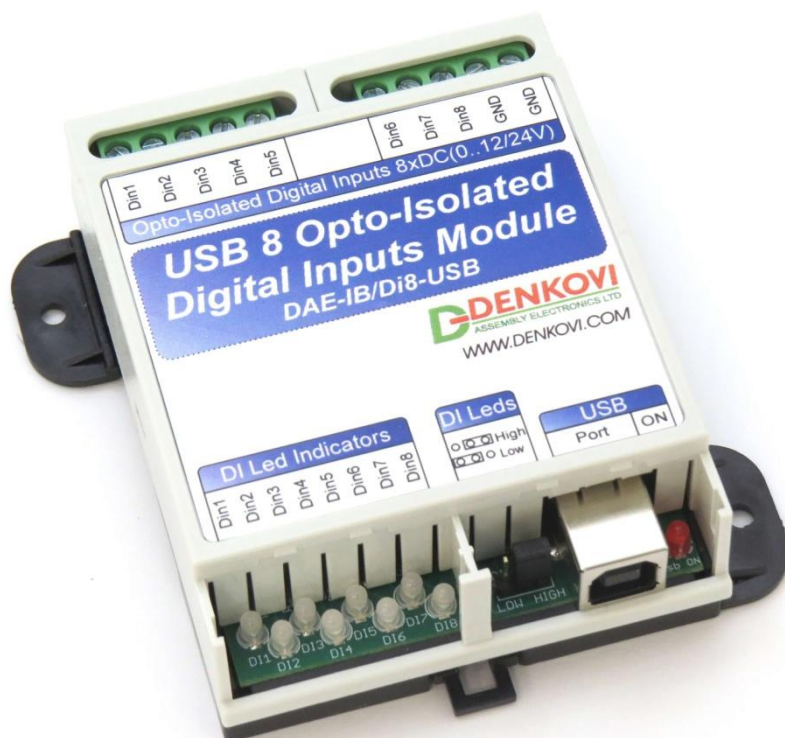


USB 8 Digital Inputs Module

User Manual

Date: 16 Nov 2021



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1. Features

- USB port: type B
- Chipset: [MCP2200](#)
- Communication: USB HID
- 8 opto-isolated digital inputs:
 - Dry contacts:
 - Logic level 0: Close to GND
 - Logic level 1: Open
 - Wet contacts:
 - Logic level 0: 0~3 VDC
 - Logic level 1: 10~30 VDC
- Power supply: 5V (from USB port)
- Maximum current consumption from USB port: 250 mA
- Leds: power, digital inputs
- Selectable digital inputs leds mode: light up on high or low input level;
- DIN Rail box IP20
- Wall mounting
- Size: 94mm x 86mm x 31.5mm
- Working temperature range: -40 to +80 °C

