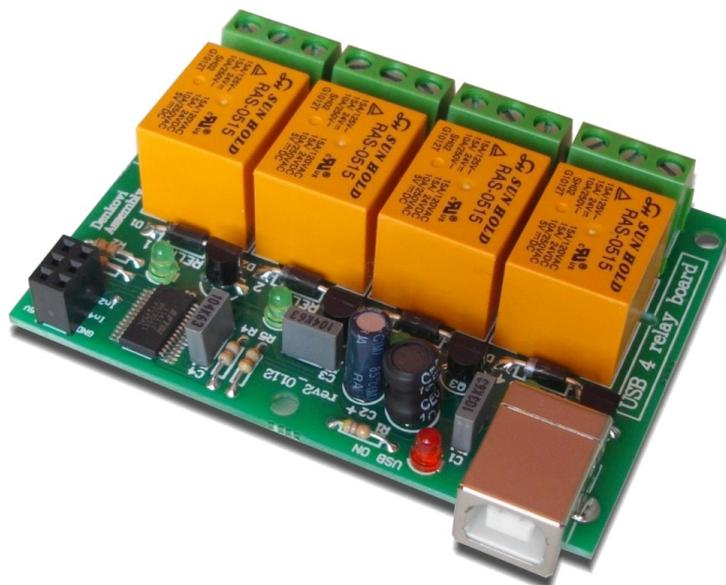


USB Four Channel Relay Board

by Denkovi Assembly Electronics LTD

User Manual
Date: 15 Jan 2013



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1. Features

- **Relays:** 4 SPDT Relays RAS-05-15. Datasheet - [here](#)
- **Relay parameters:** 5V / 72mA, 15A/24VDC (120VAC), 10A/250VAC
- **4 Digital I/O Port:** Inputs - 0-5VDC TTL levels, with pull-up 200kOhm resistor. Each can be configured as digital output (0-5VDC). In some variants this port may not be reachable by user because it is attached to another device (for example sensor).
- **PCB parameters:** FR4 / 1.5mm / two layers / metalized holes / HAL / white stamp / solder mask / additional PCB openings for better voltage isolation / doubled high voltage tracks
- **Power supply:** from USB port
- **Current consumption:** 400 mA
- **Chip:** FT245RL. Datasheet - [here](#)
- **Power led:** Yes
- **Relay leds:** Yes
- **Size:** 77mm x 56mm x 17mm

2. Product installation

2.1.VCP Drivers installation

This device is based on [FTDI](http://www.ftdichip.com) chipset ([FT245RL](http://www.ftdichip.com)), so the VCP drivers may be downloaded from this link - <http://www.ftdichip.com/FTDrivers.htm>

After that they must be installed on your computer in order to work with this device.

FTDI provides installation guides for their chips

<http://www.ftdichip.com/Support/Documents/InstallGuides.htm> (for Windows and MAC)



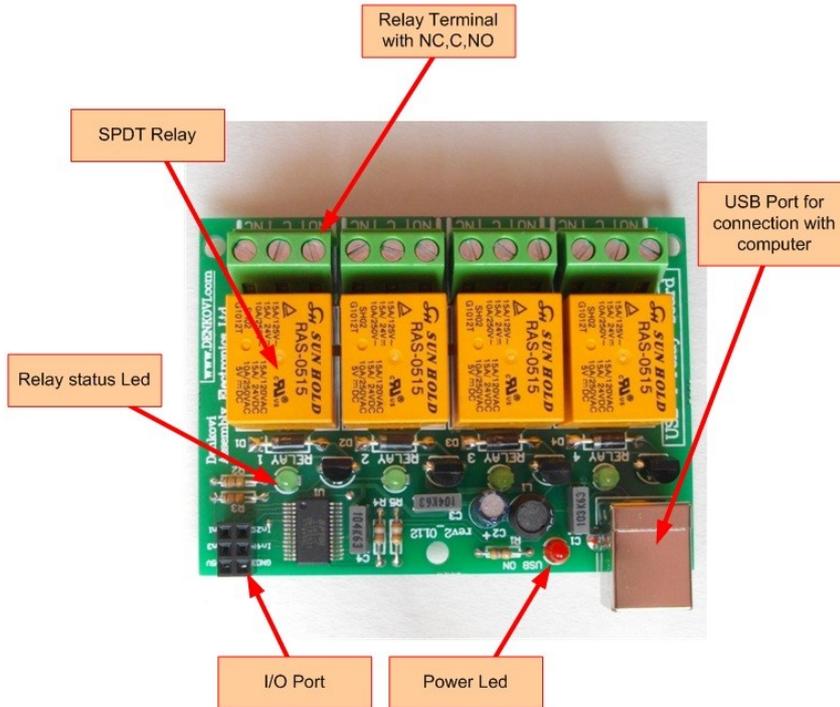
In Windows when you have drivers installed, you should see the relay board as USB Serial Port

