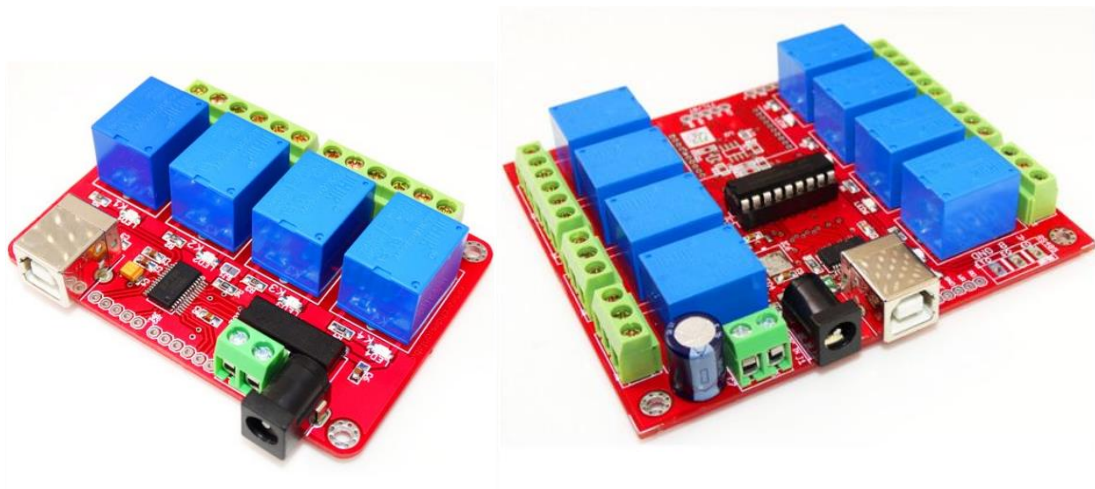




## **USB 4/8 RELAY CHANNEL BOARD (FTDI:FT245R)**

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## OVERVIEW

This document explains about, how to use USB relay board with raspberry pi and windows applications(FT245RL utility and Programmable Relay Board Software).

### USB 8/4 Channel Relay Board

This is Eight/four Channel relay board controlled by computer USB port. The usb relay board is with 8/4 SPDT relays rated up to 7A each. You may control devices 230V / 120V (up to 8/4) directly with one such relay unit. Suitable for home automation applications, hobby projects, industrial automation.

### Features

- 8/4 SPDT Relay channels (7A 250V,12A 120V,10A 125VAC, 10A 28VDC).
- Power supply:12VDC 1AMP
- Current consumption: 400 mA.
- LED indication for relay & power supply.
- Design based on highly proven IC ULN2003 as driver.
- Raspberry Pi and Beaglebone Compatible.

