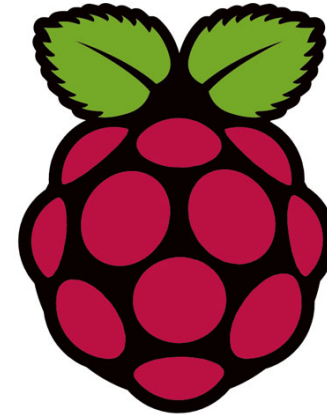


AG Tagung INF 2015



Mag. Martin Gruber
MMag. Rene Schwarzingner

Lukas Winkler (BRG Kremszeile)

Raspberry PI

- Einplatinen PC
- R.PI Foundation
- Modell B
 - 700 MHz, 1 Kern
 - 512 MB RAM
 - 2/4 x USB
 - LAN, HDMI
- Modell 2
 - 900 MHz, 4 Kerne
 - 1 GB RAM
 - 4 x USB
 - LAN, HDMI

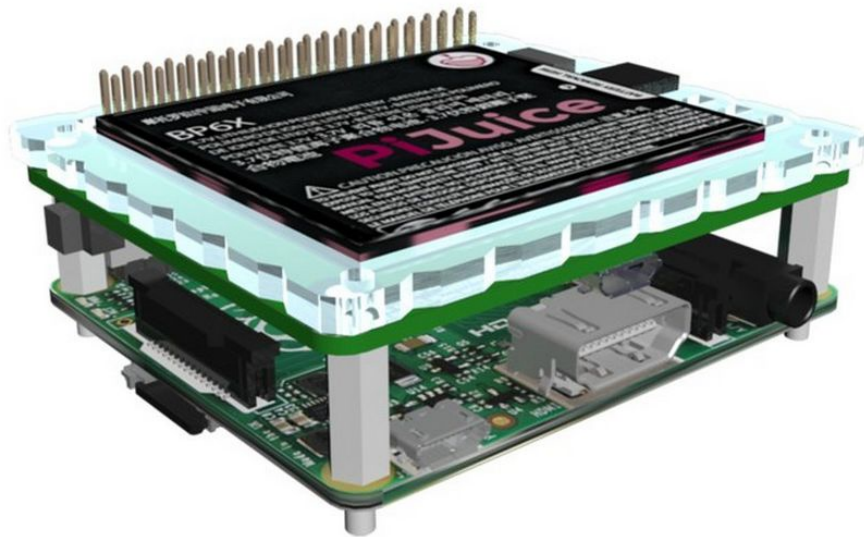
Ziel, jungen Menschen den Erwerb von Programmier- und Hardwarekenntnissen zu erleichtern.

Hardware

- Raspberry PI
- Gehäuse
- Netzteil
- USB-Hub
- HDMI-Adapter
- WLAN-USB
- Speicherkarte



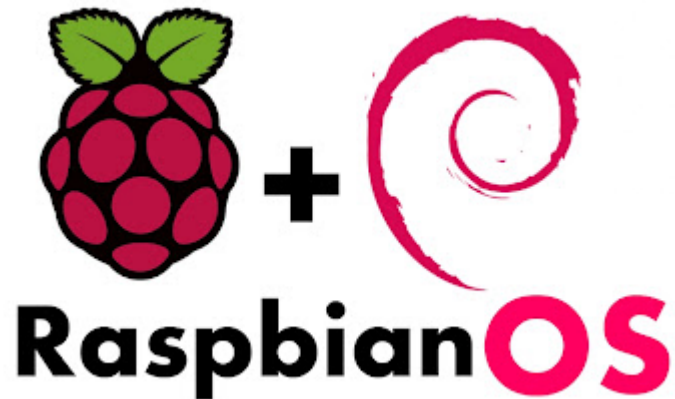
PiJuice



- tragbare Plattform
- 1400 mAh-Akku
 - ca. 6 Stunden
- PiJuice Solar
- ca. 30 \$

