
How to Connect a Turntable to a TV set with Raspberry Pi

Manual

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This manual shows how to connect a turntable to a TV-set and build an inexpensive multimedia centre with second hand parts.

Hardware procurement

I found the following parts in Ebay and on our local newspaper's small ads site.

Hardware list	Price (second hand)
TV set (4K)	>500€
TV stand	80€
2 * USB Power-adapter (4A)	10€
Socket strip with foot switch	12€
Soundbar HW-F350	25€
DVD Burner	12€
Turntable Onkyo CP-1046F	20€
Pre-Amplifier Inakustik Premium	15€
Raspberry PI 4 (new)	40€
Raspberry PI case (new)	10€
SD-card 32GB, Class 10, A1 (new)	10€
Wireless keyboard and mouse	10€
Sum (without TV)	244€

This is how the multimedia centre looks like.



Figure 1. Media-tower with Soundbar HW-F350



Figure 2. Turntable Onkyo CP-1046F



Figure 3. DVD-Burner

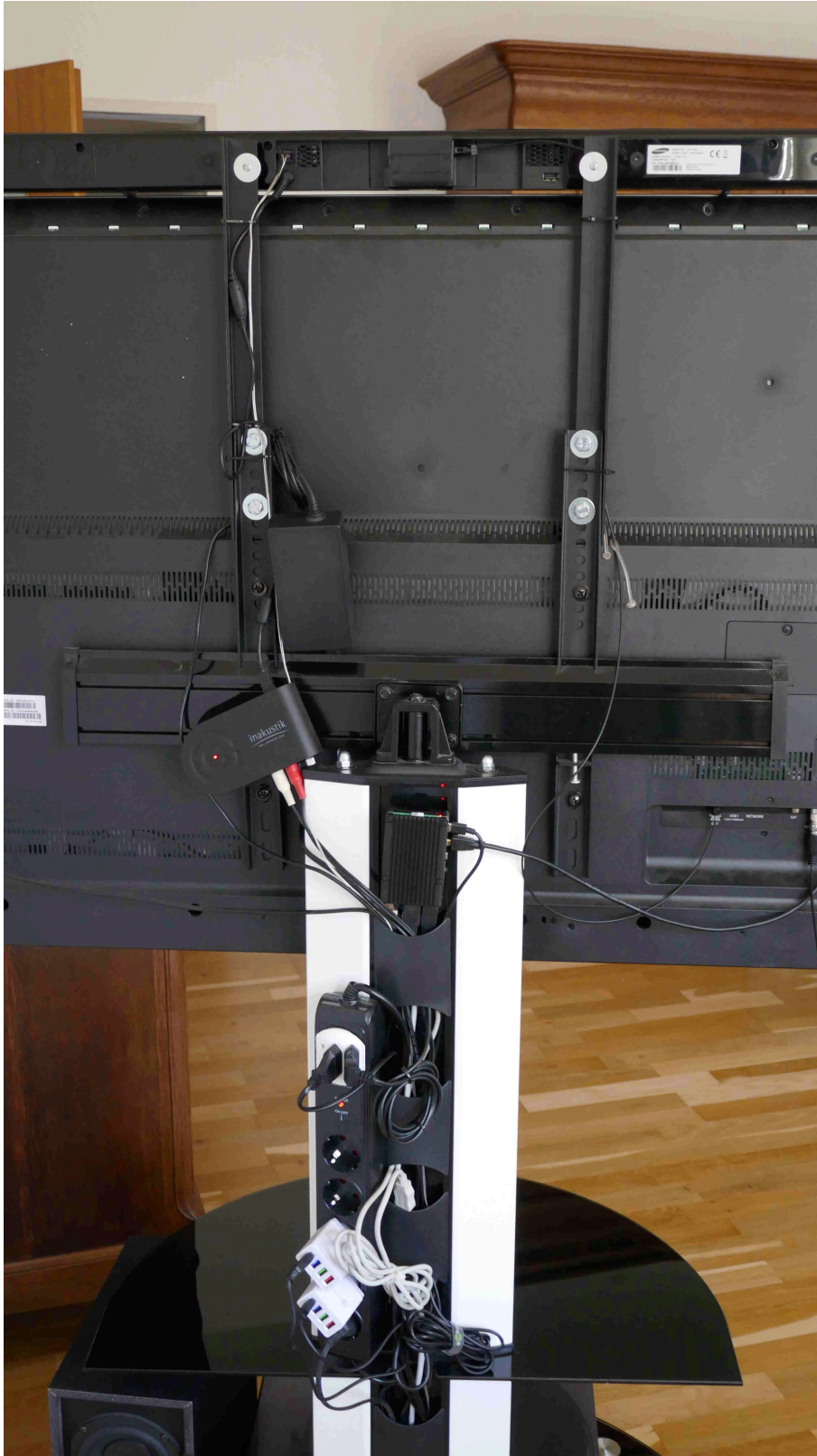


Figure 4. Rear view of media-tower



Figure 5. Inakustik Premium Pre-Amplifier and Raspberry Pi 4

Setting up

Connecting your hardware

From	Via	To
Turntable	Cinch	Pre-Amp
Pre-Amp	USB	Raspberry Pi
Raspberry Pi	HDMI	TV
TV	Optical	Soundbar
Optional: DVD burner	USB	Raspberry Pi

NB: Your optional DVD burner needs a separate power supply cable! Power supply via USB from Raspberry does not work! Do not connect the DVD-power to the same power adapter as the Raspberry PI.

NB 2: The sound is much better, when the soundbar is mounted on top of the TV.

Installing the Operating System

First [Download Raspbian for Raspberry Pi](https://www.raspberrypi.org/downloads/raspbian/)¹ and install it on you SD card.

Pass-through sound channel from Pre-Amp-output to TV-HDMI-input

Start the Raspberry PI and open a console.

¹ <https://www.raspberrypi.org/downloads/raspbian/>