### Documents and Support

#### Driver for FT245RL

<http://www.ftdichip.com/Drivers/VCP.htm>

#### Software examples- ftdi chip

<http://www.ftdichip.com/Support/SoftwareExamples/CodeExamples/VB.htm>

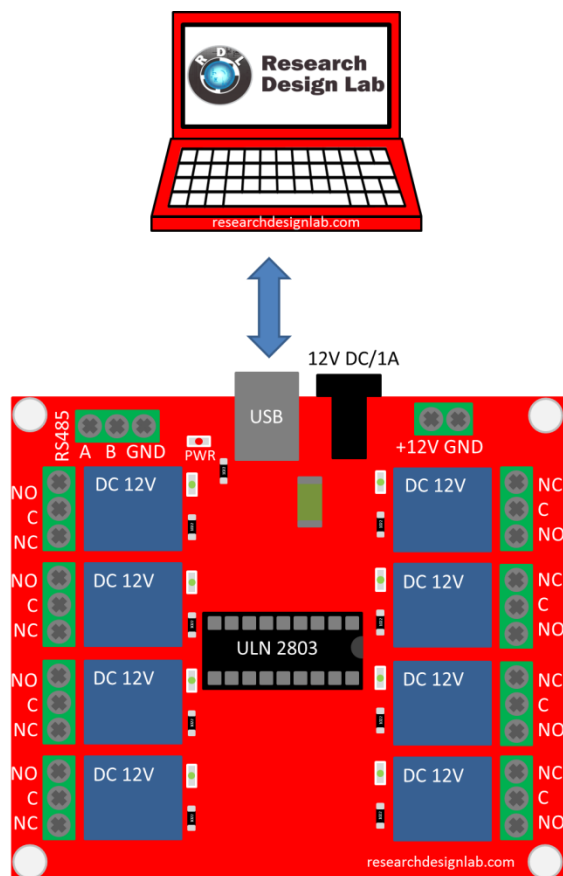
#### Manuals

<http://www.dlpdesign.com/mprog35-ug.pdf>

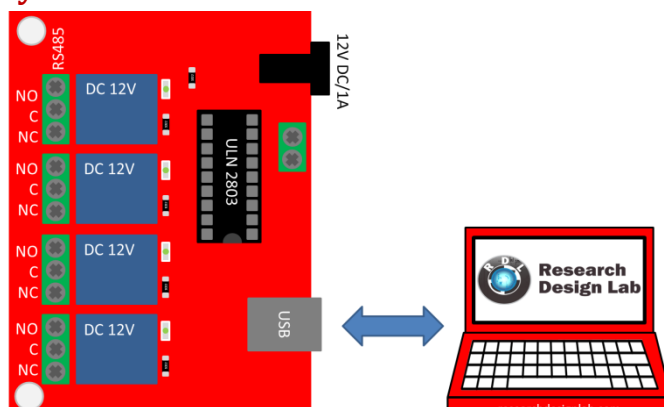
[http://www.ftdichip.com/Support/Documents/AppNotes/AN\\_130\\_FT2232H\\_Used\\_In\\_FT245%20Synchronous%20FIFO%20Mode.pdf](http://www.ftdichip.com/Support/Documents/AppNotes/AN_130_FT2232H_Used_In_FT245%20Synchronous%20FIFO%20Mode.pdf)

