



## Z-LIVEREC

### Multitrack USB recorder/player for Raspberry PI 4 & Core Class Audio/ALSA Compliant devices

We'd first like to take a moment and thank you for purchasing/evaluating Z-LiveRec multitrack recorder/player for Raspberry PI 4!

The Raspberry PI is a very popular platform for everybody looking for a nice small system for all kinds of tasks - but the PI also comes packed with some great CPU power to perform certain demanding tasks. One of them to use it as a multitrack recorder/player for any USB Class Audio devices with ALSA support like Focusrite Scarlett, Zoom U24 and digital mixing consoles like Mackie DL-16S/DL-32S series and Behringer XR18/X32 series. (More vendors will probably work also)

Raspberry PI have also support for touch screens - and Z-LiveRec have been developed to fit Raspberry PI with 3.5" touch displays.

With the Z-LiveRec for Raspberry PI and just adding the SoX library (Swiss army knife for audio) - live recordings/playbacks can be done over USB with 2-32 channels, 48KHz and 24bits into multiwave audio formats like WAV, CAF, AIFF or W64 directly to a USB 3.1 memory stick or SSD disk. (Up to 48 channels are supported - but more for experimental purposes) These files can later be used directly in Apple Logic Pro X, Steinberg Cubase or Reaper etc and will show up as separate channels for further post production tasks or remixes.

Z-LiveRec can also be used to directly replay back multitrack recordings from Raspberry PI back over USB to a digital mixers like Mackie DL Series or Behringer XR18/X32 and serve for virtual soundchecks without musicians or just let the band to listen to the PA sound.

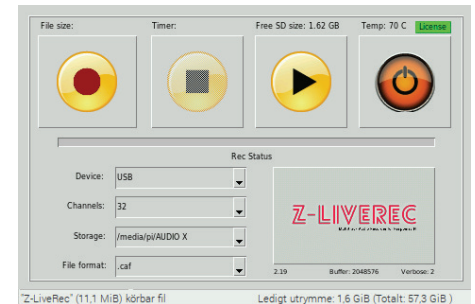
The Z-LiveRec solution is an wrapper built on the SoX library and the result of extensive research, development, wrapper knowledge and rigorous testing with a range of equipment. The solution is also a good add to most USB based digital mixers or sound devices delivering multitrack channels over USB.

## Installation

The installation of Z-LiveRec is quite straight forward - the only needed file is the Z-LiveRec - which includes everything except 3 libraries. The normal setup scenario is the following:

### Pre-requirements

1. Raspberry PI 4 or 400
2. Keyboard & mouse (ev)
3. Hdmi cable and display if not attaching screen
4. Power USB-C (for pi 4)
5. USB 3.1 stick or SSD disk formatted (eg exFAT)
6. Network (cable or WiFi) during the initial setup - for license check.
7. Download and install the latest "Raspberry OS with Desktop" build from [Raspberrypi.org](https://www.raspberrypi.org) or visit this [post](#) on z-liverec.com how to create a optimized and minimal OS installation for Z-LiveRec.