2. Applications

- Kiosks
- DAQ
- Home automation
- Hobby projects

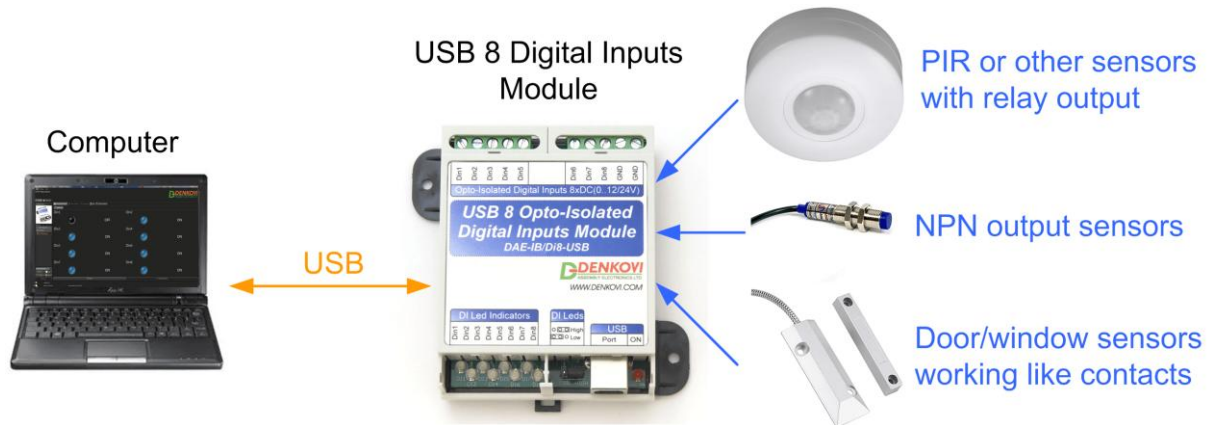


Figure 2.1. Connecting sensors

3. Overview

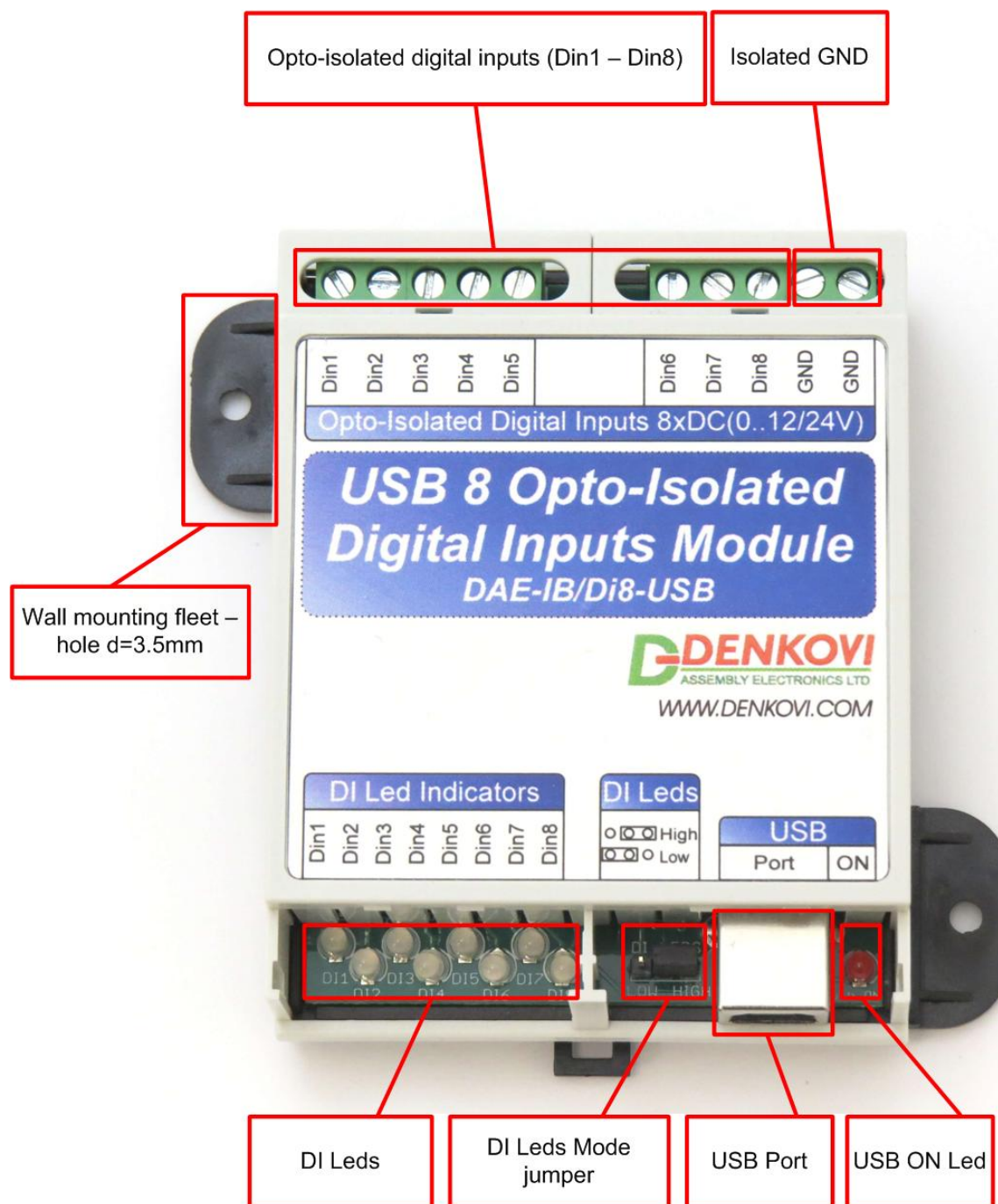


Figure 3.1. Device overview

4. Technical parameters

Table 4.1. Physical parameters

Parameter	Value
Size (L / W / H), mm	94 x 86 x 31.5
Weight, g	85
Operating temperature, °C	-40 to +80
IP protection level	IP20

