

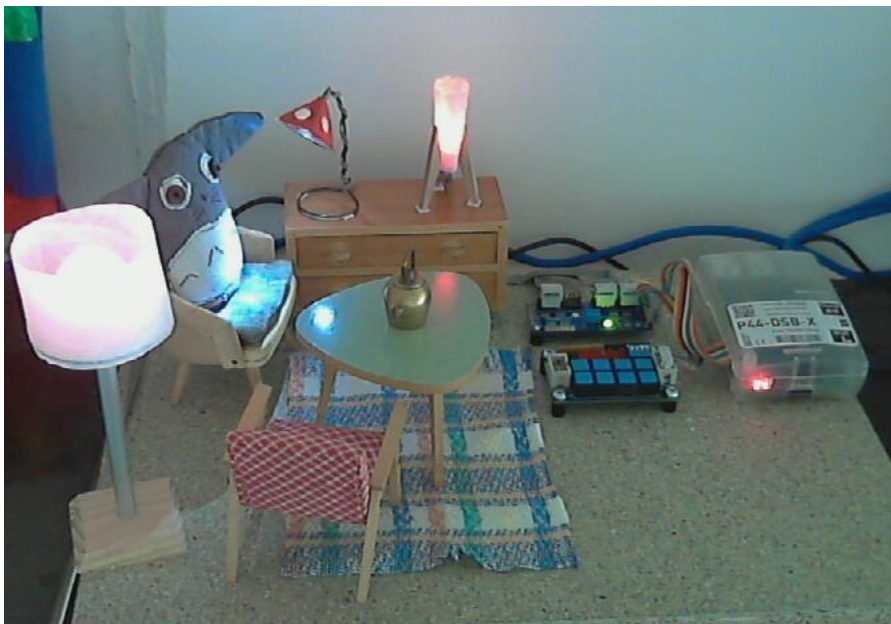
README - P44-DSB-X

Context

plan44.ch produces *and lives from selling* ready-to-use digitalSTROM gateway products, the P44-DSB-DEH(2) and the P44-DSB-E(2) (currently). There's also a standalone DALI/EnOcean light controller P44-LC-DE, and several custom devices for smart LED chain applications (e.g. P44-LC-LED, P44-LC-E+L)

While current P44 products are custom hardware, the P44-DSB-E was just a standard RaspberryPi, equipped with a EnOcean module and pre-installed firmware. The price you paid for a P44-DSB-E was not primarily for the hardware, but for the effort around to make it ready to use, to support it, to provide one click firmware updates and improve the software.

The firmware is based on OpenWrt (since version 1.9.3.0, before it was based on a stripped down Raspian), and is running the components needed for making it a digitalSTROM gateway. In particular, this is the plan44 **vdcd**, an GPLv3 open source (<https://plan44.ch/opensource/vdcd>) implementation of multiple "virtual device connectors" (vdc) instances.



a P44-DSB-X controlled dollhouse living room

vdcd

Of course, the vdcd project needs to contain vdc implementations for DALI, EnOcean and hue as supported by the P44-DSB-DEH2 and P44-DSB-E2 products.

However, vdcd has to offer a lot more, in particular for people willing to experiment and build their own stuff:

- fully functional digitalSTROM **button devices** based on digital inputs such as **GPIO** or **i2c port extender chip pins**.

- fully functional digitalSTROM **dimmers** based on **i2c connected PWM chips** or **DMX512** devices via OLA (<http://www.openlighting.org/>, using a external USB-to-DMX adapter, e.g. DMXKing).
- fully functional full **color lamps** (RGB, RGBW or even RGBWA) based on i2c PWM or DMX512, or even more fancy "lamps" like the MessageTorch (<https://github.com/plan44/messagetorch>)
- **color LED chains** (WS2812 compatible chips) can be connected directly (Data for WS2812 chain at RPi P1 connector pin 12 = PWM = GPIO18) and segments with soft edges can be defined to be digitalSTROM color lamps (Note: currently only works on RPi B+, not yet on RPi 2,3). To see what's possible with the **p44lgraphics** subsystem that powers color LED chains, see this youtube video: <https://youtu.be/vLZRrn7Mh5I>.
- **switching outputs** (like black joker terminal block) based on **GPIO** or **i2c port extenders**
- dimmers and switching outputs that use a **shell command** for switching on, off or set a analog value, for example for connecting rc remote controlled power sockets with rcswitch-pi (<https://github.com/r10r/rcswitch-pi>)
- **New in 1.5.0.10 and later: plan44 vccd external device API** to create devices as external scripts or programs which connect via a socket to the vccd, register the properties of the device and then communicate via a simple text or JSON protocol. **With this API, creating your own devices is easier than ever** (and does not need building the vccd C++ project). Some samples for devices in **C**, **nodeJS** and **bash** are [included](#). See [PDF documentation of the API](#) for details.
- The vccd is a C++ framework made to extend for new hardware easily. All the complicated digitalSTROM behaviour, timing, color management, API is already there. A virtual device implementation is very simple to create, because only the most basic I/O has to be implemented. All the behaviour is already in the framework (Of course, if the actual target hardware interface is complex, you'll have to deal with that).

