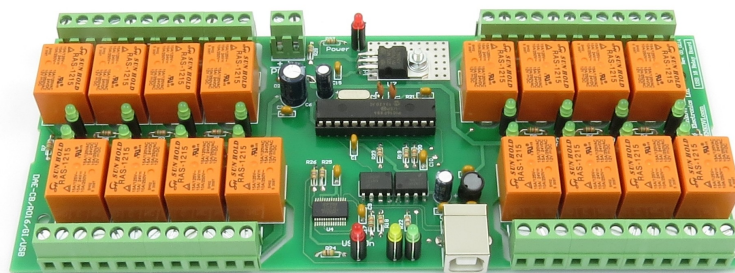


USB 16 Relay Board Virtual Com Port controlled

User Manual
Date: 20 Mar 2014



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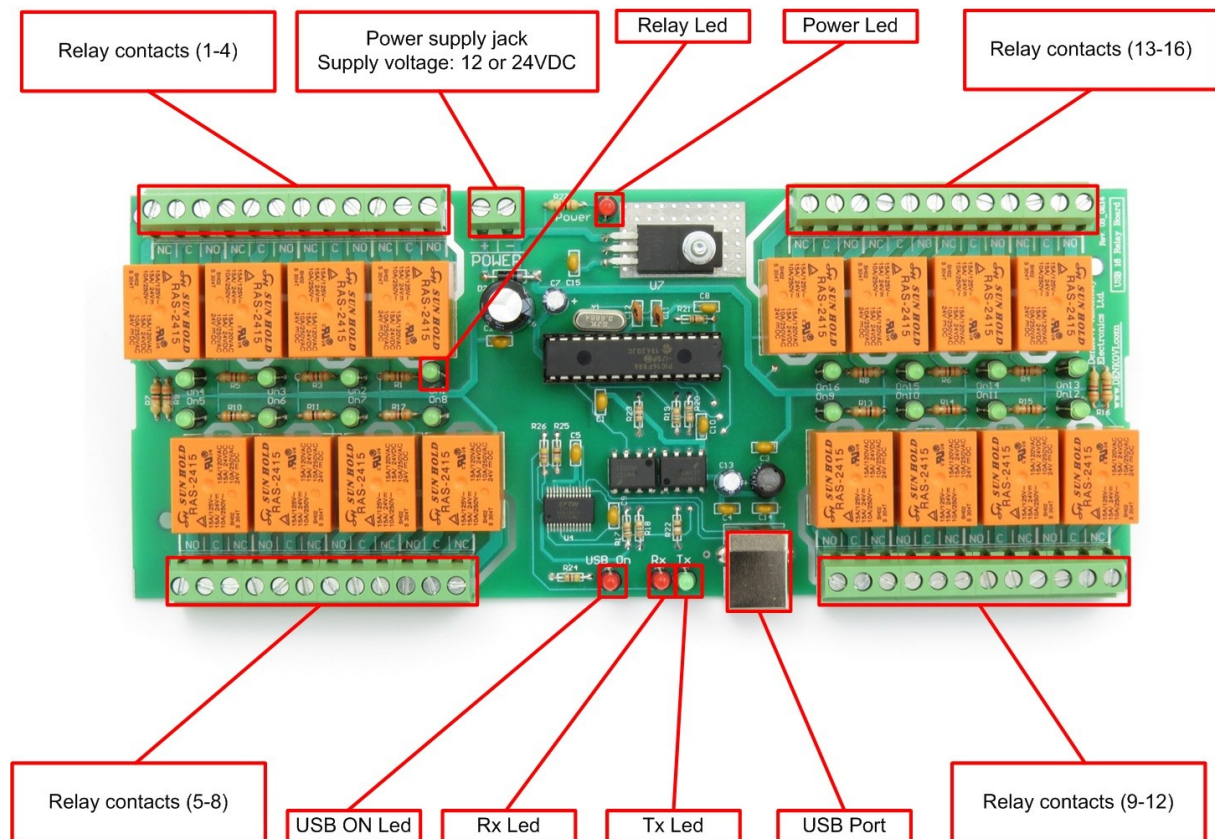
1. Specification