Table 4.2. System parameters

Parameter	Value
Power supply voltage, V DC	5 (from USB port)
Maximum current consumption, mA	250

Table 4.3. Digital inputs

Parameter	Value
Digital inputs number	8
Digital inputs voltage range, V DC	0 up to 30
Pull-up resistors	Yes
Dry contact	
Logic level 0	Close to GND
Logic level 1	Open
Wet contact	
Logic level 0	0 up to 3
Logic level 1	10 up to 30
Protection against reverse polarity	Yes

5. Device working principle

5.1. Block diagram

The figure below represents the principle of the USB 8 digital inputs module.

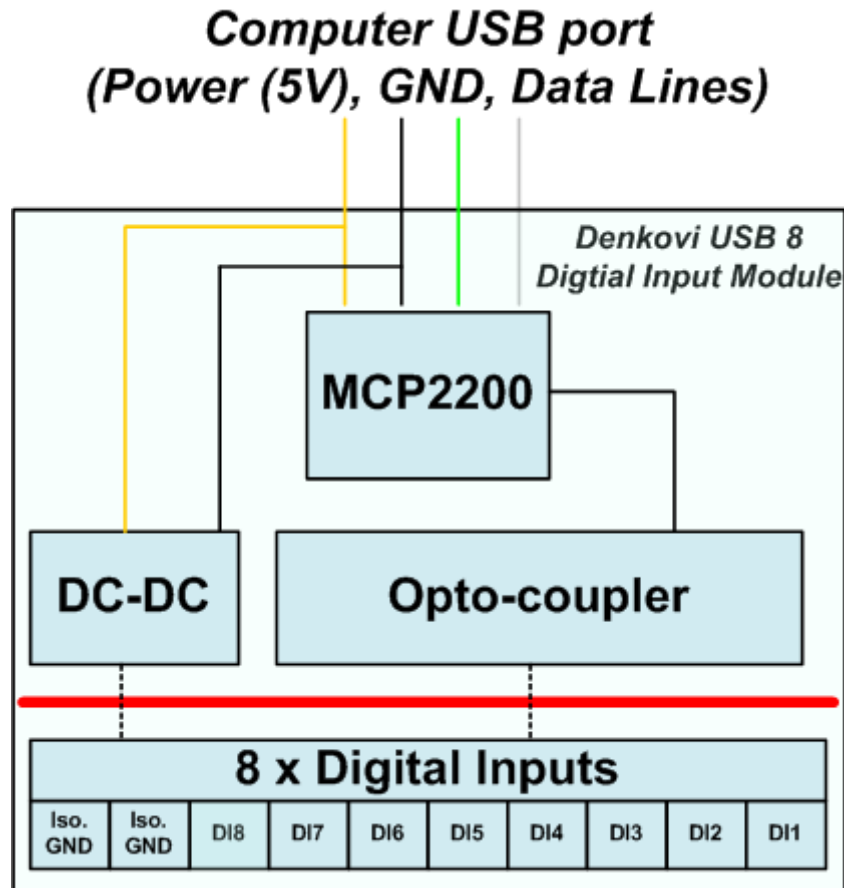


Figure 5.1. Device block diagram

5.2. Isolation of the inputs

As shown on **Figure 5.1.** the digital inputs are isolated from the host computer (the red line) via:

- Opto-coupler for the inputs
- DC-DC converter for the isolated GND (Iso. GND)

5.3. IO Map

MCP2200.GP0 -> DI1
MCP2200.GP1 -> DI2
MCP2200.GP2 -> DI3
MCP2200.GP3 -> DI4
MCP2200.GP4 -> DI5
MCP2200.GP5 -> DI6
MCP2200.GP6 -> DI7
MCP2200.GP7 -> DI8

6. Installation

- This device must be installed by qualified personnel;
- This device must not be installed directly outdoors;
- Installation consists of mounting the device, connecting USB and connecting sensors.