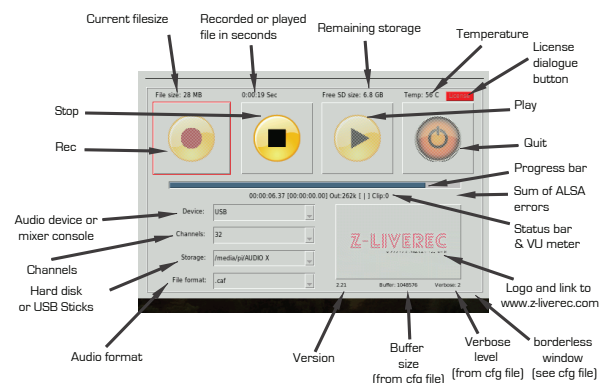


### Installation on Raspberry OS with Desktop / Raspberry PI 4

1. Load the LIBSoX library (Audio library for all kind of tasks) in a terminal window:  
`> sudo apt-get install sox libsox-fmt-mp3`
2. If using ExFat fileformat on the memory sticks - will enable recordings with larger files than 4GB. This is a addon to Raspberry PI. A must when using bigger memory sticks 32GB-256GB. To handle ExFAT please, install the following library's from the terminal: (it is included in the latest build of Raspberian Buster OS)  
`> sudo apt-get install exfat-fuse`  
`> sudo apt-get install exfat-utils`
3. Unzip the Z-LiveRec.zip and it (about 10MB) to your home directory on you Raspberry PI.(The manual is located in the zipfile.)
4. Attach your recording mixer/device via one of the USB 3 ports on Raspberry Pi 4. (The two ports in the middle) and attach an USB 3.1 based memory stick to an USB 3 port.
5. Start Z-LiveRec app - sometimes Raspberry requires changed access rights to the filesystem. To ensure that the app is executable run the command: `"chmod u+x Z-LiveRec"` in a terminal window where the app is located.
6. The Z-LiveRec app can also be started from the terminal by using the `"./Z-LiveRec"` as command.
7. For the full functionality in Z-LiveRec / you need internet access for registrating your license by clicking on the red license text using the licens info from the order mail (only done once at initial setup)

## Operational

When recording with Z-LiveRec first time - the settings needs to be configured. The first parameter to set is the audio device for the recording/player - Just by using the dropdown box for the devices - the app will find all installed ALSA devices - just pick the right device. Do the same thing with the amount of recording channels for your device - e.g Mackie DL-32S, select 32 Channels or Behringer XR18 select 18 channels. Finally select the right partition/hard disk for recording e.g. the USB memory stick. (The home/pi directory or USB Stick will be shown) It is not recommended to record directly to the internal micro SD card where the OS is installed for the Raspberry PI. SSD disks are normally 4 times faster compared to SD Cards.



You will probably end up with a lot of buffer over-run issues. Last - just pick the requested audio format - see below file format section for recommendations.

The first time you record with Z-LiveRec, a configuration file will be created in the same directory as Z-LiveRec.exe is located. The config file is called Z-LiveRec.cfg. When restarting the application the last stored configuration will be loaded and presented in the app. Some fine tune parameters can now be found under the "license" button but is also located in the cfg fil.

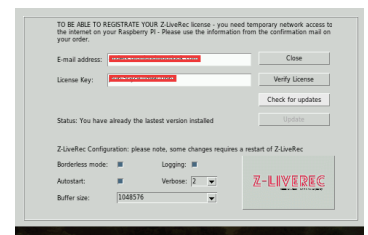


Now you are ready to record - by just pressing the REC button with a mouse or if using a touch screen, with your finger. Z-LiveRec will automatically create a new file with a filename based on the date and time + audio extention. Z-LiveRec will show the actual file size of the recording and how much hard disk space is left. You will also see a counter in red text, if running into buffer over-run problems or other alsa warnings. (Which could indicate that you have a too slow USB Stick - a USB 3.1 stick with transfer rates over 130MB/s is recommended)

Z-LiveRec includes some logics to handle hardisk storage issues, splitting files when recording wav files. You will also be able to see the temperature on the CPU - a normal temperature is around 74-80 Celsius.

When clicking on the play button - a recorded file can be selected for multitrack replays back to the selected device - Z-LiveRec also knows which file that was last recorded - and will bring it up as default. The app will playback all recorded channels over USB.

In the same directory as Z-LiveRec.exe remains, a Z-LiveRec.log file is created with all stored status like ALSA warnings and errors. If you see the ALSA counter increasing - you can always go back afterwards and look what happened in the log file for further investigations. If you want to disable the log function - you can set the log=0 parameter located in the Z-LiveRec.cfg or in the GUI (Full version). The verbose parameter (default is 2) is used to track ALSA errors. If using 0, no errors will be captured on either the screen or in the log file, and between 1-7 a more deep logging will occur. The buffer parameter found in Z-LiveRec.cfg or GUI is default set to 1048576 for good performance with all type of audio formats. This parameter can be changed in the z-liverec.cfg for experimental purposes. The Z-LiveRec can get a bit more unresponsive/slower when a larger buffer is used but more reliable from a recording perspective. (less buffer over-runs). If you want to run Z-LiveRec in borderless mode - change the decox=0 to 1 in the Z-LiveRec.cfg or in the GUI under the license button. Added in 2.21 a checkbox enabling Z-LiveRec to start when booting the OS. Z-LiveRec V2.19 and later have an autoupdate function built in found in the licence dialog for registrated users.