Betriebssystem

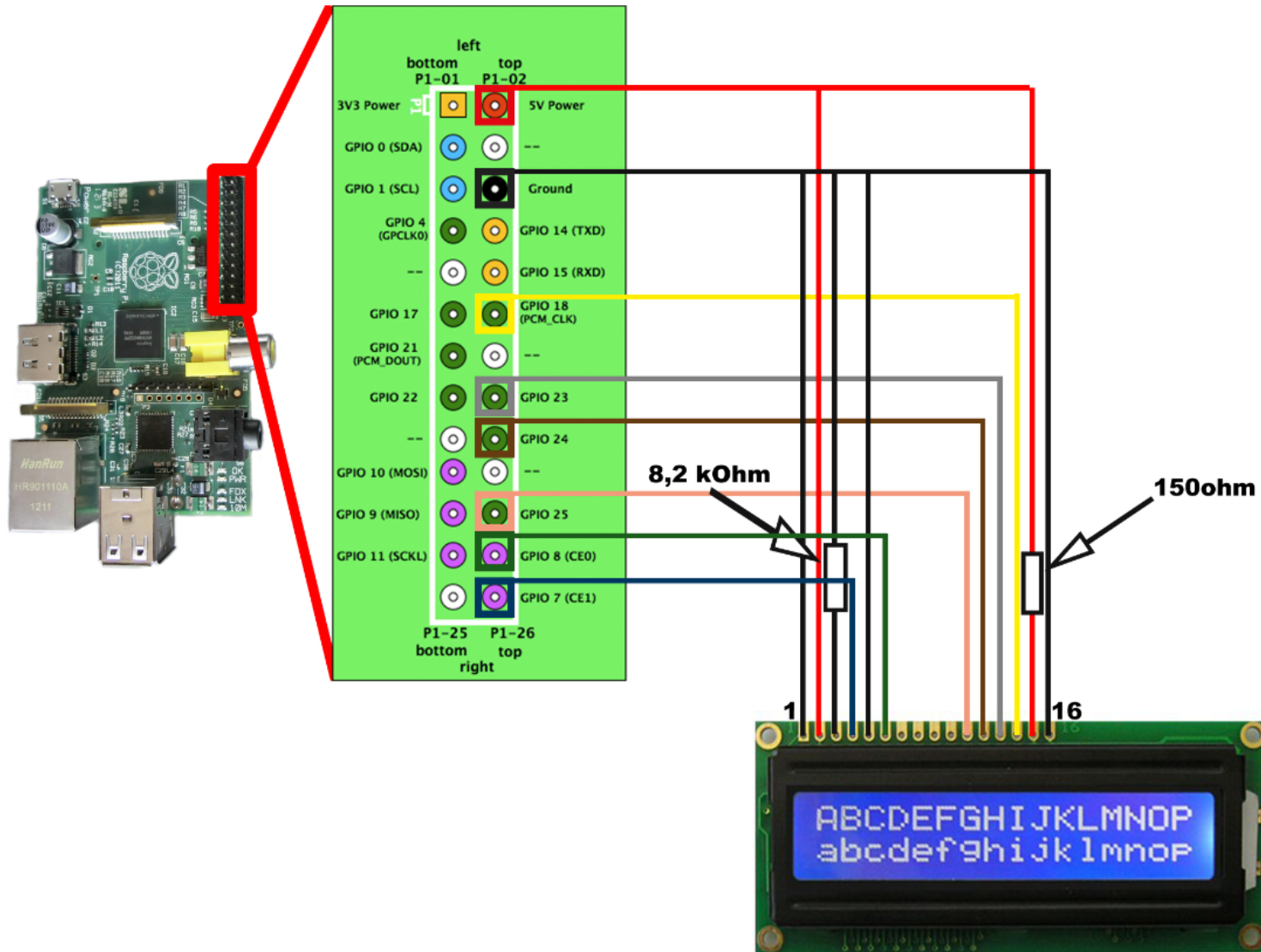
- SD Speicherkarte
 - min. Class 6, besser Class 10
- Linux Betriebssystem
 - Raspian
 - NOOBS
 - u.v.m.