- 16 x SPDT relays, selectable during purchase:
 - JQC-3FC/T73 (7A / 250VAC, 10A / 125VAC, 12A / 120VAC, 10A / 28VDC)
 - RAS-12-15 (10A / 250VAC, 15A / 120VAC, 15A / 24VDC)
 - RAS-24-15 (10A / 250VAC, 15A / 120VAC, 15A / 24VDC)
- USB connector - type B
- Power supply requirements:
 - 12V DC / 600mA (for relays JQC-3FC/T73 and RAS-12-15)
 - 24V DC / 400mA (for relays RAS-24-15)
- Converter chipset: FT232RL
- FT232RL optical isolation against communication noises
- Communication: serial USB communication (Virtual Com Port)
- Led-s: Relay Led, Power ON Led, USB ON Led, Rx Led, Tx Led
- Operating temperature range: from -30 °C to +80 °C
- PCB parameters : FR4 / 1.5mm / two layers / metalized holes / HAL / white stamp / solder mask / Extra PCB openings for better voltage isolation / Doubled PCB tracks for better voltage isolation
- Dimensions: W=82mm x L=203mm x H=24mm
- SKU:
 - **DAE-CB/Ro16-JQC3FC-USB** for option with relays JQC-3FC/T73
 - **DAE-CB/Ro16-RAS1215-USB** for option with relays RAS-12-15
 - **DAE-CB/Ro16-RAS2415-USB** for option with relays RAS-24-15

2. Applications examples

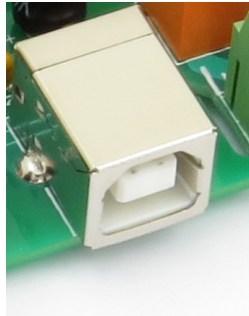
- Home automation
- Industrial automation
- Control electrical devices

3. Relay module overview



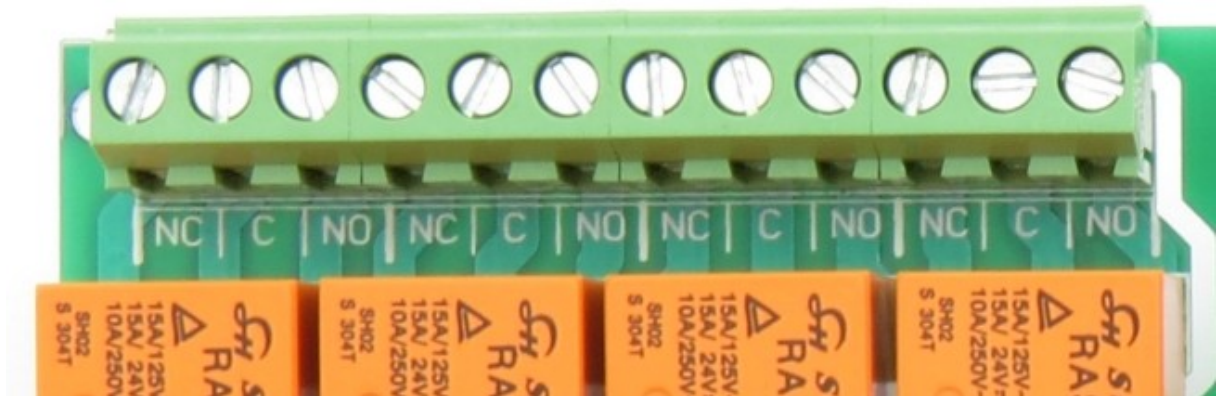
4. USB port

The type of this USB port is shown on the image bellow. You can find suitable USB cables in our stock as well - <http://denkovi.com/category/24/usb-cables.html>