6.1. Mounting

6.1.1. DIN rail



Figure 6.1. Mounting the device to a DIN rail

6.1.2. Wall mounting



Figure 6.2. Mounting the device to a DIN rail

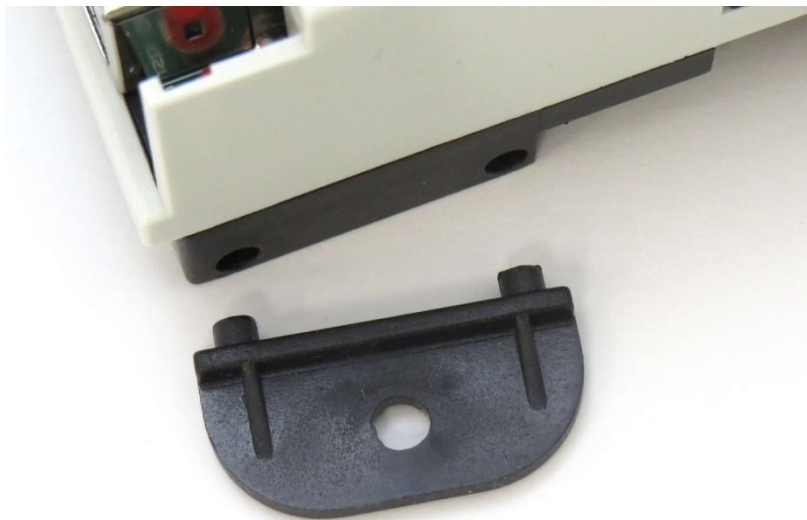


Figure 6.3. The mounting feet for wall mounting can be removed if necessary

6.2. Connecting inputs

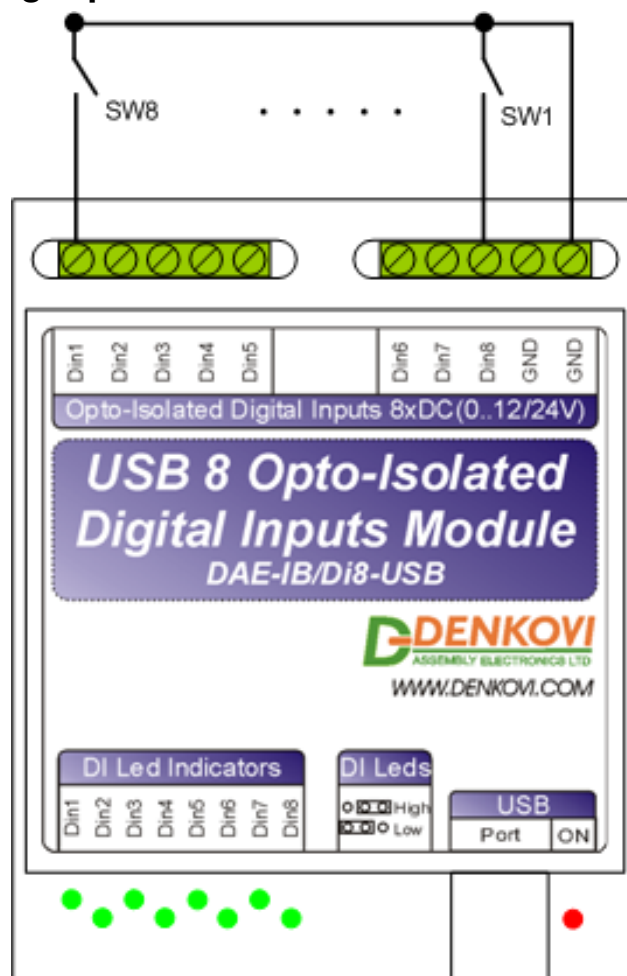


Figure 6.4. Connecting SPST NO output (dry contact) sensors, switches, buttons, door sensors etc. to the Digital Inputs