1. Identify the USB-pre-amp device, here device 005 (help: [USB-IDs²](#)):

```
.....  
pi@raspberrypi:~ $ lsusb  
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub  
**Bus 001 Device 005: ID 0c45:17ef Microdia**  
Bus 001 Device 004: ID 045e:0745 Microsoft Corp. Nano Transceiver v1.0  
for Bluetooth  
Bus 001 Device 003: ID 13fd:3940 Initio Corporation external DVD  
burner ECD819-SU3  
Bus 001 Device 002: ID 2109:3431 VIA Labs, Inc. Hub  
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub  
.....
```

2. Identify the HDMI playback device, here `-P hw:1.1.0`:

```
.....  
pi@raspberrypi:~ $ aplay -l  
...  
card **1**: ALSA [bcm2835 ALSA], device **1**: bcm2835 IEC958/HDMI  
[bcm2835 IEC958/HDMI]  
Subdevices: 0/1  
Subdevice #**0**: subdevice #0  
.....
```

3. Identify the capture device, here `-C hw:2.0.0` (look for 005):

```
.....  
pi@raspberrypi:~ $ aplay -l  
...  
card **2**: USB [PA-005-2 USB], device **0**: USB Audio [USB Audio]  
Subdevices: 1/1  
Subdevice #**0**: subdevice #0  
.....
```

4. Test pass-through:

```
.....  
pi@raspberrypi:~ $ alsaloop -v -C hw:2,0,0 -P hw:1,1,0 -t 50000 --  
thread 2 -A 5  
.....
```

5. Adjust `alsamixer` settings:

1. Install the `alsamixer`:

```
.....  
pi@raspberrypi:~ $ sudo apt install alsamixer  
.....
```

² <https://github.com/usbids/usbids/blob/master/usb.ids>

2. Open a terminal window and start `alsamixer`.

```
pi@raspberrypi:~ $ alsamixer
```

3. With `[F6]` followed by cursor keys, select the external sound card `PA-005-2 USB`.
4. Press `[F5]` to view **All**.
5. Use the cursor keys to select the right **Line** capture controller.
6. Activate `CAPTURE` for **Line** with the `[Space]` key.
7. Use the cursor keys to select the left **Line** playback controller.
8. Unmute with the `[m]` key. You should see two green `00`.