## Audio Formats

- wav files - Up to 48 channels have been tested without any over-run buffer warnings and splitting the files in 2GBs portions up to of 32GB and more. Please note, to be compliant with Fat32 filesystem - the maximum file size for native wav files is 4GB - e.g. about 15 minutes when recording with 32 channels. Z-LiveRec splits wave files to a new file after every 2GB. Please note that a small sound glitch can occur during this split. To be 100% safe - we recommend using the W64 or CAF format instead to be able to record and address larger files than 4GB and using ExFat file systems. (Files of 50 GB have successfully been recorded).
- caf - Apple Core Audio Format - Up to 48 channels have been tested without any warnings and file sizes of 32GB imported into Garageband & Logic Pro X.
- w64 - Same format as .wav but without the limitation of 4GB on ExFat file systems. This format records over 32GB multitrack in a single file without any limitation. (W64 takes slightly more CPU power than wav & caf)



## Some General Notes/Recommendations

The recording and played files needs to have the same amount of channels - so if recording with 32 channels - the play back needs to be 32 channels. The system will warn if over-runs occurs. All warnings are counted and these are visible in the Z-LiveRec app as a red counter behind the status bar. Please switch off WIFI and Bluetooth on the PI when recording. Please note that a faster USB 3.1 memory - (at least 130MB/s) is needed

## Tested Environment

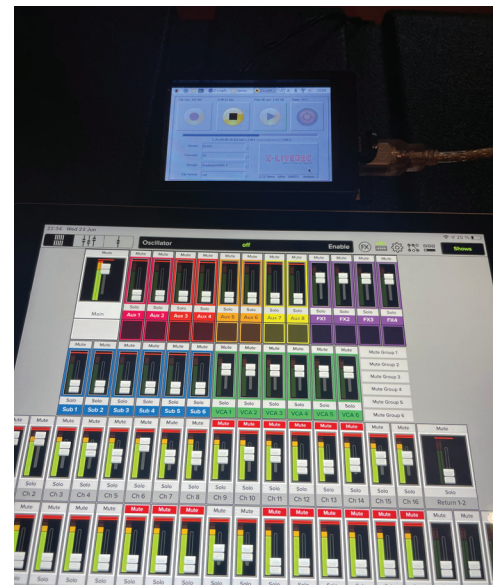
- Raspberry PI 4, 2GB or more, PI 400 (Note: Raspberry W Zero and PICO is too weak)
- Platform: Linux-5.10.17-v7l+-armv7l-with-debian-10.9
- Raspbian GNU/Linux 10 (buster)
- Linux raspberrypi 5.10.17-v7l+ #1403 SMP Mon Feb 22 11:33:35 GMT 2021 armv7l GNU/Linux

## Tested audio devices

- Zoom U24 (2 Channels), Zoom H6 (6 Channels), Scarlett 4i4 Gen 3 (4 channels), Mackie DL-32S (32 Channels), Mackie DL-16S (16 Channels) and Behringer XR18.

## Memory Cards

- SANDisk USB Ultra Fit 64GB USB 3.1 - 130 MB/s, SANDisk USB Extreme Go 64GB USB 3.1 - 150MB/s
- SSD Disks - please note most SSD disk requires external power



## MOUNTING RASPBERRY PI 4 with a touchbased display.

Can be found and bought from [Ebay](https://www.ebay.com) - a special box with a 3.5" touch display for Raspberry PI 4.

- 3.5 inch Screen connect with SPI directly, also support HDMI screen display at same time.
- Physical resolution 320x480 with resistive touch control, can be directly connect Raspberry Pi 3 B+ and 4B No additional Power. (Raspberry Pi is not included)

## License, Support & Limited Warranty

[SoX library](https://www.gnu.org/licenses/old-licenses/gpl-2.0.html) is licensed under GNU General Public License as published by the Free Software Foundation; either version 2 or later. Z-LiveRec is distributed and sold in the hope that it will be useful, but WITHOUT ANY WARRANTY; without the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. Please submit any questions or suggestions via the <https://www.z-liverec.com> site.

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## Credits

The [Raspberry PI Forums](https://www.raspberrypi.org/forums), Mikael Svennungsson, Andreas Bilén, Kaj Grönlund and the great [Peter Dikant](https://www.peterdikant.com).

## More information

<http://www.z-liverec.com>