## BLOCK DIAGRAM

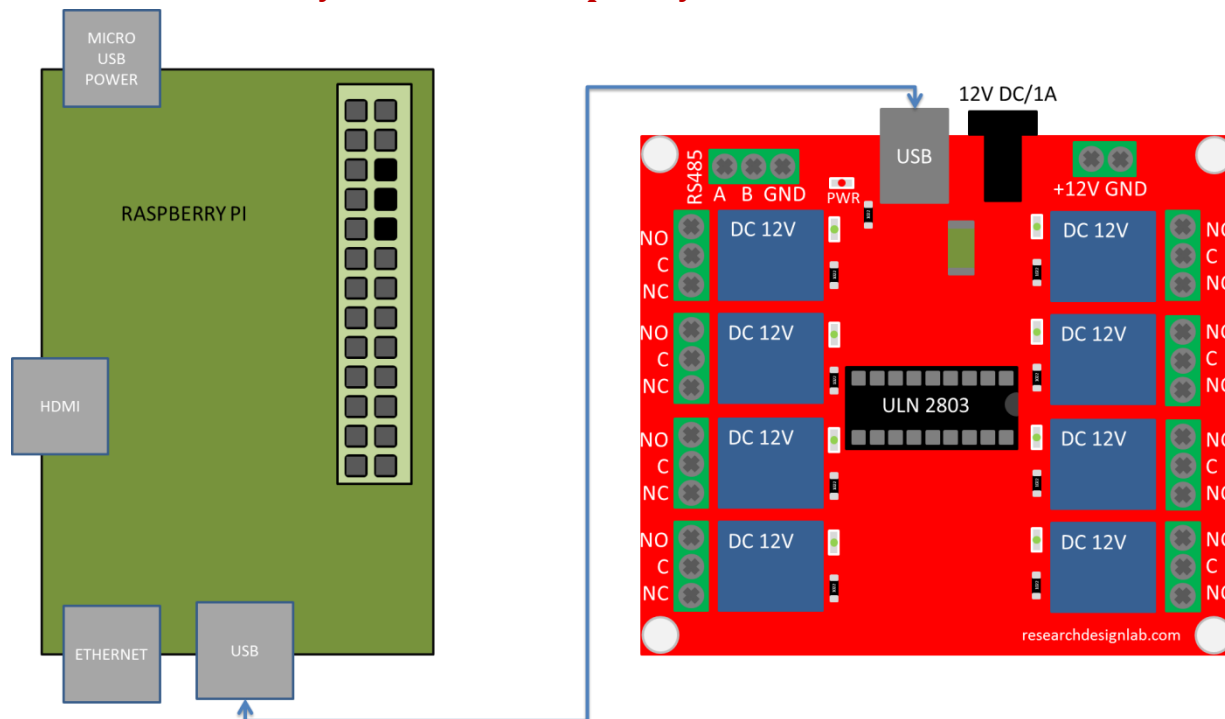
### USB 4 Channel Relay Board to PC



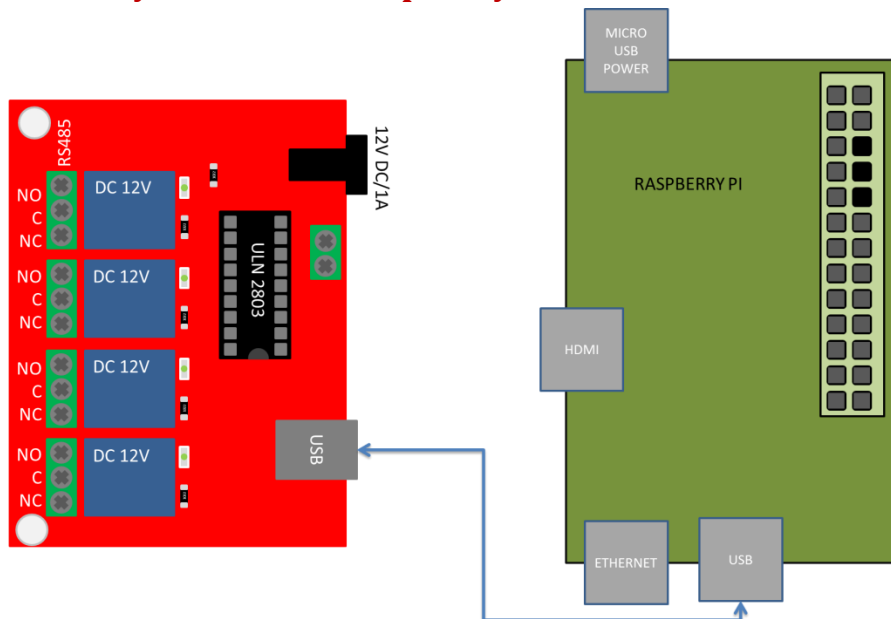
### USB 8 Channel Relay Board to PC



## USB 8 Channel Relay Board with Raspberry Pi



## USB 4 Channel Relay Board with Raspberry Pi

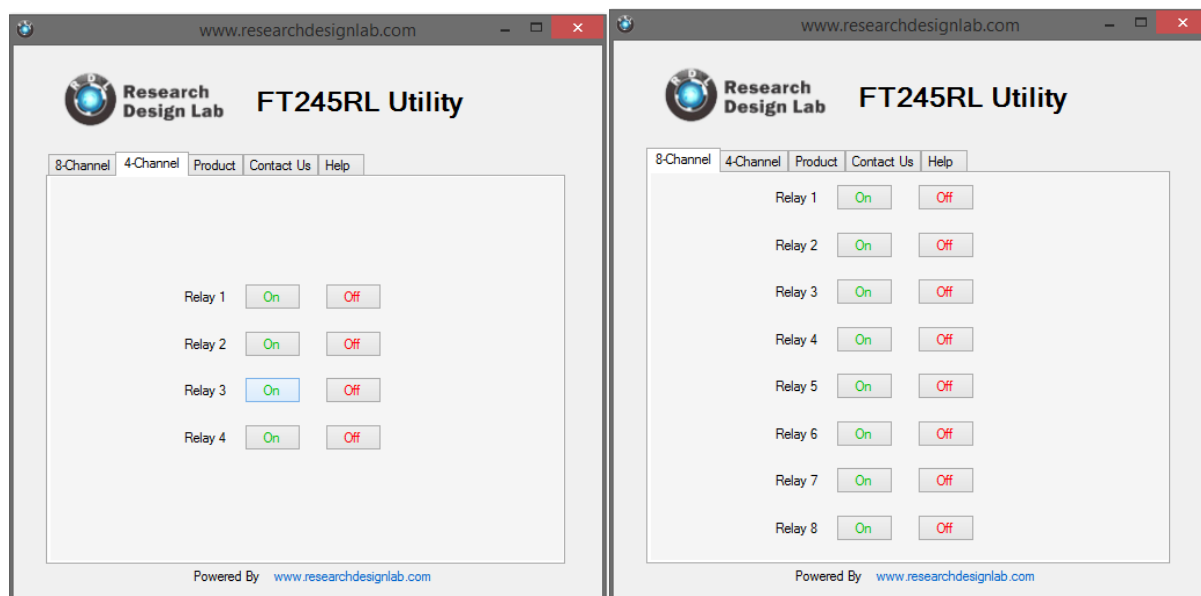


## FT245RL utility software

### Features

- On and off button provided to test onboard relays with status indication.
- Windows application.
- COM port will be automatically selected.