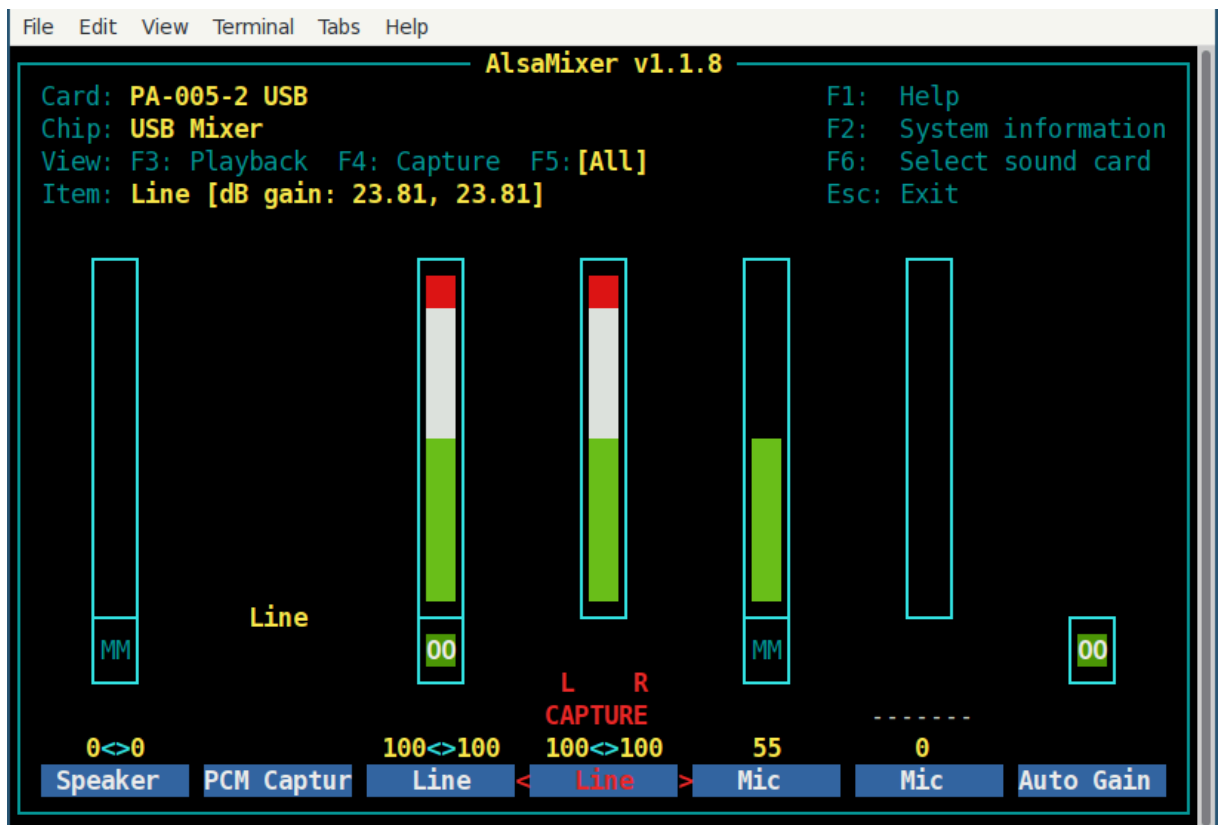


Figure 6. Alsamixer settings for the external USB sound card

Note: check that `L R CAPTURE` is activated for channel **Line**.

Now, you should hear the turntable sound via TV.