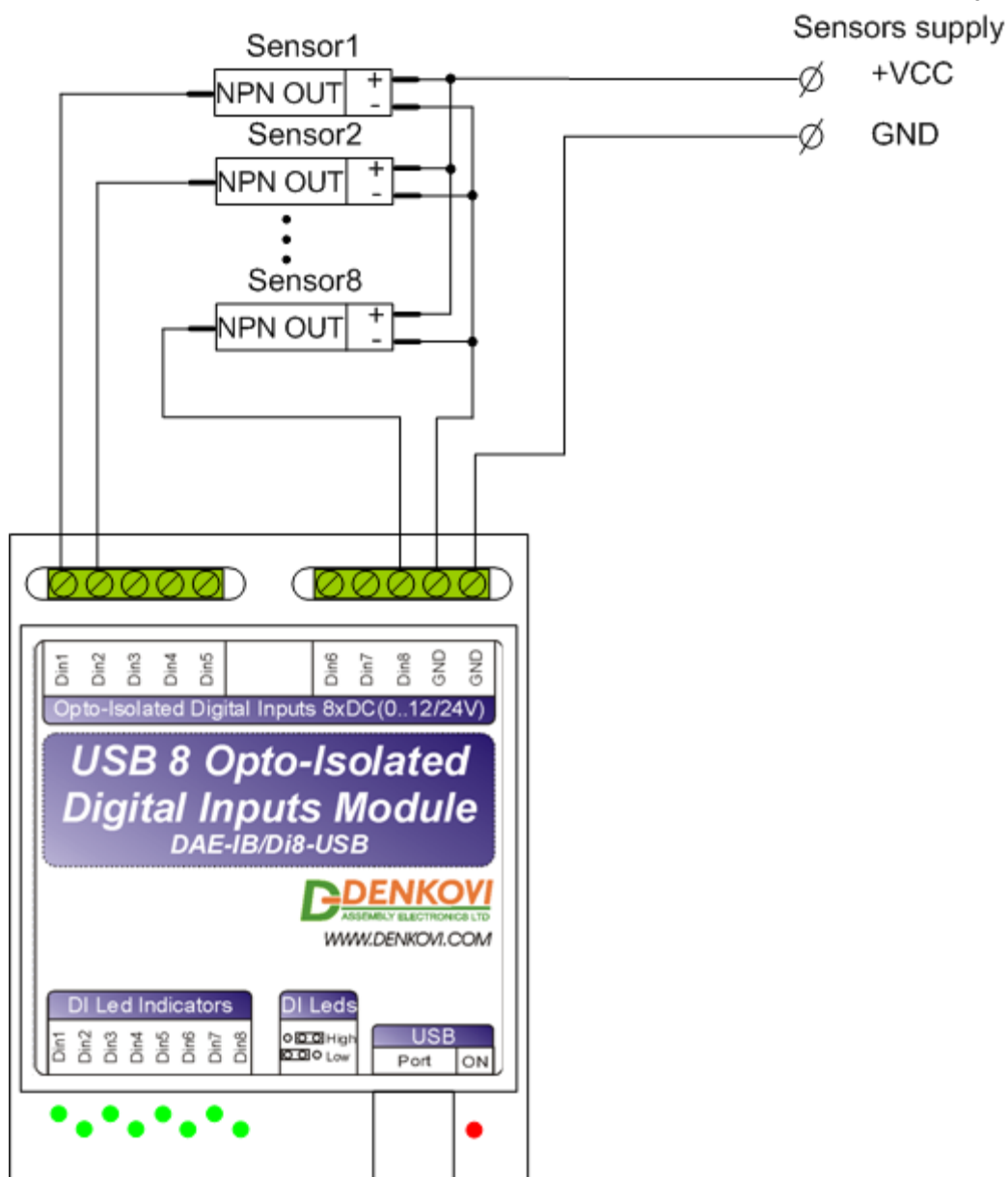


Figure 6.5. Connecting to NPN sensors

- ❗ The module is compatible only with NPN sensors!
- ❗ All digital inputs are designed to work with maximum **30 V DC** input voltage! Applying voltages higher than **30 V DC** may damage the device!