For USB 8/4 Channel Relay

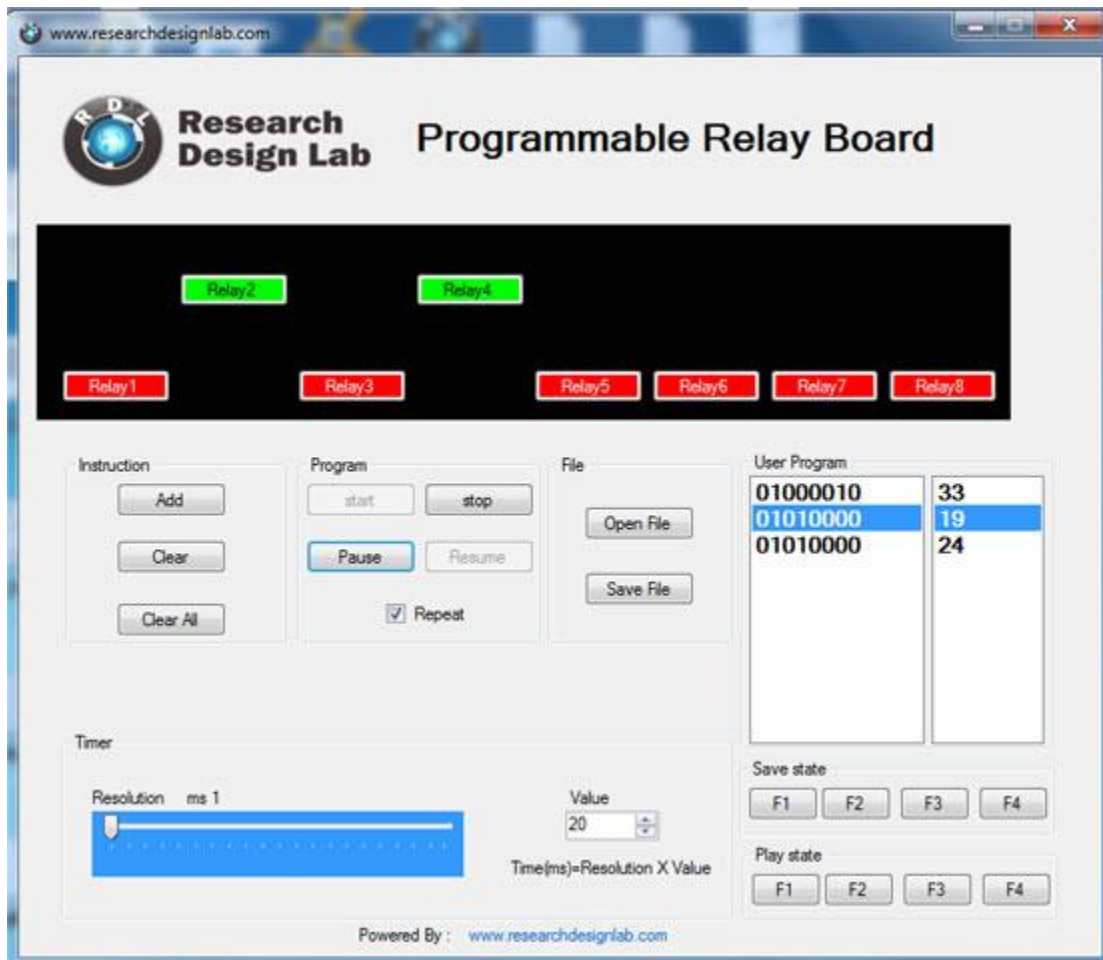


To download FT245RL utility, go to the link given below

<https://docs.google.com/file/d/0BzrGD4zr88GnM2ZZMWxRMEFvRnM/edit>



## Programmable Relay Board Software



### Features

- Under instruction ,one can add /clear relay states. For example,01010000 means relay 2 and relay 4 will be turned ON and corresponding graphical view will be displayed.
- Setting the timer,  $\text{time(ms)} = \text{resolution} \times \text{value}$ ,this is the counter value set so that when a program is started ,relays will be turned on/off for specified timer value.
- Programs can be stopped/resumed as well.
- One can save/open/play the program file(xxxx.rdl)

To download programmable relay board software, go to the link given below.

<https://docs.google.com/file/d/0BzrGD4zr88GnTjBPWTI4Mk9ZRFE/edit>

## Raspberry Pi setup

### INTRODUCTION

Instructions how to install the needed libraries and test DRControl utility to control USB Relay board in Raspberry Pi board

### INSTALLING LIBRARIES

CONNECT WORKING ETHERNET CABLE TO RASPBERRY PI(internet)

OPEN LXTERMINAL

STEP 1 :

Install Python-FTDI library, and Python-pip package is needed to install the pyLibFTDI

**# sudo apt-get install python-ftdi python-pip**

STEP 2 :

Install the FTDI wrapper PyLibFTDI using PIP.