For Linux - the FTDI VCP drivers are built in the kernel.

3. Product variants

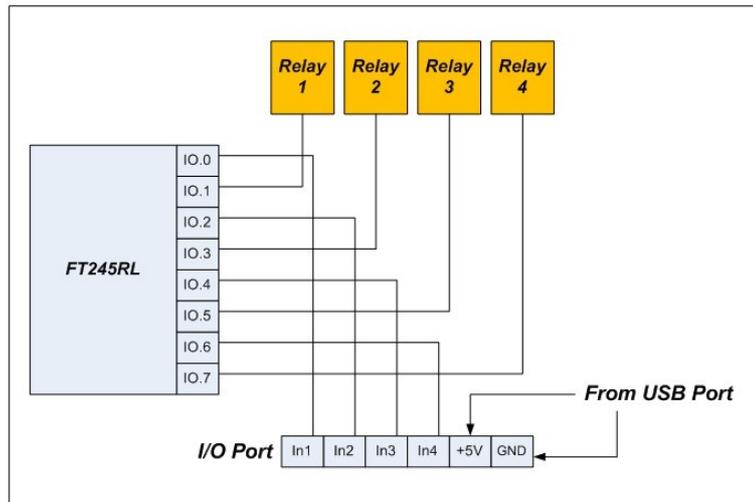
3.1.USB Four Channel relay board (original version)

This version is the original [USB Four Channel relay board](#), sold without any extra components.



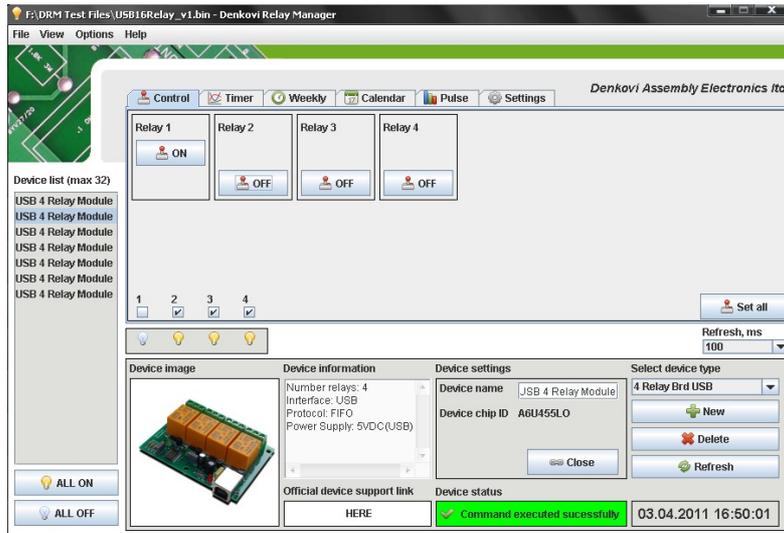
The 4 relays are connected to FT245RL IO pins 1,3,5 and 7.

There is one additional I/O port. It may be used for extension with other device via SPI, I2C or simply used for general purpose I/O lines. On this port they are mapped FT245RL IO pins 0,2,4 and 8. The 5VDC and GND are directly from the USB port.