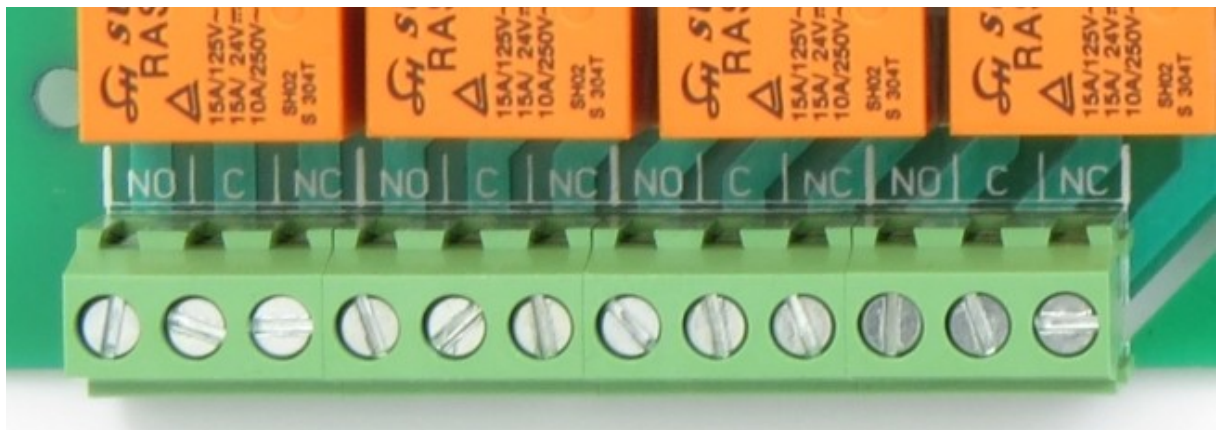


5. Relay contacts

- Relays 1 - 4 and 13 - 16



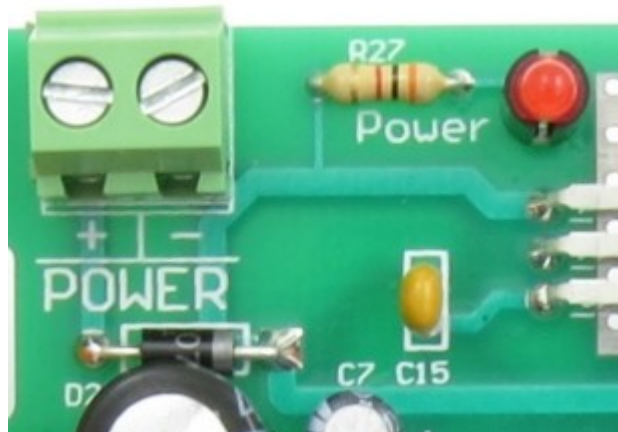
- Relays 5 - 8 and 9 - 12



6. Power connector

The power supply connector is shown on the image bellow. The supply voltage is **12 VDC** or **24VDC** depending on the relay type selected during purchase:

- Option JQC-3FC/T73 relays - supply voltage 12VDC
- Option RAS-12-15 relays - supply voltage 12VDC
- Option RAS-24-15 relays - supply voltage 24VDC

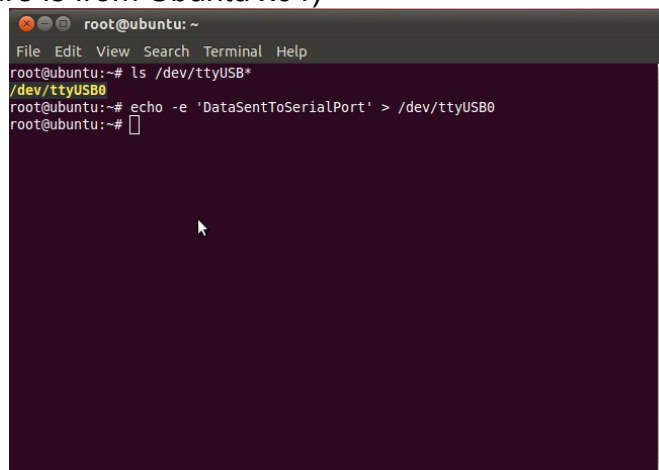


7. Drivers Installation

1. Be sure you have FTDI VCP drivers installed. In order to use the device, you have to install them first. If you don't have them installed, please go to FTDI official web page - <http://www.ftdichip.com/Drivers/VCP.htm> and download and install them.
2. Connect the USB relay board to your computer and see if it appears as virtual com port. If everything is ok with the drivers, you should see some of the images below:
 - 2.1. Windows (picture is from 7 x64)



2.2. Linux (picture is from Ubuntu x64)



For installation guides:

<http://www.ftdichip.com/Support/Documents/InstallGuides.htm>

8. Protocol

8.1. Serial Port parameters

Baud rate	9600 bps
Stop bit	1
Data bits	8
Parity	No

8.2. Command for receiving relay status

Command format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
'a'	's'	'k'	'/'	'/'

Expected answer

Byte 1								Byte 2							
Bit7							Bit0	Bit7							Bit0

The answer is 2 bytes. If the bit is 0, relay is OFF, if the bit is 1 relay is ON.

