



## Z-LIVEREC

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

Z-LiveRec is a unique multitrack sound recorder and player, designed from the ground up to meet the specific needs of live sound engineers and musicians. It combines rock-solid operation with an intuitive graphical user interface. It's quick to set up, simple to use and very flexible.

It does all the things you'd expect of a multitrack recorder, so if you're familiar with recorders, you can probably install the software on a Raspberry PI, launch the application and get it to work.

Z-LiveRec also has a few features that go beyond what you usually see in a recorder. Some of these features are ability to record to one multitrack file, go beyond 4GB limit, up to 48 channels and be a player for virtual soundchecks. (without musicians or just let the band to listen to the PA mix.) News is that Z-LiveRec now includes a complete touch based graphical user interface and advanced export functions.

Raspberry PI is a very popular platform for everybody looking for a 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, Behringer Flow8, XR18/X32, Midas MR18 series, Soundcraft UI24, Teenage Engineering TX-6 (More mixer vendors will probably work)

Raspberry PI have also support for touch screens - and Z-LiveRec have been developed to fit Raspberry PI with 3.5" touch displays and have a 100% touch based GUI.

With the Z-LiveRec for Raspberry PI and just adding the open source SoX library (Swiss army knife for audio) - live recordings/playbacks can be done over USB with 2-48 channels, 48KHz and 24bits into multitrack audio formats like WAV, CAF, AIFF or W64 directly to a USB 3.1/3.2 memory stick or SSD disk. 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.

## Installation

The installation of Z-LiveRec is quite straight forward - the only needed file is the Z-LiveRec application - which includes everything except 1-3 librarys. The normal setup scenario is the following:

### Pre-requirements

1. Raspberry PI 4 or 400 (PI 3 might work also)
2. Keyboard & mouse (for the initial setup)
3. Hdmi cable and display if not attaching screen
4. Power USB-C (for PI 4)
5. USB 3.1/3.2 stick or SSD disk formatted (eg exFAT - see specs below)
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.
8. Both 32 and 64 bit versions of Raspberry OS (Bullseye & Buster) are supported by Z-LiveRec. (64 bit version of Bulleye is supported)



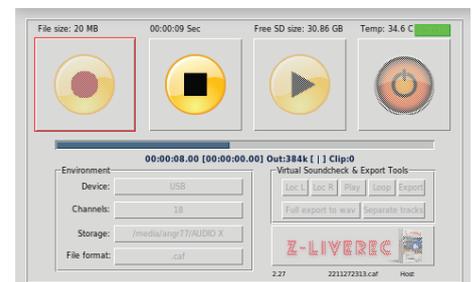
### Installation on Raspberry OS with Desktop / Raspberry PI 4

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 older versions of PI OS (before Buster, V10 and Bulleye, V11) to handle recordings with larger files than 4GB on the memory sticks with NTFS or ExFat format, please install the following library's from the terminal window:
 

```
> sudo apt-get install exfat-fuse
```

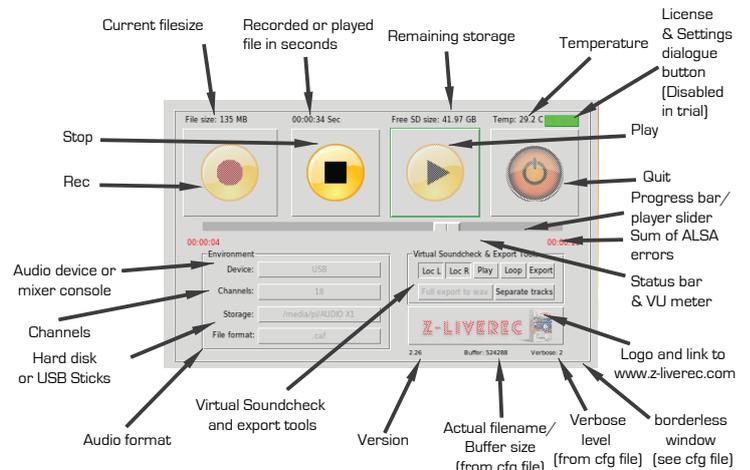
```
> sudo apt-get install exfat-utils
```
3. Unzip the Z-LiveRec.zip and it (about 11-13MB) to your home directory on you Raspberry PI.(The manual is located in the zipfile.)
4. Attach your recording mixer/device via one of the USB 3 ports on Raspberry Pi 4 and attach an USB 3.1/3.2 based memory stick to an USB 3 port. (The two ports in the middle on PI 4)
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"` in the command prompt.
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 - Not available in the Trial version of Z-LiveRec)