**# sudo pip install pylibftdi**

### TESTING LIBRARIES

If you have the relay board connected, then you can run a quick test by entering following command. Note, when you run this after installation and under normal user you might get a error instead of printout.

**# python -m pylibftdi.examples.list\_devices**

Example printout

**pi@raspberrypi:~#sudo python -m pylibftdi.examples.list\_devices**

FTDI:FT245R USB FIFO:A9005R02

**pi@raspberrypi:~#**

Note that this command will list all FTDI devices



## REMOVING ERRORS

Do you only get following printout when you list the devices;

1. **pi@raspberrypi /opt/drcontrol \$ python -m pylibftdi.examples.list\_devices**

**::**

**pi@raspberrypi /opt/drcontrol \$**

2. **pi@raspberrypi ~ \$ python -m pylibftdi.examples.list\_devices**

Traceback (most recent call last):

File "/usr/lib/python2.7/runpy.py", line 162, in \_run\_module\_as\_main

"\_\_main\_\_", fname, loader, pkg\_name)

File "/usr/lib/python2.7/runpy.py", line 72, in \_run\_code

exec code in run\_globals

File "/usr/local/lib/python2.7/dist-packages/pylibftdi/examples/list\_devices.py", line 42, in <module>

for device in get\_ftdi\_device\_list():

File "/usr/local/lib/python2.7/dist-packages/pylibftdi/examples/list\_devices.py", line 33, in get\_ftdi\_device\_list

for device in Driver().list\_devices():

File "/usr/local/lib/python2.7/dist-packages/pylibftdi/driver.py", line 158, in list\_devices

raise FtdiError(self.fdll.ftdi\_get\_error\_string(byref(ctx)))

pylibftdi.\_base.FtdiError: error sending control message: Operation not permitted

**pi@raspberrypi ~ \$**

You can try to run with sudo, and if that works, then you know it is a permission thing.

**pi@raspberrypi ~ \$ sudo python -m pylibftdi.examples.list\_devices**

FTDI:FT245R USB FIFO: A9005ro2

## ADDING ACCESS RIGHTS TO ALL USERS

**pi@raspberrypi ~ \$ sudo nano /etc/udev/rules.d/99-libftdi.rules**

Add following line to the file and save.

```
SUBSYSTEMS=="usb",      ATTRS{idVendor}=="0403",      ATTRS{idProduct}=="6001",  
GROUP="dialout", MODE="0666"
```

Check that the file is OK

**pi@raspberrypi ~ \$ cat /etc/udev/rules.d/99-libftdi.rules**

```
SUBSYSTEMS=="usb",      ATTRS{idVendor}=="0403",      ATTRS{idProduct}=="6001",  
GROUP="dialout", MODE="0666"
```

**pi@raspberrypi ~ \$**

Do a reboot.

## DRCONTROL INSTALL

CONNECT WORKING ETHERNET CABLE TO RASPBERRY PI(internet)

open LX terminal

```
# mkdir drcontrol
```

```
# cd drcontrol
```

```
# wget http://drcontrol.googlecode.com/files/drcontrol.0.12c.zip
```

```
# unzip drcontrol.0.12c.zip
```

```
# wget http://drcontrol.googlecode.com/svn/trunk/drcontrol.py
```

## TO LIST ALL THE DEVICES

**pi@raspberrypi ~/drcontrol \$ ./drcontrol.py -l**

```
Vendor      Product          Serial  
FTDI        FT245R USB FIFO  A9005ro2
```

//USE THE DEVICE SERIAL NAME LISTED INTO FOLLOWING SCRIPT FILE



## CREATING SCRIPT FILE

**pi@raspberrypi ~/drcontrol \$**ssh nano usb\_relay.sh

### usb\_relay.sh

```
// script file --- 4 relays---
```

```
sudo ./drcontrol.py -d A9005ro2 -c off -r all -v
sleep 1
for i in 1 2 3 4
do
sudo ./drcontrol.py -d A9005ro2 -c on -r $i -v
sleep 1
done
sudo ./drcontrol.py -d A9005ro2 -c off -r all -v
//end of file
```

(for 8 relay ,change the iterations from 4 to 8 in a for loop)

## TO RUN A SCRIPT FILE

**pi@raspberrypi ~/drcontrol \$**ssh usb\_relay.sh

(relays will be turned on and off according to script file)