- Byte1.Bit7 represents relay 1
- Byte1.Bit0 represents relay 8
- Byte2.Bit7 represents relay 9
- Byte2.Bit0 represents relay 16

Example:

- answer 1: 00 -> relays from 1 to 16 are OFF.
- answer 2: 255(dec) 255(dec) -> relays from 1 to 16 are ON.
- answer 3: 81(dec) 81(dec) -> Relays 1,8,9,16 - ON, the rest are OFF.

Please note that data received from this command is not always in printable ASCII format!

8.3. Command for setting single relay ON/OFF

Command format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Address1	Address2	Sign	'/'	'/'

- Address1 and Address2 represent the relay number - from '0' '1' up to '1' '6' (for 16 relays)
- Sign is '+' for relay ON and '-' for relay OFF.

Command format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Addres s1	Addres s2	Sign	'/'	'/'

Expected answer - if the command is successful, the answer is exactly the same like the command.

Example:

- "01-/" - Relay 1 is switched OFF
- "12+/" - Relay 12 is switched ON

8.4. Command for setting all relays ON

Command format

Byte 1	Byte 2	Byte 3	Byte 4
'o'	'n'	'/'	'/'

Expected answer - if the command is successful, the answer is exactly the same like the command i.e. "on//".

Example:

- "on//" - all relays ON

8.5. Command for setting all relays OFF

Command format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
'o'	'f'	'f'	'/'	'/'

Expected answer - if the command is successful, the answer is exactly the same like the command i.e. "off//".

Example:

- "off//" - all relays OFF

8.6. Command for setting all relays at a time

Command format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
'x'	State1	State2	'/'	'/'

State1						State2					
Bit7					Bit0	Bit7					Bit0

- State1.Bit7 is the state of Relay 1
- State1.Bit0 is the state of Relay 8
- State2.Bit7 is the state of Relay 9
- State2.Bit0 is the state of Relay 16
- If bit is 0, the relay state is OFF, if bit is 1 the relay state is ON

Expected answer - if the command is successful, the answer is exactly the same like the command sent.

Example:

Send: 'x' 1A 05 '/' '/'

1A(hex)=00011010(bin)

05(hex)=00000101(bin)

Relays 1,2,3,6,8,9,10,11,12,13,15 - switched OFF

Relays 4,5,7,14,16 - switched ON

Please note that State1 and State2 are not always printable ASCII chars. These bytes are binary representation of the relays.

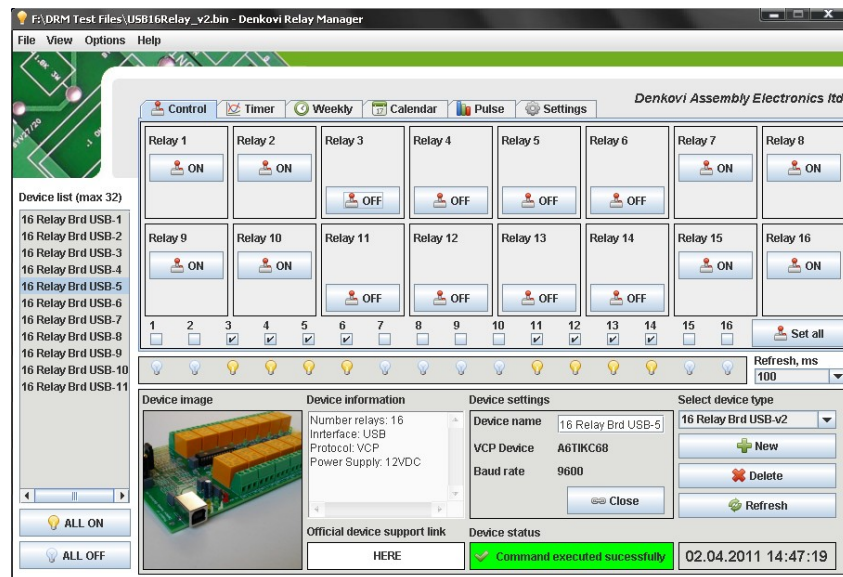
8.7. Additional information

Note that there must be minimum 5ms interval between every two commands !

9. Software

9.1. DRM Software

This device is supported by **DRM Software**. It is software for controlling all Denkovi relay boards. With this software you may simply turn off/on relays, set states and delays, make pulses or schedules.