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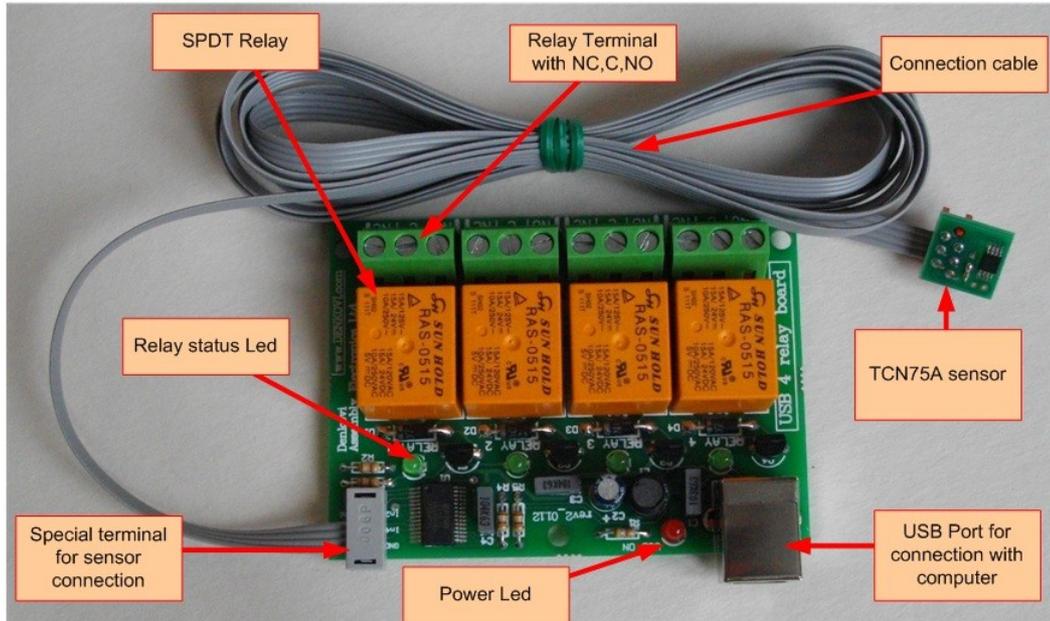
This device is supported by **DRM Software**. It is software for controlling all Denkovi relay boards. With this software you may simply turn off/on relays, set states and delays, make pulses or schedules.



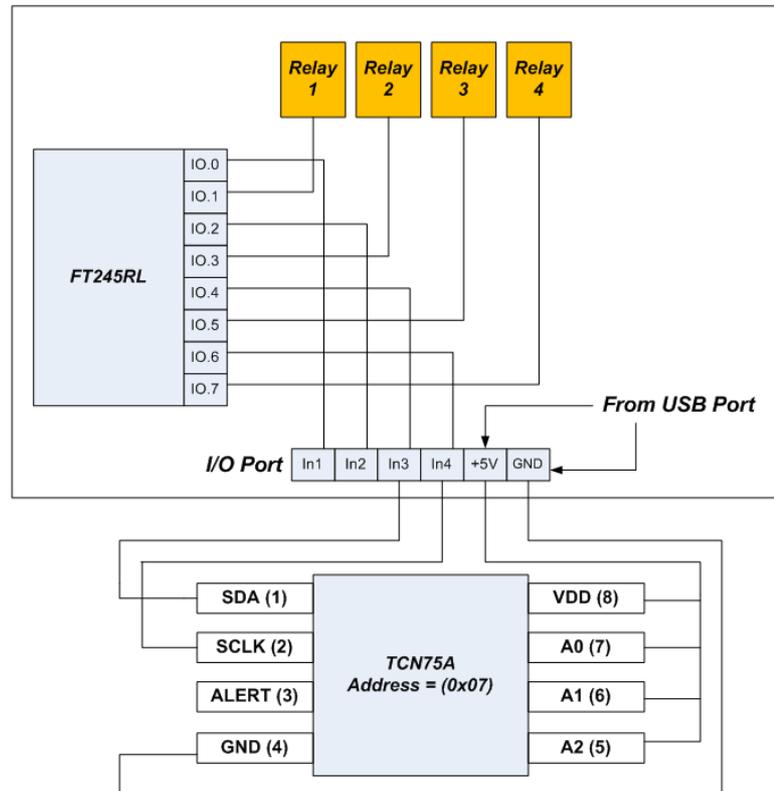
For more information and download - <http://denkovi.com/page/13/drm-software.html>

3.2.USB Four Channel relay board with temperature sensor TCN75A

This is [USB 4 Channel Relay Board + TCN75A sensor](#). The device is sold with directly connected sensor to the I/O port of the relay board.



