

# USB 16 Relay Board Virtual Com Port controlled

*User Manual*  
*Date: 04 Aug 2017*



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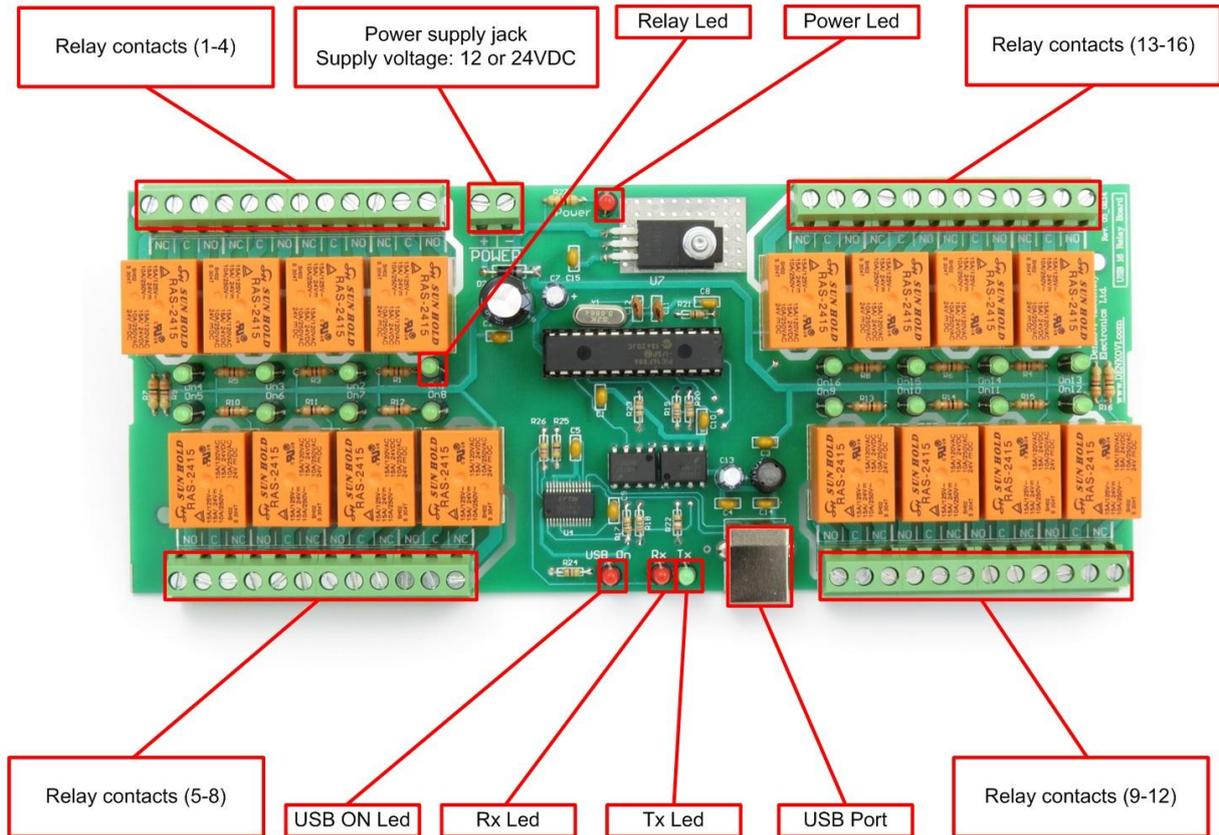
## 1. Specification

- 16 x SPDT relays - 10A / 250VAC, 15A / 120VAC, 10A / 28VDC;
- USB connector - type B
- Power supply requirements, selectable during purchase:
  - 12V DC / 600mA
  - 24V DC / 400mA
- 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/Ro16-12V-USB-PCB** for 12VDC PCB version
  - **DAE-CB/Ro16-24V-USB-PCB** for 24VDC PCB version
  - **DAE-CB/Ro16-12V-USB-BOX** for 12VDC BOX version
  - **DAE-CB/Ro16-24V-USB-BOX** for 24VDC BOX version