Customizing the menu

In order not to type the `alsaloop` command each time you want to hear a record, we will add 3 items to our “Sound & Video” sub-menu:

- *Slow down DVD device*
- *Turntable Sound Off*
- *Turntable Sounc On*

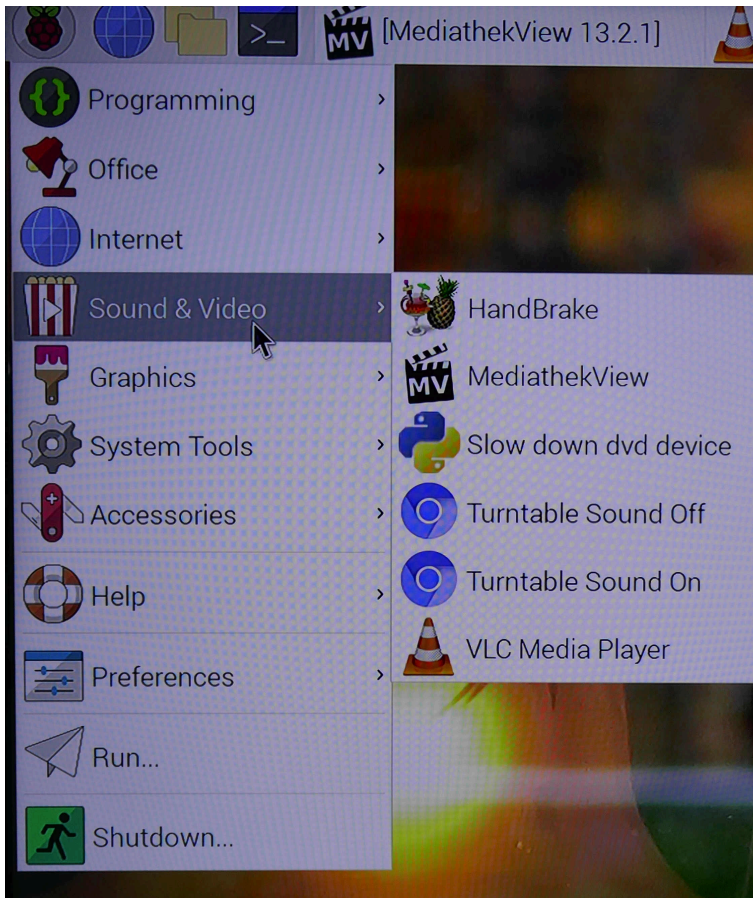


Figure 7. Customized menu items 3-5 “Slow down...Sound on”

1. Add custom menu-entry by creating the file: `/usr/share/applications/turntable-sound-on.desktop`

with the following content:

```
.....  
[Desktop Entry]  
# Copy this file in /usr/share/applications  
Comment=Turntable Sound On  
Name=Turntable Sound On  
Exec=alsaloop -v -C hw:2,0,0 -P hw:1,1,0 -t 50000 --thread 2 -A 5
```



```
Terminal=false
Type=Application
Categories=AudioVideo;Player;Recorder;
Icon=/usr/share/pixmaps/chromium-browser.png
```

2. Add custom menu-entry by creating the file: `/usr/share/applications/turntable-sound-off.desktop`

with the following content:

```
[Desktop Entry]
# Copy this file in /usr/share/applications
Comment=Turntable Sound Off
Name=Turntable Sound Off
Exec=killall alsaloop
Type=Application
Terminal=false
Categories=AudioVideo;Player;Recorder;
Icon=/usr/share/pixmaps/chromium-browser.png
```

3. Bonus: add a custom menu entry for slowing down the DVD-burner. Create file: `/usr/share/applications/slow_down_dvd_device.desktop` with the following content:
-

```
[Desktop Entry]
# Copy this file in /usr/share/applications
Comment=Slow down DVD device
Name=Slow down DVD device
Exec=eject -x 4 /dev/sr0
Terminal=false
Type=Application
Categories=AudioVideo;Player;Recorder;
Icon=/usr/share/pixmaps/python2.7.xpm
```
