

# IES-PI-HIFI Quick Start Guide

## Connection:

The PIFI should be connected to the Raspberry-Pi board using the supplied USB A to Micro B cable (or to a different platform / PC using a standard USB A to Micro B cable). The PIFI is designed to sit above the Raspberry-Pi board on the supplied standoffs and provides an on-board USB2.0 hub so that you gain an additional USB port.

There are three [3] options to connect to an audio output device, headphones (external amplifier), SPDIF optical to external amplifier or on-board 6W+6W speaker amplifier:

1. Headphone socket: Connect a pair of earphones or headphones with a 3.5mm stereo jack plug and minimum impedance of 32 ohms, or an external amplifier (ie. PC speaker amplifier with green jack plug) to the jack socket marked 'LINE / HEADSET'.
2. SPDIF port: Connect the SPDIF socket to your amplifier using a standard SPDIF optical cable [not supplied].
3. Speaker terminals: Connect a pair of speakers 6-15Watts (Minimum 4 ohms) to the pluggable terminal blocks, one speaker on each terminal block, speaker + to the + next to the terminal block. Use speaker cable of at least 7/0.2, 22AWG for best results. Connect the 2.1mm coaxial socket, marked 'SPEAKER POWER 5-20VDC' to an external mains adaptor, 12Volts @ 1Amp (min) recommended.

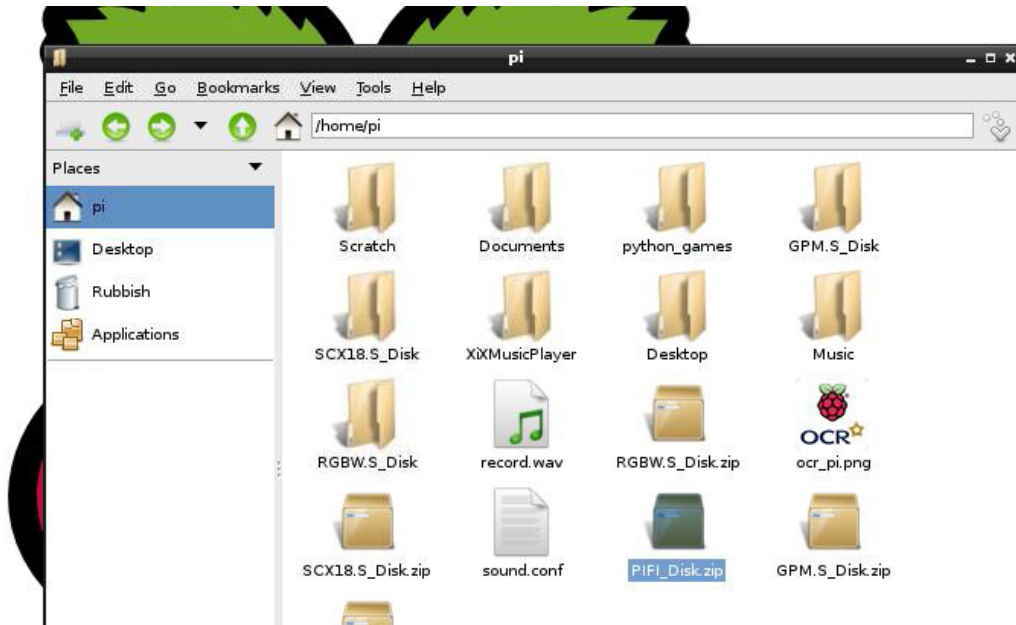
There are two [2] options to record audio, the on-board microphone or an external electret microphone:

1. On-board microphone: The on-board microphone is automatically enabled when no external microphone is connected.
2. External microphone: An external electret microphone (~1kohm impedance) [not supplied] with a 3.5mm mono/ stereo jack plug can be connected to the jack socket marked 'EXTERNAL MICROPHONE'. Note: The PIFI provides the electret microphone supply voltage, no external supply is necessary.