## 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



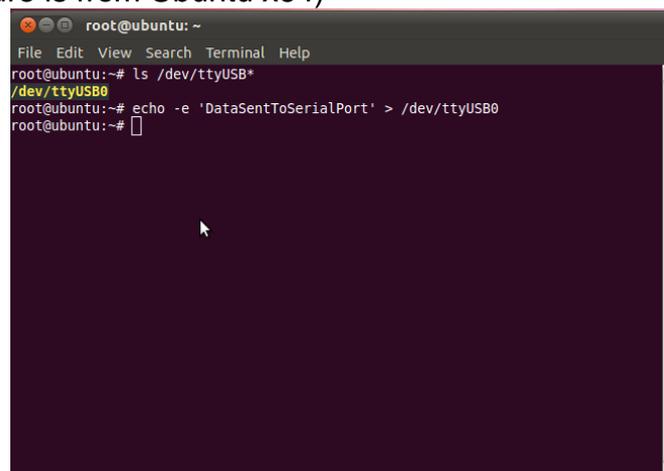
## 7. Drivers Installation

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 the some of the images bellow:

### 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

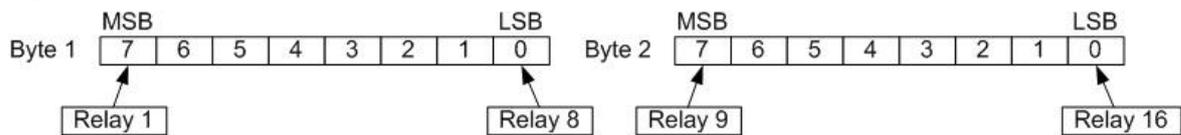
Baud rate	9600 bps
Stop bit	1
Data bits	8
Parity	No

### 8.2. Command for receiving relay status

Command format

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

Expected answer



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
Address1	Address2	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'	'/'	'/'

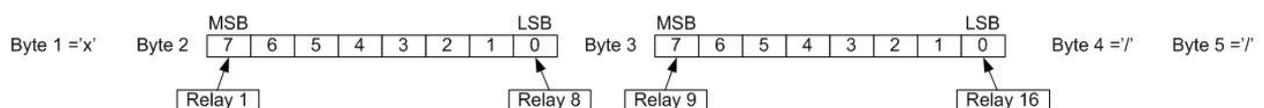
Expected answer - if the command is successful, the answer is exactly the same like the command i.e. "off//".

Example:

- "off//" - all relays OFF

### 8.6. Command for setting all relays at a time

Command format



- Byte2.Bit7 is the state of Relay 1

- Byte2.Bit0 is the state of Relay 8
- Byte3.Bit7 is the state of Relay 9
- Byte3.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.*

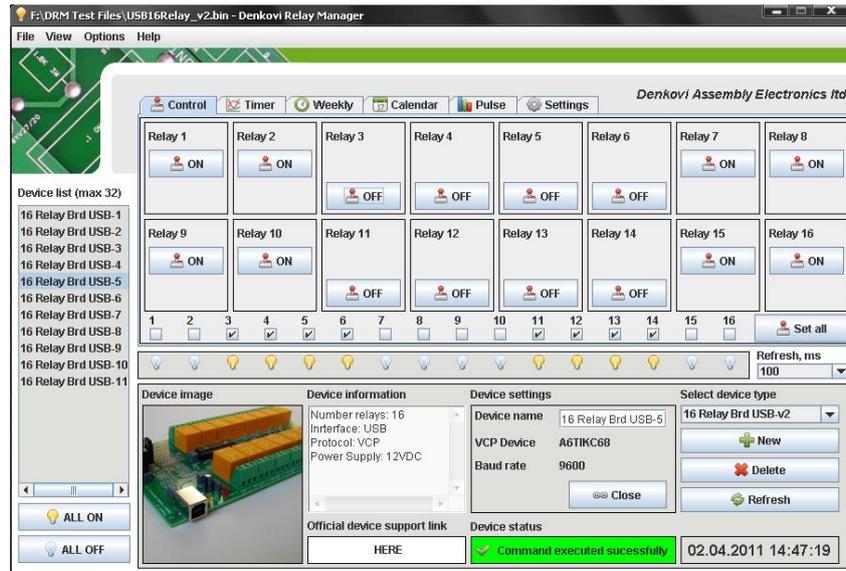
## 8.7. Additional information

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. Denkovy Relay Command line tool

