 use negative logic to control the relays. To turn on a relay, write zero to the corresponding PIO channel. To turn off a relay, write one to the corresponding PIO channel.

PIO channels 5-8 are connected to the input terminals. **You must always program these PIO channels as logic one.**

The following diagram shows how to write byte value F6h to the relay card.



The following diagram shows how to read the PIO logic states, PIO output latches and PIO activity latches from the relay card.



4 Software Support

1-Wire Automation Server

Use client command **Device PIO** to control the state of the relays. For example:

```
dev "29-11BD2A" pio off 1 4 on 2
```

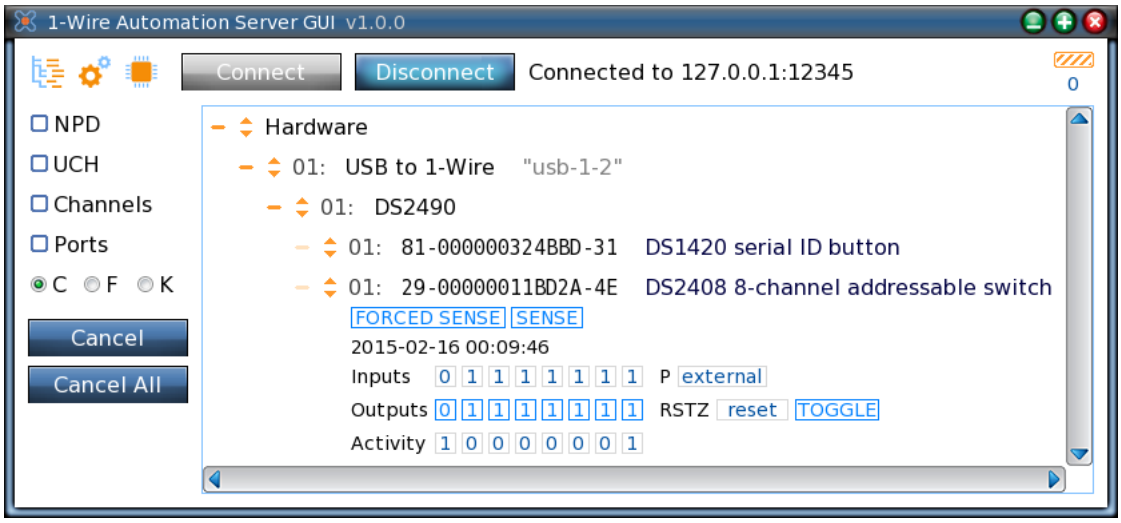
This command turns on relays 1 and 4 and turns off relay 2.

To determine the state of the inputs, issue client command **Device Sense**:

```
dev "29-11BD2A" sense force
dev "29-11BD2A" sensed ds2408 "2015-02-15 10:10:20 11110010 11110010
10001111 reset  external"
```

The most significant four bits of the sensed values (marked in yellow) represent the state of the inputs.

The 1-Wire Automation Server GUI program offers a comfortable way to work with the 1-Wire Relay Card in a graphical desktop environment:



In the above picture, the first relay has been turned on and all four inputs are high.

ows

Software package **ows** v1.3.0 and later includes program **owspio**. This program enables you to fully control the relay card.

Example invocations of the program:

```
# ./owspio -lu -id 29-11BD2A -off 1 4 -on 2
```

This command turns on relays 1 and 4 and turns off relay 2.

```
# ./owspio -lu -id 29-11BD2A -read 10
```

This command reads the state of the four relays and the sensed state of the four inputs ten times.

owfs

It's assumed you're using the filesystem client of the **owfs** package. In the examples it's supposed you've specified **/mnt/onewire/** as the mount directory for the 1-Wire file system.

Since owfs inverts all values written to PIO channels, the default negative logic becomes positive logic.

```
# echo "1" > /mnt/onewire/29.2ABD11000000/PIO.0
```

This command turns on relay 1. Note the use of positive logic as opposed to the real value zero that's written to the PIO latch in the DS2438.

```
# echo "0" > /mnt/onewire/29.2ABD11000000/PIO.3
```

This command turns off relay 4.

```
# cat /mnt/onewire/29.2ABD11000000/PIO.0
```

This command reads the latched value for relay 1.

```
# cat /mnt/onewire/29.2ABD11000000/sensed.0
```

This command reads the sensed value of relay 1.

```
# cat /mnt/onewire/29.2ABD11000000/sensed.4
```

This command reads the sensed value of input 1 on the relay card.

```
# cat /mnt/onewire/29.2ABD11000000/sensed.7
```

This command reads the sensed value of input 4 on the relay card.

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