Projekte

- Fernzugriff (ssh, scp, rdesktop)
- WLAN Konnektivität
- WLAN Access Point
- USB Festplatte → Netzwerk
- USB Drucker → Netzwerk
- RI als Webserver
- RI als Mediacenter

Ausflug in die Elektronik



Jahrgang 2014



01/2014
RasPi im WLAN



02/2014
RasPi-Projekte



03/2014
RasPi im Lan

Jahrgang 2013



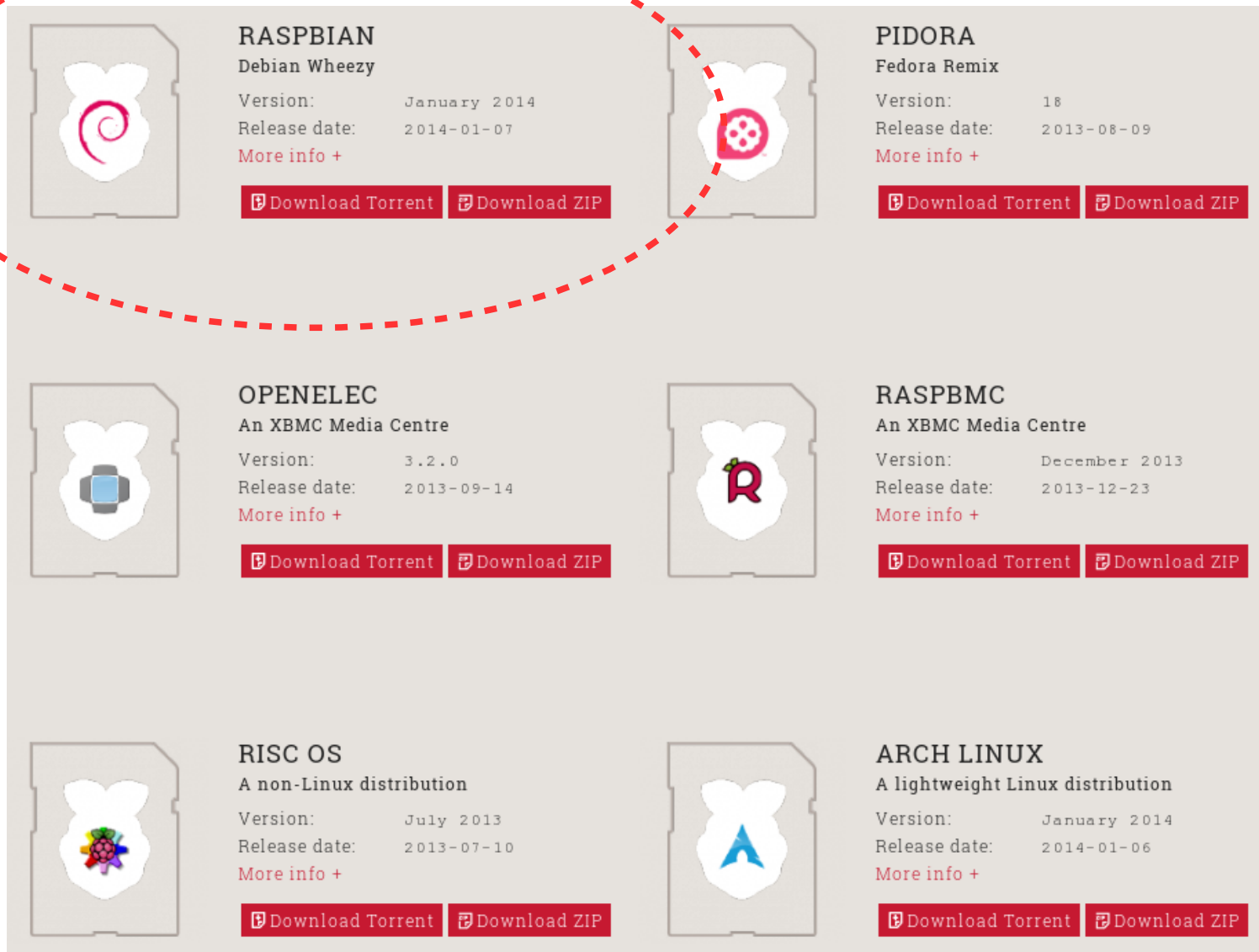
05/2013
RasPi-Hacks



06/2013
Tuning-Tipps

Schritt 1: Betriebssystem

<http://www.raspberrypi.org/downloads/>



The screenshot displays the Raspberry Pi OS download page. A red dashed circle highlights the first two options: Raspbian and PIDORA. Each option is presented in a card format, including a logo, name, description, version, release date, a 'More info +' link, and buttons for 'Download Torrent' and 'Download ZIP'.