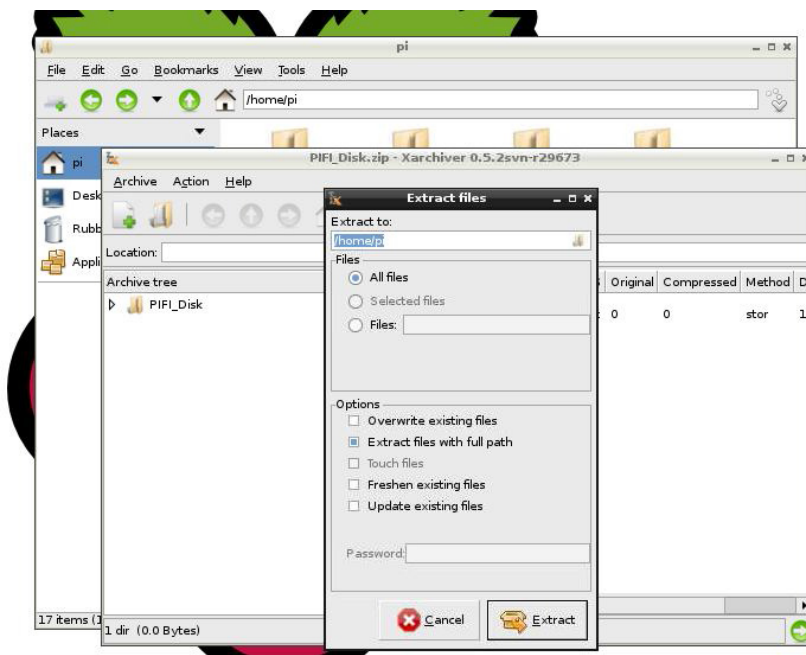
### Raspberry-Pi setup:

After preparing an SD card with the latest release of the NOOBS (New Out Of Box Software) downloaded from <http://www.raspberrypi.org/downloads> start the Raspberry-Pi, log in (default username 'pi', password 'raspberrypi') and start the desktop using the command 'startx'. (Note: run raspi-config to open out the SD card if not already done) Click on the start menu icon in the bottom left-hand corner of the desktop and select 'Internet' and 'NetSurf Web Browser'.

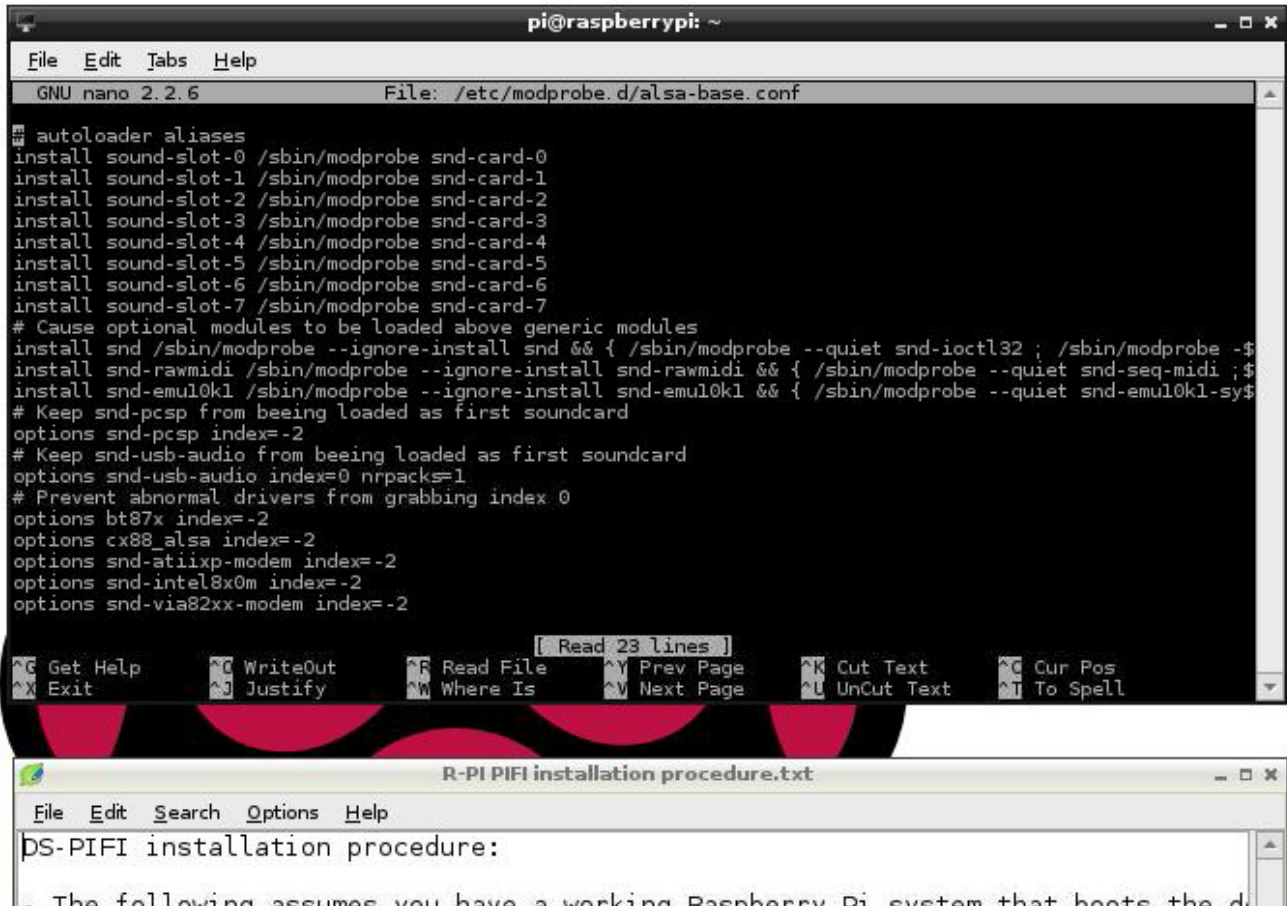
Navigate to <http://www.i-groupuk.com/downloads/> and confirm that you want to save this file. Close the NetSurf browser and click on the start menu icon, 'Accessories' and 'File Manager', you should then see the PIFI\_Disk.zip file listed under the /home/pi directory as below:



Double click on this file to start the zip extractor and then go the 'Action', 'Extract' and click on the 'Extract' button as below:



Close the XArchiver window and the file manager window should now contain a directory called 'PIFI\_Disk'. Double click on this directory, then 'R-PI' and locate the 'R-PI PIFI installation procedure.txt' file and double click to open this file so that it can be read. You now need to start the LX Terminal window to configure the alsa driver, so close the file manager window and double click the 'LXTerminal' icon on the desktop. Type in 'sudo nano /etc/modprobe.d/alsa-base.conf' and you should now have a desktop that looks similar to the below:

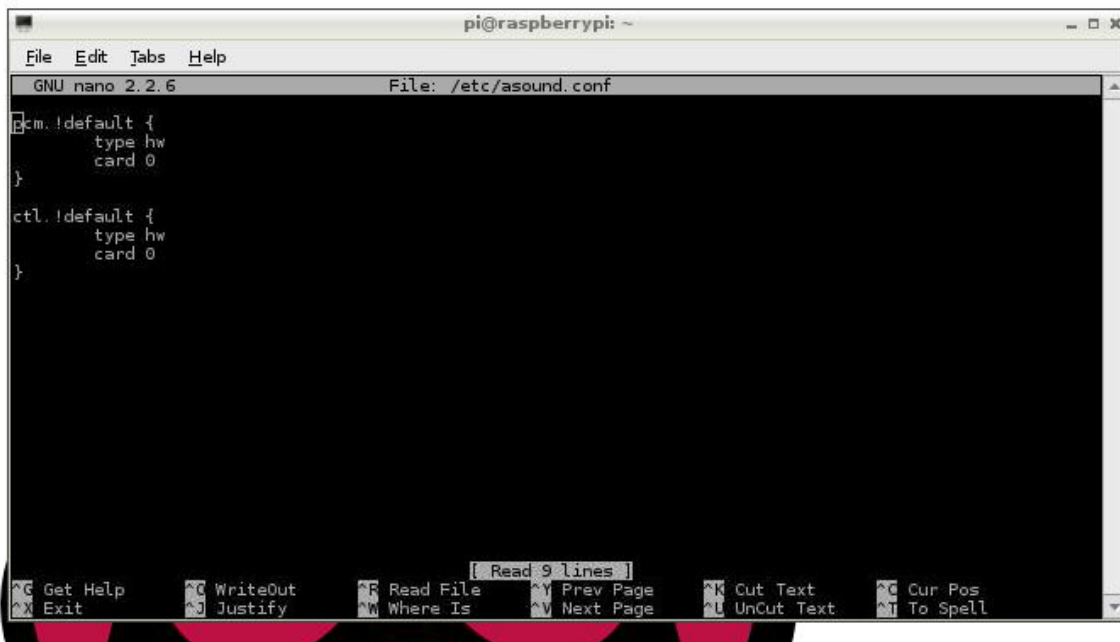


Locate the line 'options snd-usb-audio index=-2' and if not already changed change this to 'options snd-usb-audio index=0 nrpacks=1', hold the CTRL key, tap 'O' and press Enter. Hold CTRL again and tap 'X' to exit.