USB Four Channel Relay Board



As FT245RL has 8 I/O lines and for the relays they are used 4, the rest 4 remains free and can be used for additional applications. For example the device on the above image can measure temperature with TCN75A sensor.

The sensor range is from **-40°C** up to **+100°C**. The accuracy is **+0.5°C (typical)** and **+ 3°C (max)**. The offered device works with TCN75A sensor with slave address 0x07.

Typical applications for the above device (with combination of course with computer and suitable software) are:

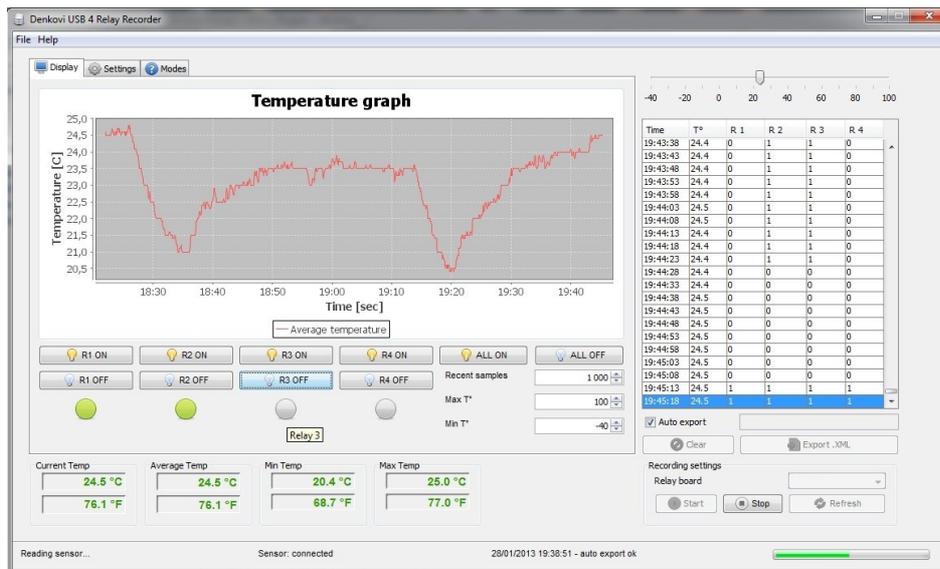
- Temperature measurement/monitoring
- Temperature logging
- USB thermometer
- Organizing simple low cost USB thermoregulator

The sensor is designed for measurement mostly in places with low value of humidity.

Denkovi A E LTD developed special software for the above device - **Denkovi USB 4 Relay Recorder**.

Features:

- **OS:** Windows/Linux
- **Temperature logging:** table based logging for the temperature and relay states.
- **Graph plotting:** graph history for selectable last N samples.
- **Simple thermoregulator:** the relays can be controlled according temperature level
- **Export the recorded log:** into .XML file
- **Selectable temperature units:** Celsius / Fahrenheit
- **Adjustable samples rate, digital filter size**



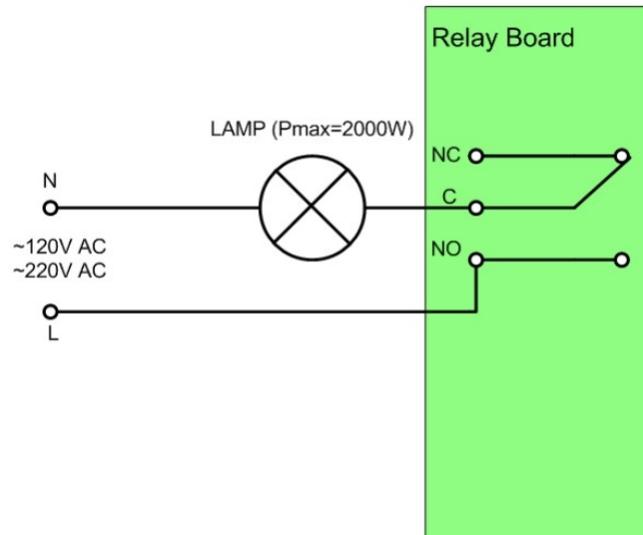
For more information and download - <http://denkovi.com/page/44/denkovi-usb-4-relay-recorder.html>