OS Name	Description	Version	Release date	Download Options
RASPBIAN	Debian Wheezy	January 2014	2014-01-07	Download Torrent, Download ZIP
PIDORA	Fedora Remix	18	2013-08-09	Download Torrent, Download ZIP
OPENELEC	An XBMC Media Centre	3.2.0	2013-09-14	Download Torrent, Download ZIP
RASPBMC	An XBMC Media Centre	December 2013	2013-12-23	Download Torrent, Download ZIP
RISC OS	A non-Linux distribution	July 2013	2013-07-10	Download Torrent, Download ZIP
ARCH LINUX	A lightweight Linux distribution	January 2014	2014-01-06	Download Torrent, Download ZIP

INSTALLING OPERATING SYSTEM IMAGES

How to install a Raspberry Pi Operating System image on an SD card. You will need another computer with an SD card reader to install the image.

We recommend most users download **NOOBS** which is designed to be very easy to use. However more advanced users looking to install a particular image should use this guide.

DOWNLOAD THE IMAGE

Official images for recommended Operating Systems are available to download from the Raspberry Pi website: raspberrypi.org/downloads

Alternative distributions are available from third party vendors.

WRITING AN IMAGE TO THE SD CARD

With the image file of the distribution of your choice, you need to use an image writing tool to install it on your SD card.

See our guide for your system:

- Linux
- Mac OS
- Windows

user@debian: ~

Datei Bearbeiten Ansicht Suchen Terminal Hilfe

root@debian:/home/user# fdisk -l

Disk /dev/sda: 80.0 GB, 80026361856 bytes
255 heads, 63 sectors/track, 9729 cylinders, total 156301488 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	63	78124094	39062016	83	Linux
/dev/sda2		78124095	79120124	498015	82	Linux swap / Solaris
/dev/sda3		79120125	156296384	38588130	83	Linux

Disk /dev/sdb: 16.7 GB, 16651386880 bytes
64 heads, 32 sectors/track, 15880 cylinders, total 32522240 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000b947a

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb1		2048	4194303	2096128	c	W95 FAT32 (LBA)
/dev/sdb2		4194304	22501375	9153536	83	Linux
/dev/sdb3	*	22501376	22706175	102400	83	Linux
/dev/sdb4		22706176	32522239	4908032	83	Linux

root@debian:/home/user#

pv
2015-02-16-raspb
ian-wheezy.img |
dd of=/dev/sdd
bs=4M

Schritt 2: vor dem Start

- SD-Karte am normalen Rechner
- /boot
- config.txt
 - **hdmi_force_hotplug=1** setzen bzw. auskommentieren

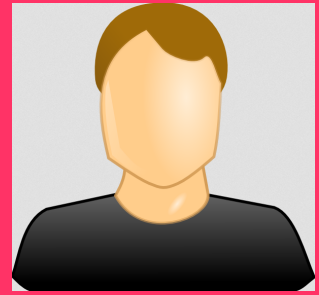


Schritt 3: Start + Konfiguration

- raspi-config (wirksam beim nächsten S.)
 - upgrade raspi-config
 - expand_rootfs (> 4 GB)
 - set keyboard layout (Generic 105-key)
 - German | The default for the keyboard layout | No compose key
 - set locale (de_AT.UTF-8 UTF-8 | de_AT.UTF-8)
 - set timezone (Europe | Vienna)
 - memory split (Hauptprozessor ↔ Grafik-CPU)
 - enable ssh



Schritt 4: Neuer User



- Benutzername: pi
- Passwort: raspberry
- sudo adduser rene
- sudo passwd rene
- sudo usermod -a -G sudo rene
 - sudo visudo
 - /etc/sudoers → rene ALL=(ALL:ALL) ALL bzw.
 - /etc/sudoers → rene ALL=(ALL) NOPASSWD: ALL
- Starten der **GUI**: startx