## 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 (or click on the button if using Z-LiveRec in touch mode) - the app will find all installed ALSA devices - just pick the right audio/mixer device.
- Do the same thing for the amount of recording channels for your device - e.g. Mackie DL-32S, select 32 Channels or Behringer XR18 select 18 channels etc.
- Finally select the right partition/hard disk for the recordings e.g. the USB memory stick. The home/pi directory or USB Stick will be shown
- Last - just pick the requested audio format - see below file format section for recommendations.



**Please note:** It is not recommended to record directly to the internal micro SD card where the OS is installed for the Raspberry PI - You will probably end up with a lot of buffer over-run issues. SSD disks are normally 4 times faster compared to SD Cards.



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 (Disabled on the trial version) but parameters is also located in the z-LiveRec.cfg file.

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 extension - a new function in 2.26 is the opportunity to set your own custom file name. 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 3.1/3.2 stick with transfer rates over 130MB/s for reading and 55 MB/s for writing is recommended)

Z-LiveRec includes some logics to handle harddisk 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 degrees Celsius for a Raspberry PI 4 - and 35-40 degrees Celsius on Raspberry PI 400.



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. Z-LiveRec will determine channels, bit depth and format automatically. So if you have edited a wave file outside Z-LiveRec in DAW and saved in float 32 bit depth...Z-LiveRec will see this and ready the file and replay it to the mixer console. See the new functionality introduced in V2.25 - Virtual Soundcheck & Export Tools.

## License, settings and functionality (Disabled in Trial version)

Most generic settings for Z-LiveRec can be found under the license button in Z-LiveRec application. This button is disabled in the trial version. All settings except the license is stored in the Z-LiveRec.cfg file present in the same directory as the Z-LiveRec application.

### License

First time when entering the email and license key - the Raspberry PI needs to be online and have access to internet. Fill in the requested data (from the order confirmation mail) and click on "verify" the license. A status update text will show if you have a valid licens key. (It will be stored when pressing close.) - A soft keyboard will show up when running in "touch" mode.

### Log functionality

In the same directory as Z-LiveRec 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.

### Buffers

The buffer parameter found in Z-LiveRec.cfg or GUI is default set to 1048576 for good performance with all type of audio formats. (Some more values were added in V2.25 and V2.26 - 4, 8 GB buffer size can be used if experiencing buffer overruns) This parameter can be changed in both the GUI and 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).

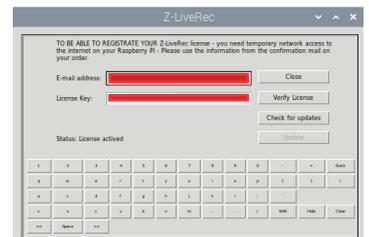
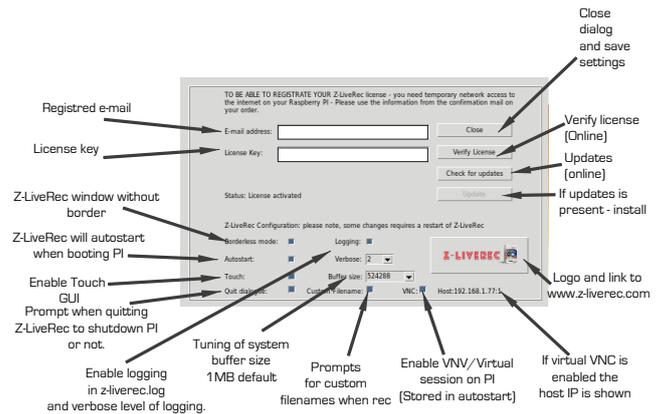
**Notes:** If experiencing a lot of buffer overruns in the GUI - you could go from exFAT file format to NTFS or change to a faster USB stick. See more information under the tested hardware section.