6.3. DI Leds mode selection

The digital inputs leds working mode is selected via the jumper "DI Leds" shown below



Figure 6.6. DI Leds jumper

- Low mode - the input led is **on** when the input level is **low (0)**;
- High mode - the input led is **on** when the input level is **high (1)**.

❗ It is mandatory to select the DI Leds mode with the jumper. Without selecting (leaving the jumper unconnected), the module leds will not work properly!

6.4. USB connection

It is necessary to be used USB-A to USB-B type quality cable like this one:
<http://denkovi.com/usb-printer-cable-gold-plated-1.8m>

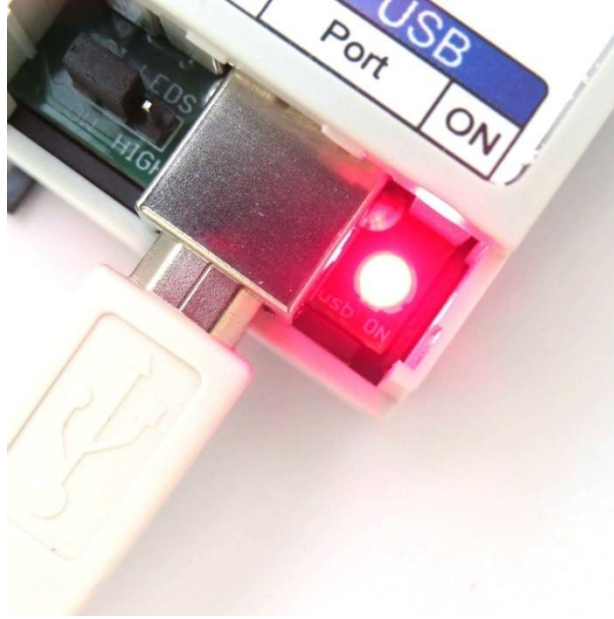


Figure 6.7. USB cable connection

7. Drivers installation

The device is based on MCP2200 chipset. The drivers are usually built in the operating system. However if the device is still not recognized, they must be installed from the bellow link: <http://www.microchip.com/wwwproducts/en/MCP2200>

7.1. Windows

After successful installation, the relay board will be shown as shown below.



Figure 7.1. The module in Windows

7.2. Linux

In Linux usually the drivers are installed by default.

```
pi@raspberrypi: ~  
pi@raspberrypi:~$ usb-devices  
T: Bus=01 Lev=00 Prnt=00 Port=00 Cnt=00 Dev#= 1 Spd=480 MxCh= 1  
D: Ver= 2.00 Cls=09(hub ) Sub=00 Prot=01 MxPS=64 #Cfgs= 1  
P: Vendor=1d6b ProdID=0002 Rev=04.19  
S: Manufacturer=Linux 4.19.97-v7l+ xhci-hcd  
S: Product=xHCI Host Controller  
S: SerialNumber=0000:01:00.0  
C: #Ifs= 1 Cfg#= 1 Atr=e0 MxPwr=0mA  
I: If#=0x0 Alt= 0 #EPs= 1 Cls=09(hub ) Sub=00 Prot=00 Driver=hub  
  
T: Bus=01 Lev=01 Prnt=01 Port=00 Cnt=01 Dev#= 2 Spd=480 MxCh= 4  
D: Ver= 2.10 Cls=09(hub ) Sub=00 Prot=01 MxPS=64 #Cfgs= 1  
P: Vendor=2109 ProdID=3431 Rev=04.21  
S: Product=USB2.0 Hub  
C: #Ifs= 1 Cfg#= 1 Atr=e0 MxPwr=100mA  
I: If#=0x0 Alt= 0 #EPs= 1 Cls=09(hub ) Sub=00 Prot=00 Driver=hub  
  
T: Bus=01 Lev=02 Prnt=02 Port=02 Cnt=01 Dev#= 3 Spd=12 MxCh= 0  
D: Ver= 2.00 Cls=ef(misc ) Sub=02 Prot=01 MxPS= 8 #Cfgs= 1  
P: Vendor=04d8 ProdID=00df Rev=01.01  
S: Manufacturer=Microchip Technology Inc.  
S: Product=MCP2200 USB Serial Port Emulator  
S: SerialNumber=0005772147  
C: #Ifs= 3 Cfg#= 1 Atr=80 MxPwr=100mA  
I: If#=0x0 Alt= 0 #EPs= 1 Cls=02(commc) Sub=02 Prot=01 Driver=cdc_acm  
I: If#=0x1 Alt= 0 #EPs= 2 Cls=0a(data ) Sub=00 Prot=00 Driver=cdc_acm  
I: If#=0x2 Alt= 0 #EPs= 2 Cls=03(HID ) Sub=00 Prot=00 Driver=usbhid  
  
T: Bus=02 Lev=00 Prnt=00 Port=00 Cnt=00 Dev#= 1 Spd=5000 MxCh= 4
```