A P44-DSB for Makers

So, besides being the base for a plan44 commercial product, a RaspberryPi running a vccd is also a great starting point for experiments extending what can be done with digitalSTROM for people who want to *make* things themselves. I really want to encourage this, so that's what the P44-DSB-X is about.

The P44-DSB-X is a firmware image, which can be put on a SD card turning a RaspberryPI B, B+, 2 B v1.x and Rpi 3 into an almost ready to use variant of the P44-DSB-E!

You need to buy the Raspberry yourself, and copy the firmware image to a SD card yourself.

- No EnOcean support configured. It's not forbidden and entirely possible to enable it if you dig in deep enough (if you don't want to do that - buy a P44-DSB-E2...)
- No official support. Of course feedback by email/jabber/irc and true questions are welcome - but not those of the "I'm too lazy, make my stuff work for me, fast!" type.
- No one-click online updates guaranteed (there will be some, from time to time, but there's no entitlement to get them all).
- Version for [Onion Omega2](#) (that's what is inside the P44-DSB-DEH2 and -E2) is planned.

How to use

- Flash the **correct** image (the RPi B+ image does not run on Rpi 2/3 and vice versa!) onto a SD card of at least 1GB size (<https://etcher.io/> is a good tool for that on all platforms, on the mac you can also use the excellent [ApplePi-Baker](#))
- Insert SD card into a RaspberryPi, Model B, B+, 2+ or 3+
- connect to your LAN (must have DHCP)
- connect power
- if there is a dSS version ≥ 1.13 in your LAN, it will find and automatically connect the P44-DSB-X (you'll see it in the dSS Configurator Hardware tab)
- There's the P44-DSB-X configuration website available on port 80 (default user/pw = vdcadmin)
- The OLA (for DMX512) website is available at port 9090
- The vdc drives the DMX universe number 42, so to use DMX, you need to create universe 42 in OLA connected to your DMX512 output device.
- Using the "+ Device" button in the P44-DSB-X configuration, you can add DMX512, GPIO, LED, spi and i2c devices.
- Currently supported i2c chips are the TCA9555 (16 digital I/O, e.g. <http://shop.e-lab.de/de/Module/Boards/I2C/I2C-DigIO>), PCF8574 (8 digital I/O, e.g. http://www.ereshop.com/shop/digital-outputs-c-143_182/) and PCA9685 (16 channel 12bit PWM, e.g. <http://www.play-zone.ch/de/adafruit-16-channel-12-bit-pwm-servo-driver-i2c-interface-pca9685.html>), MCP23017 (16 digital I/O), LM75 (temperature sensor).
- Currently supported SPI chip is MCP23S17 (16 digital I/O, as used in PiFace 2), MCP3008 (8 analog inputs), MCP3002 (2 analog inputs).
- The OS on the P44-DSB-X is a customized OpenWrt with little packages installed. So you can use it more or less like a regular OpenWrt on the command line.
- **You can login via ssh as root with password *eXperiment*** - you should change this when your RPi is accessible from the open internet!

How to participate

- Use it! This already makes you part of the virtual digitalSTROM device community :-)
- Improve it - vdc is GPLv3 on github <https://github.com/plan44/vdcd>, you can build it on the raspberry itself (the *olavdcd* target needs the OLA libraries to be present, the *vdcd* target is without OLA support)
- Join the vdc mailing list (google groups) - https://groups.google.com/group/plan44_vdcd
- Provide feedback (luz@plan44.ch email and jabber, pull requests in github)