If you use Linux you might want to know some hints in order to work with this software (source - <http://kenai.com/projects/javaftd2xx/pages/Home>):

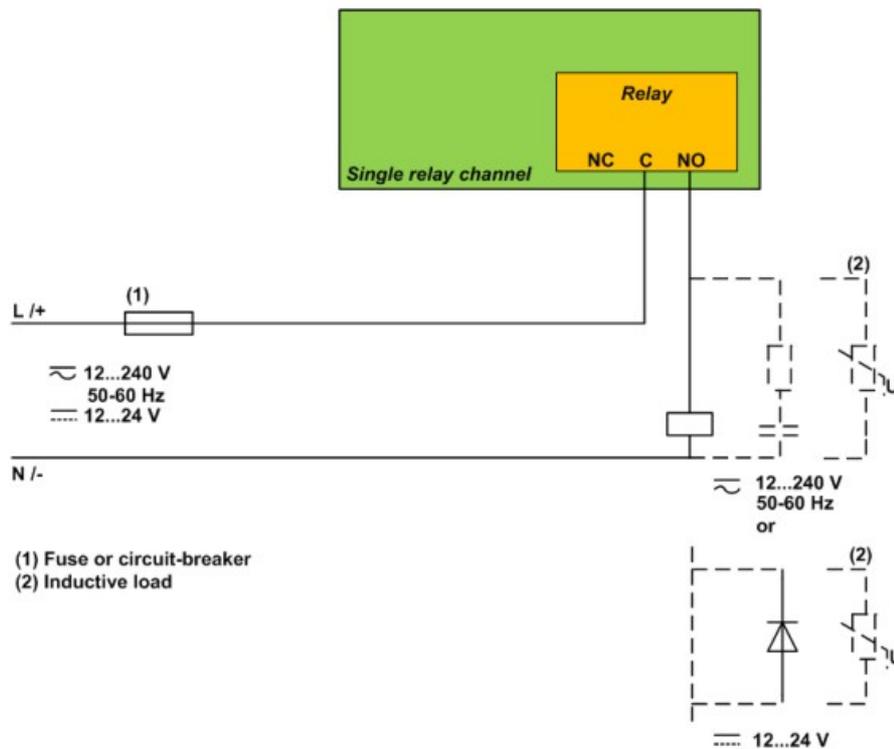
- You should be sure that you have permission to write to the chip. (/dev/bus/usb/[BUS]/[DEVICE], you can determinate the exact location by lsusb). By default you will not have permission, so you must chown it every time when you physically connect, or make an UDEV rule: [this way](#). You must fit idVendor and idProduct values to ftdi's, using lsusb. For example a device: Bus 004 Device 003: ID (this is idVendor-->)0b38:0003(<--this is idProduct) ...
- From FTDI Linux D2xx readme: "Other problems will be related to the ftdi_sio driver loading - 1.you must unload this driver (and usbserial) if it is attached to your device ("rmmod ftdi_sio" and "rmmod usbserial" as root user)."