For more information and download - <http://denkovi.com/page/13/drm-software.html>

9.2. Denkovi Relay Command line tool

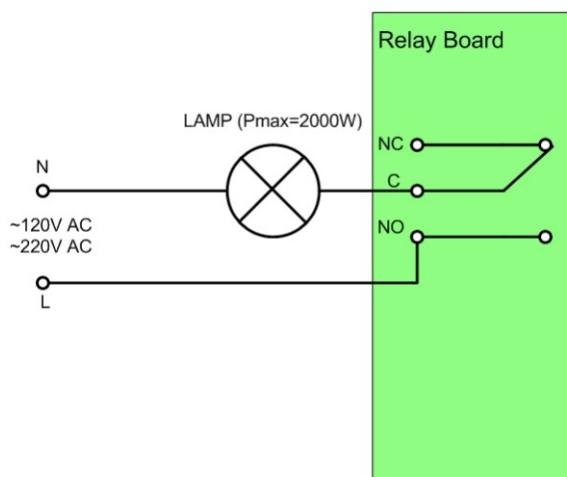
For more information and download - <http://denkovi.com/page/48/denkovi-relay-command-line-tool.html>

9.3. Other software

Here you can find our very first software for this USB relay board - <http://denkovi.com/page/25/usb-16-channel-relay-board-software.html>

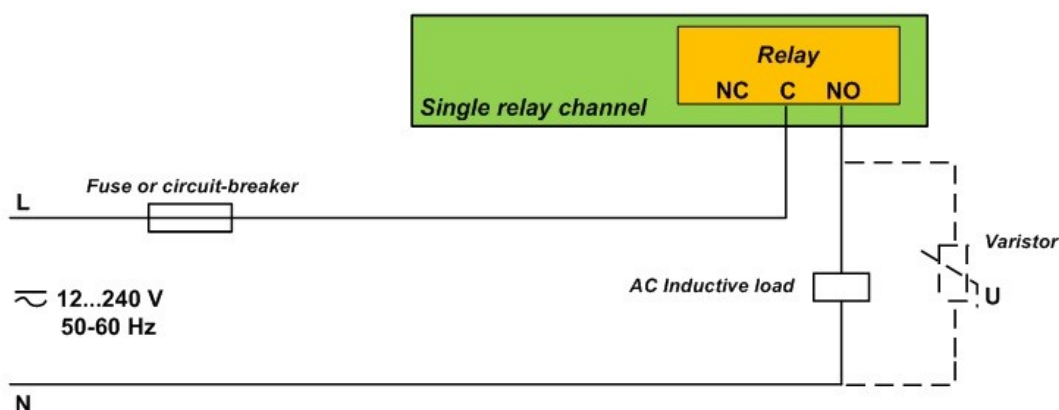
10. Appendix 1. Connections

10.1. Connect lamp to relay

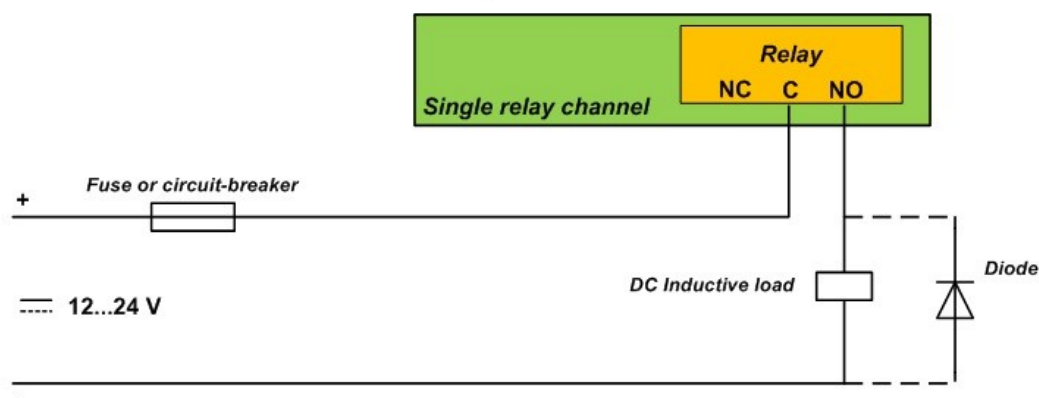


10.2. Connect inductive load to relay

Controlling AC inductive load



Controlling DC inductive load



11. Appendix 2. PCB dimensions