Schritt 5: Fernzugriff

- **SSH**

- /etc/ssh/sshd_config
 - # PermitRootLogin
yes auskommentieren
- /etc/ssh/sshd_config
 - Zeile AllowUser User1
User2 ...
- service sshd restart
- ssh User@IP

- **rdesktop**

- RPI: sudo apt-get
install xrdp
- Client: apt-get install
rdesktop



Schritt 5b: IP-Adresse

- Eintragung einer statischen IP-Adresse
 - /etc/network/interfaces

```
1  ## Ethernet Schnittstelle 0
2  auto eth0
3  # Beim Bootvorgang automatisch starten
4  iface eth0 inet static
5      address 192.168.0.97
6      netmask 255.255.255.0
7      gateway 192.168.0.1
```


Schritt 6: Datei Transfer

- **SCP**

- scp dateiname
User@IP:/Verzeichni
s oder
- scp -r Verzeichnis
User@IP:/Verzeichni

- **sshfs**

- apt-get install sshfs
- usermod -aG fuse pi
- mkdir share
- sshfs
User@Host/Verzeic
hnis share
- fusermount -u
~/share

Schritt 7: NAS

- /etc/fstab
 - /dev/sda1 /mnt/ExternalStorage
ext4 defaults 0 0
- sudo chmod -R 777
/mnt/ExternalStorage
- ev. Stromsparen via hdparm
einstellen
- sudo apt-get install samba
samba-common-bin
- sudo nano
/etc/samba/smb.conf
- security = user bei Bedarf
auskommentieren

```
[public]
comment = Public
path = /mnt/ExternalStorage/
valid users = @users
force group = users
create mask = 0660
directory mask = 0771
read only = no
```

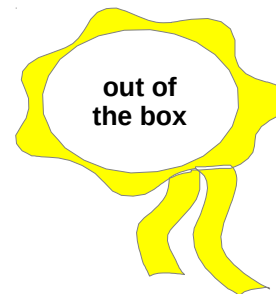
Schritt 7b: NAS

- `sudo /etc/init.d/samba restart`
 - `sudo useradd nasuser -m -G users`
 - `sudo passwd nasuser`
 - `sudo smbpasswd -a nasuser`
-

Serveradresse

`sftp://pi@10.0.0.22/home/pi`

Zum Beispiel: `smb://foo.example.org`



Schritt 8: Backup

- `sudo apt-get install rsync`
- `sudo nano /etc/rsyncd.conf`
- `rsync -avz ~/dokumente/* rsync://192.168.2.129/public`

```
use chroot = true
hosts allow = 192.168.2.0/24

transfer logging = true
log file = /var/log/rsyncd.log
log format = %h %o %f %l %b

[public]
comment = Public
path = /mnt/ExternalStorage/
read only = no
list = yes
uid = nobody
gid = nogroup
```