Type in 'sudo nano /etc/asound.conf'. At this point you may have a blank file in-front of you or some other text. Add or change the text to the following:

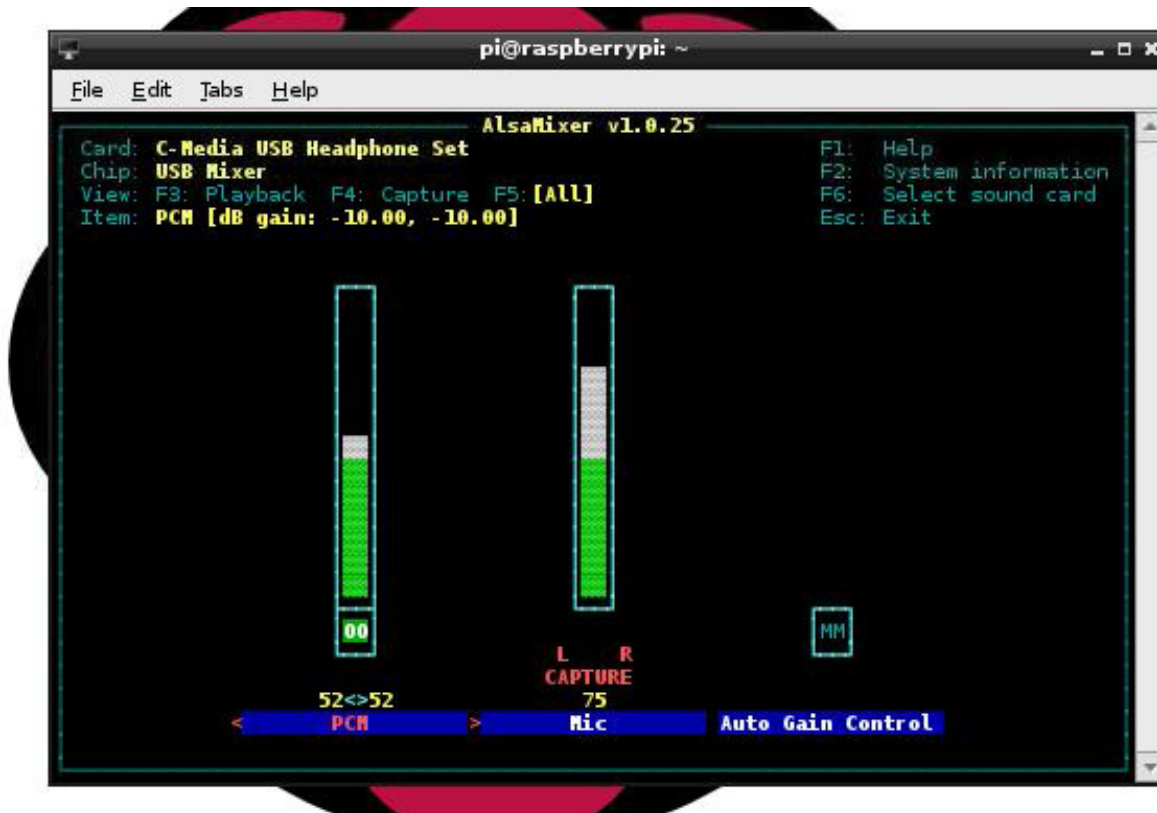
```
pcm.!default {
type hw
card 0
}
ctl.!default {
type hw
card 0
}
```

You should now have a file that looks as below:



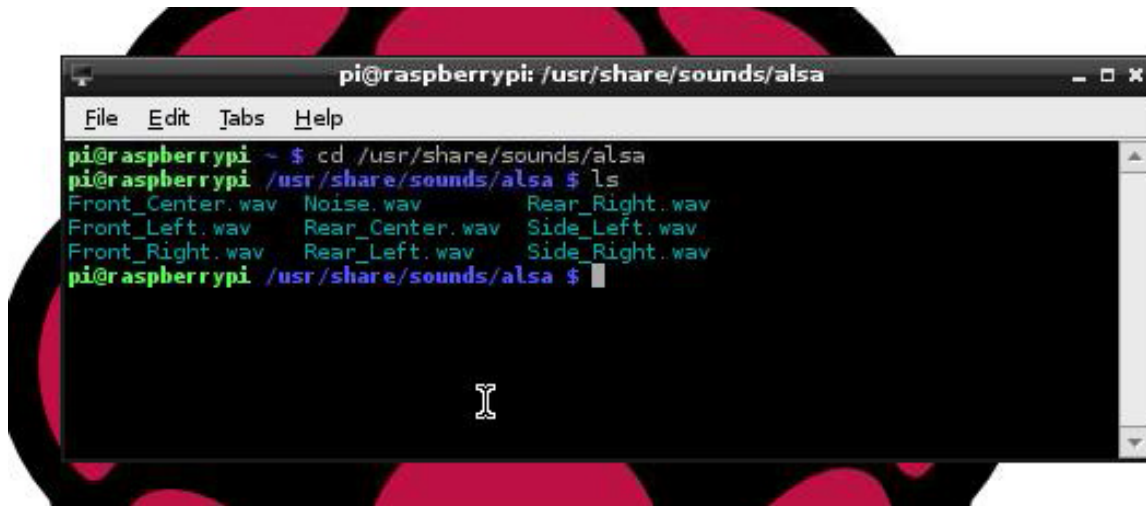
Hold the CTRL key, tap 'O' and press Enter. Hold CTRL again and tap 'X' to exit. Enter 'sudo reboot' to restart the Raspberry-Pi and come back to the desktop as above.

Restart the LXTerminal and enter 'alsamixer' and tap F5, you should then get a desktop that looks similar to the below:



Using the left and right cursor keys you can select either 'PCM' (Volume level), 'Mic' (Microphone level) or 'Auto Gain Control' (Microphone auto gain on/off). To ensure that you do not damage your hearing select 'PCM' and then use the down cursor key to reduce the volume to 10. Also select 'Mic' and change the level to 50 and then the 'Auto Gain Control' and press the 'M' key so that '00' appears in box. Press ESC key to exit.

Enter 'cd /usr/share/sounds/alsa', and then enter 'ls' to list the files, you should now have a desktop that looks something like this:



Enter 'aplay -device=plughw:Set Front\_Left.wav', you should hear 'Front left' from the left speaker/earphone, enter 'aplay -device=plughw:Set Front\_Right.wav', you should hear 'Front right' from the right speaker/earphone. Raspberry-Pi audio playback/recording:

There are a number of ways to play and record audio to/from your PIFI expansion board. Probably the simplest is to use the 'aplay' and 'arecord' commands that come with ALSA. You have already used 'aplay' above to test the speaker outputs using a WAV file from the ALSA shared folder, so copy over some other WAV music files to your Raspberry-Pi to try these also.

The 'arecord' command will allow you to record audio from the on-board or an externally connected microphone, enter 'arecord -device=plughw:Set -d5 -f cd record.wav' and speak into the microphone. To playback your recording enter 'aplay -device=plughw:Set record.wav'.

(Note: It is not recommended that arecord be used under the desktop environment as recording quality can be compromised due to lack of resource. Exit the desktop and run from the command line for best results. Use an external microphone and power down the speaker amplifier for the highest quality recordings).

Another option is to use a music player such as the qmmp player (install using 'sudo apt-get install qmmp'), which has been fully tested with the PIFI (Note that you need to disable the equalizer function by clicking 'Off') or XiXMusicPlayer, see <http://www.xixmusicplayer.org/>, which also has been fully tested with this player and apart from the integrated volume control not working in version 0.32b, the player works very well.

To connect to Spotify, Google Music and SoundCloud there is MusicBox, <http://www.woutervanwijk.nl/pimusicbox/>, or use RaspyFi or the Shairport AirPlay emulator to turn your Raspberry-Pi and PIFI into a stream player or AirPlay enabled speakers.

### More information:

For a PDF of this quick start guide or a full technical datasheet please visit:

[www.i-sbc.com](http://www.i-sbc.com)

## **WEEE Consumer Notice**

This product is subject to Directive 2002/96/EC of the European Parliament and the Council of the European Union on Waste of Electrical and Electronic Equipment (WEEE) and, in jurisdictions adopting that Directive, is marked as being put on the market after August 13, 2005, and should not be disposed of as unsorted municipal/public waste. Please utilise your local WEEE collection facilities in the disposition and otherwise observe all applicable requirements. For further information on the requirements regarding the disposition of this product in other languages please visit [www.i-sbc.com](http://www.i-sbc.com)

## **RoHS Compliance**

This product complies with Directive 2002/95/EC of the European Parliament and the Council of the European Union on the Restriction of Hazardous Substances (RoHS) which prohibits the use of various heavy metals (lead, mercury, cadmium, and hexavalent chromium), polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE).

## **For further information please contact IES**

The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.