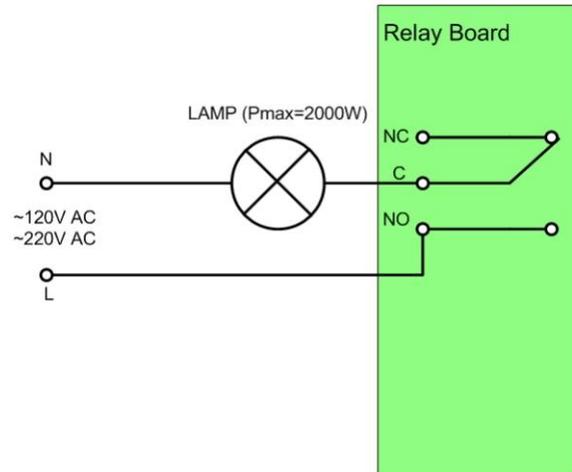
For more information and download - <http://denkovi.com/page/48/denkovi-relay-command-line-tool.html>

### 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>

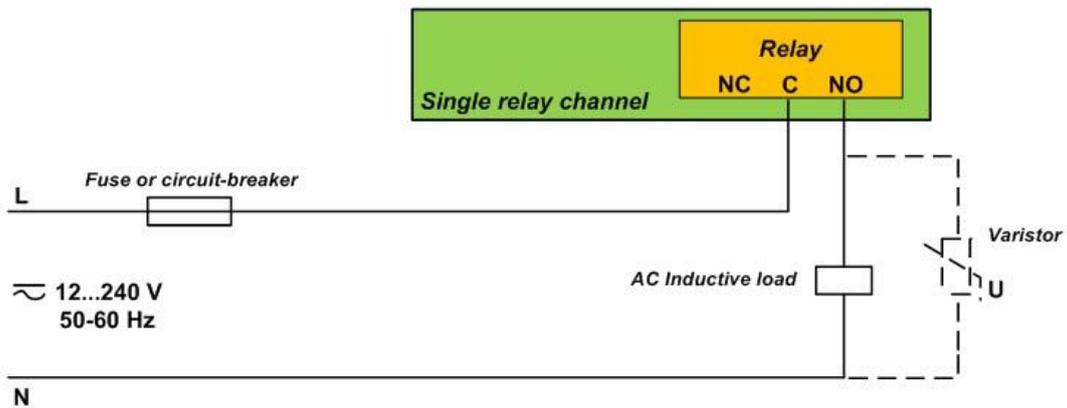
## 10. Appendix 1. Connections

### 10.1. Connect lamp to relay

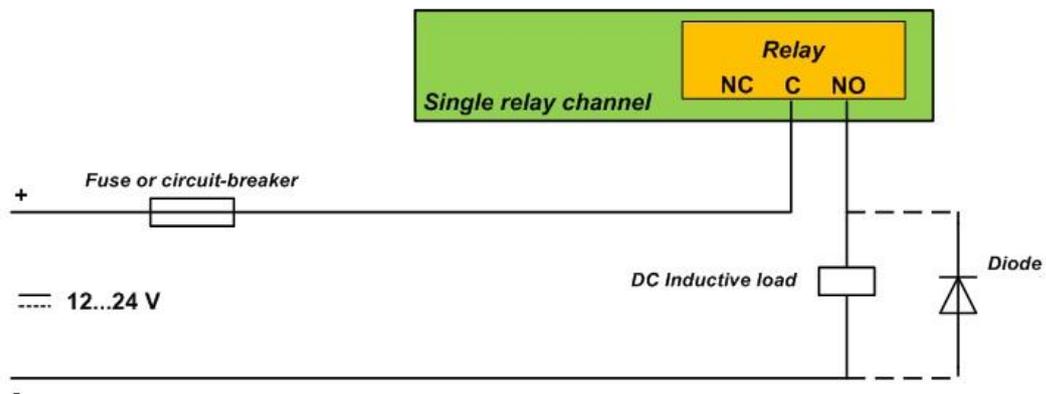


### 10.2. Connect inductive load to relay

#### Controlling AC inductive load



#### Controlling DC inductive load



### 11. Appendix 2. PCB dimensions