Figure 7.2. The module in Linux

8. Software

8.1. DRMv3

DRMv3 software downloads, documentation and hints can be found on this link:
<http://denkovi.com/drm-software-v3>

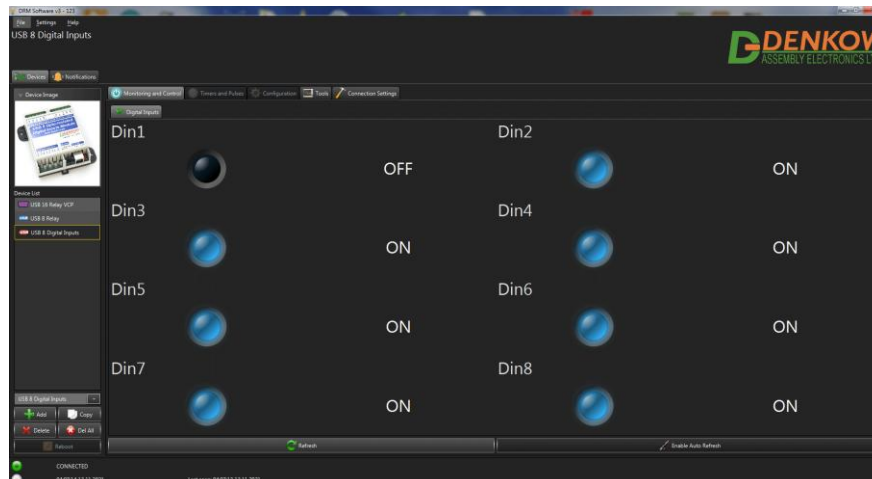


Figure 8.1. DRMv3 software

8.2. Command line tool

The tool downloads, documentation and hints can be found on this link:
<http://denkovi.com/denkovi-relay-command-line-tool>

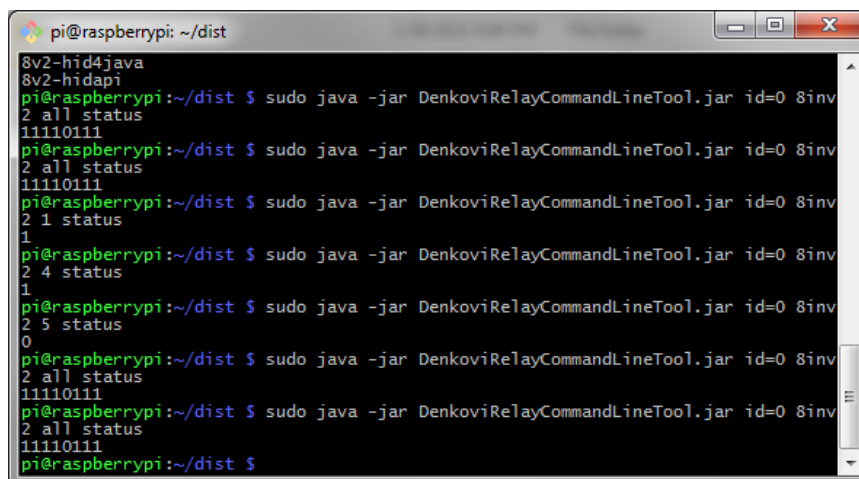


Figure 8.2. Denkovi Relay Command Line Tool

8.3. Software examples

Many software examples in different language platforms can be found on [this link](#).