Schritt 9: Druckserver

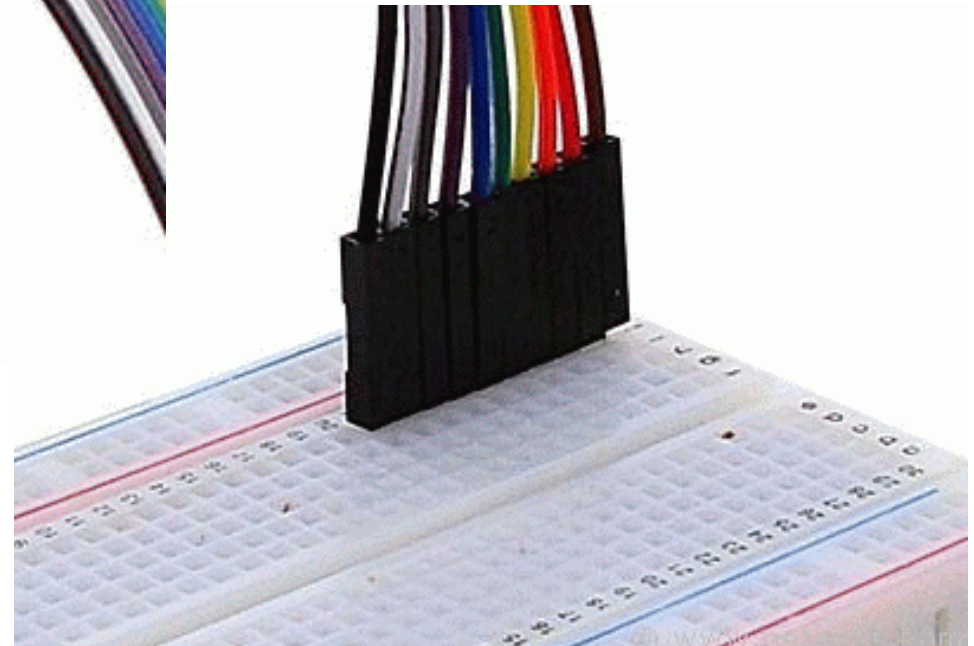
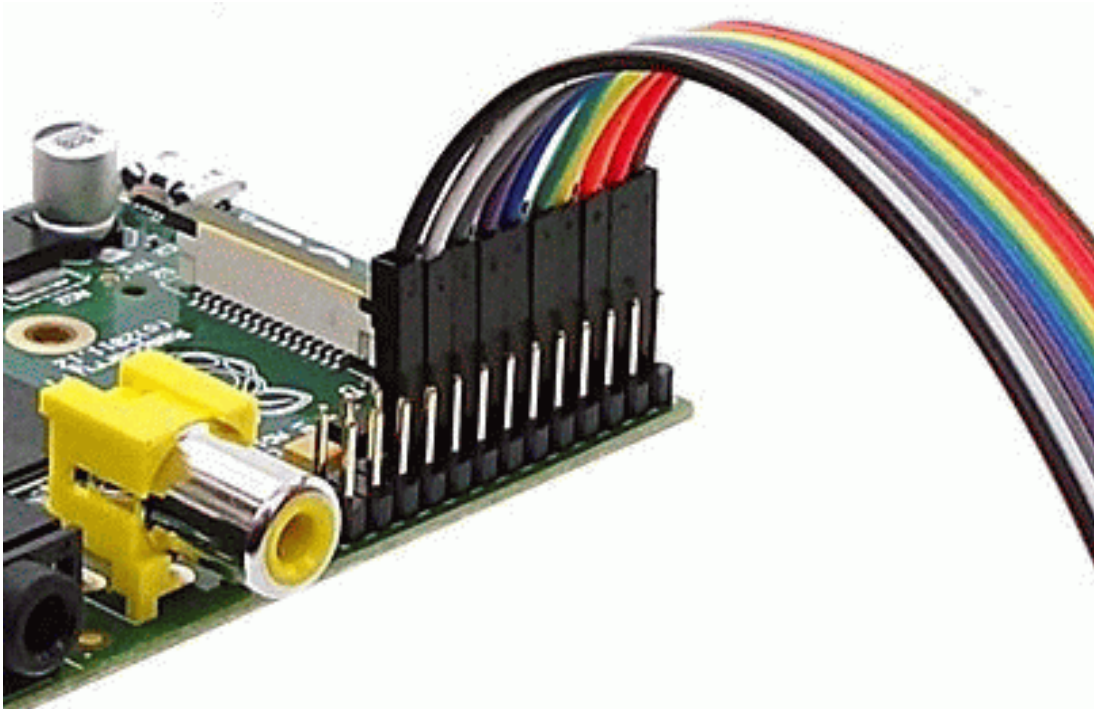
```
$ sudo apt-get install cups
$ sudo cupsctl
--share-printers
--remote-printers
--remote-admin
$ sudo usermod -a -G lpadmin
pi
```

Drucker hinzufügen

Lokale Drucker: ● HP Drucker (HPLIP)
○ HP Fax (HPLIP)

- Port 631
- Für Windows:
 - /etc/samba/smb.conf
 - printing = cups
 - printcap name = cups
 - sudo
/etc/init.d/samba
restart

General Purpose Input Output



Projekt: Lukas Winkler

Umweltdatenmessung mit dem Raspberry Pi