4. Appendix 1. Connections

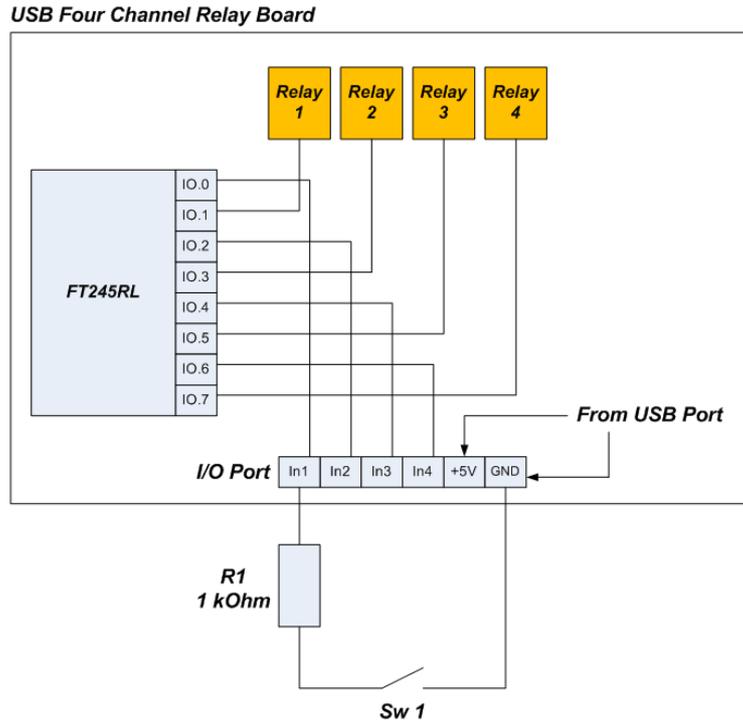
4.1. Connect lamp to relay



4.2. Connect inductive load to relay

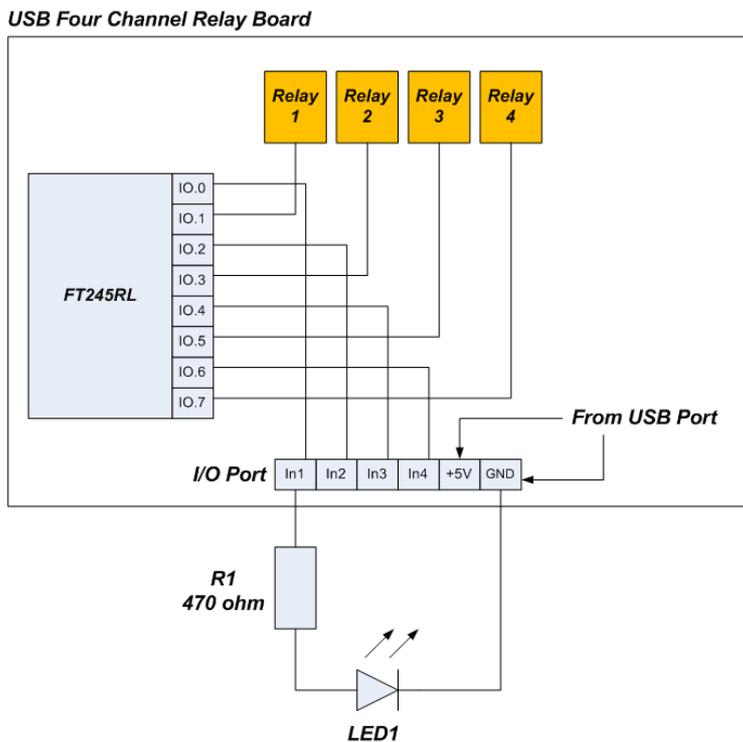


4.3. Connecting switch button to the I/O Port



IO.0 must be configured as input. The protection resistor R1 is recommend in case IO.0 pin is configured as output in order to prevent short cut.