Please note since the MCP2200 is with 8 input/output lines, it is very important all the 8 lines to be configured as inputs only!



Please note the device is not controlled via Virtual COM Port (Virtual Serial Port) although it may appear in the OS in such way! It is controlled via USB HID API or USB HID raw protocol!

9. Appendix 1. Mechanical drawing

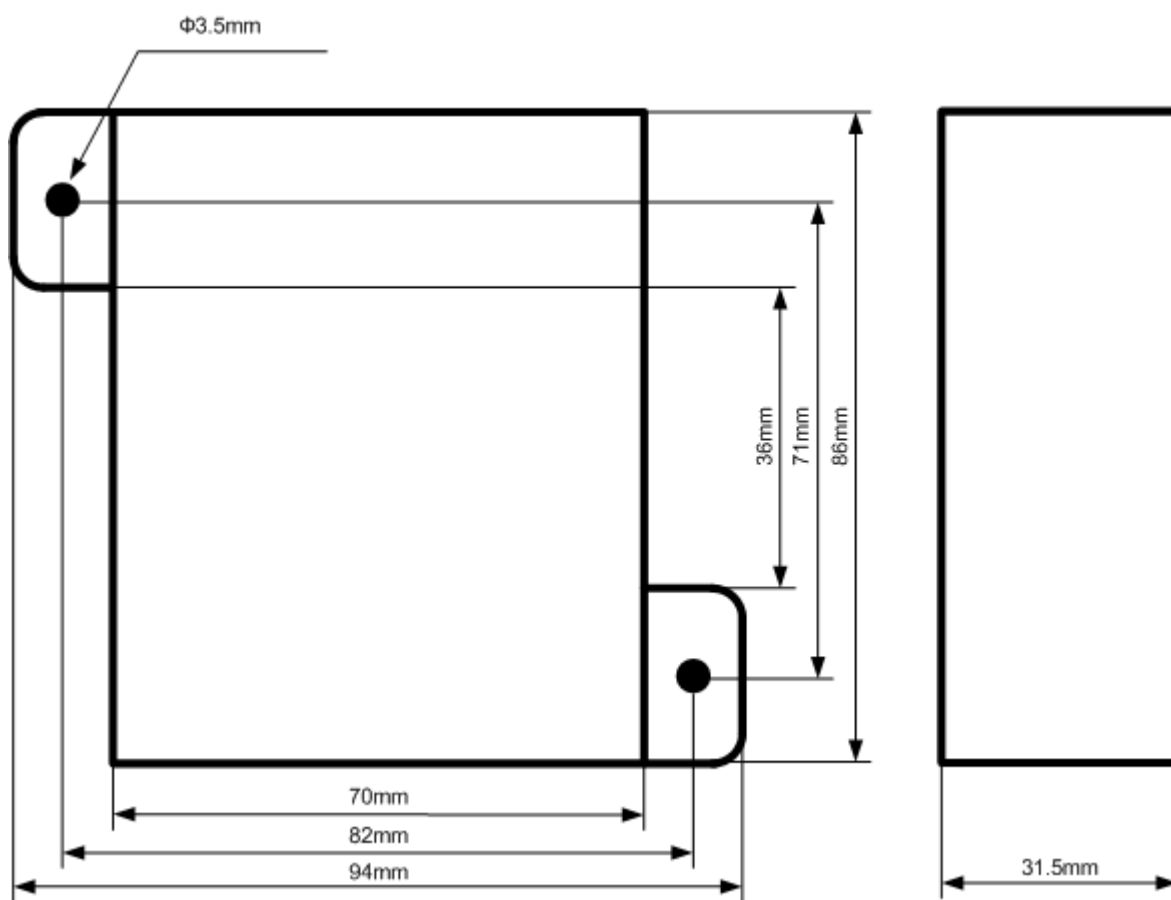


Figure 9.1. Device dimensions

10. Appendix 2. Disclaimer

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