4.4. Connecting led to the I/O Port

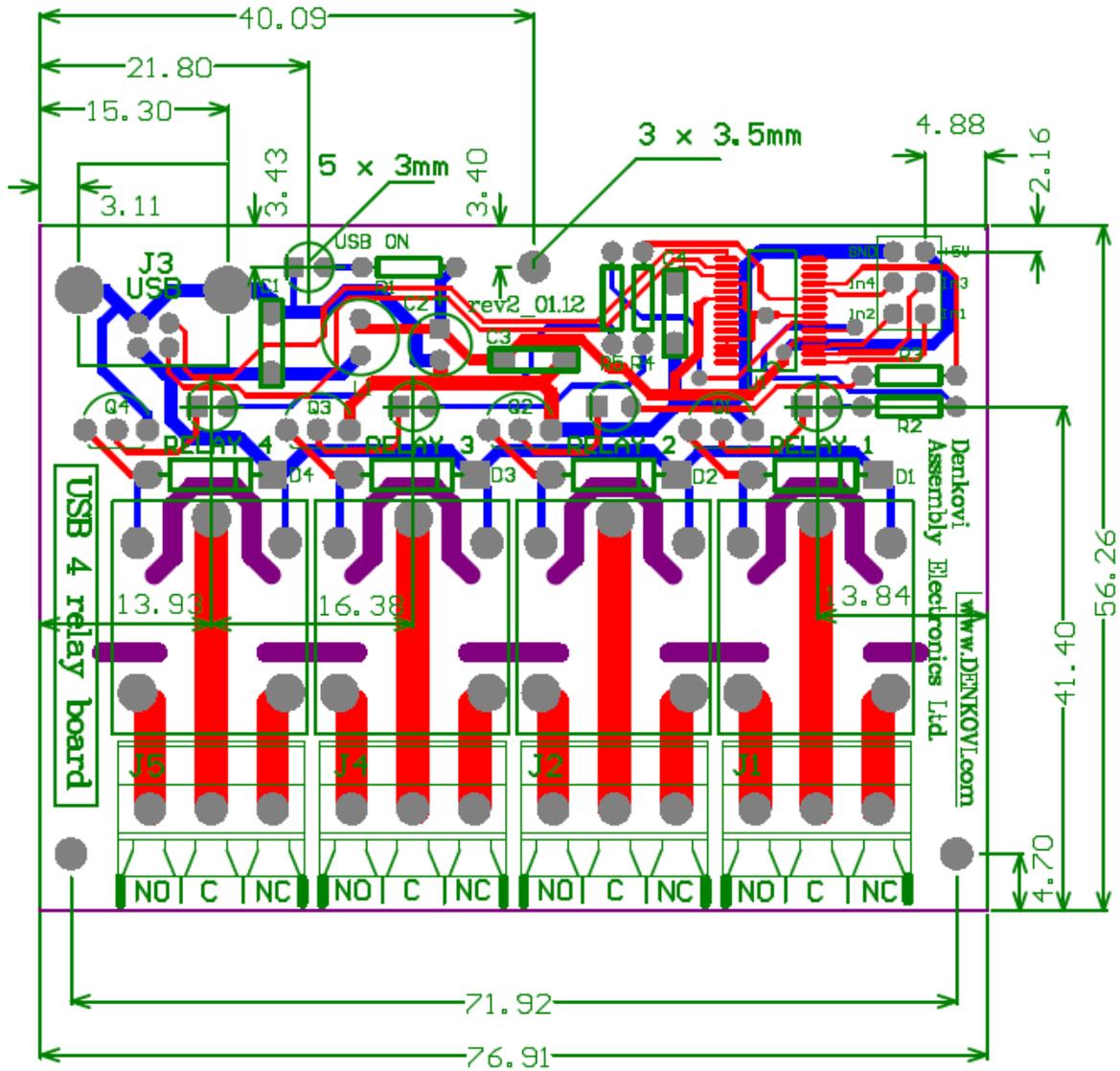


The IO.0 must be configured as output.

5. Appendix 2. Warnings

- The USB 4 Relay module can not work without computer.
- The USB 4 Relay module does not have any protection against short cut or over voltage on its I/O port!
- The +5VDC and GND pins from I/O port are mapped directly from the USB port. Do not short cut them in any way, otherwise the host computer may be damaged permanently!
- The TCN75A sensor is not encapsulated. Do not put it in water or other liquids otherwise the relay board or computer may be damaged permanently because of short cut!

6. Appendix 3. PCB drawings



7. Appendix 4. Software examples

Software examples can be provided for many languages. Some of them can be found on the ***USB Four Channel Relay Board*** and its versions pages. Others can be gathered by contacting us at **support@denkovi.com**. Here are the languages we can provide software examples for:

- Borland C++ Builder 6.0
- .NET
- MS Visual C++
- Java
- LabView