### Touch and borderless mode

If you want to run Z-LiveRec in borderless mode (Which is great for smaller touch screens) - change the decox=0 to 1 in the Z-LiveRec.cfg or in the GUI under the license button. A checkbox which handles Z-LiveRec to start when booting the OS. Z-LiveRec V2.19 and later have an auto update function built in found in the licence dialog for registered users. (Not present for the 64bit version of Z-Liverec) A 100% touch based GUI is available for the main screen and an on-screen keyboard and a nice transport slider when replaying recordings. To turn on the touch GUI - just mark the checkbox "Touch" and restart the application.

### Keyboard shortcuts

In V2.25 we also added keyboard shortcuts ctrl + r(recording), p(playing), s(stop), x(Quit app) + locators on ctrl F1 and F10 - which speeds up common tasks.



```

INFO:root:----- Playing -----
INFO:root:Z-LiveRec Version: 2.23 Demo
INFO:root:Date: 16/01/2022 15:51:39
INFO:root:File: /media/pi/AD10 X1/202109040747.caf
INFO:root:Channels: 32
INFO:root:Bits: 24
INFO:root:Buffer Size: 1048576
INFO:root:Temp: 36
INFO:root:File System: exfat
INFO:root:[WARN] 'alsa', 'can't', 'encode', '24-bit', 'Signed', 'Integer', 'PCM']
INFO:root:Temp: 37
INFO:root:[WARN] 'alsa', 'can't', 'encode', '24-bit', 'Signed', 'Integer', 'PCM']
INFO:root:Temp: 35
INFO:root:Time Recorded: 00:33:33 Sec
INFO:root:File Size Recorded: File size: 14762 MB
INFO:root:Temp: 34
INFO:root:----- Now file recording -----
INFO:root:Z-LiveRec Version: 2.23
INFO:root:Date: 17/01/2022 11:37:58
INFO:root:File: /media/pi/AD10 X1/202201171137.caf
INFO:root:Channels: 32
INFO:root:Buffer Size: 1048576
INFO:root:Temp: 34
INFO:root:File System: exfat
INFO:root:
  
```

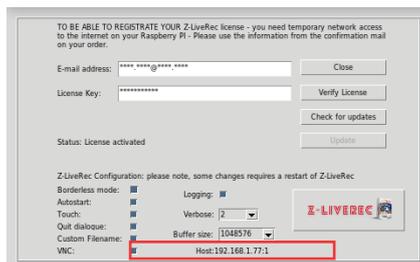
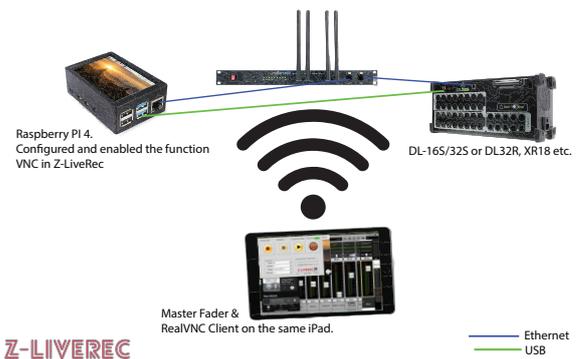
**News:** from V2.25 a function is added when quitting Z-LiveRec - is an option to also shutdown the complete Raspberry PI OS. From V2.27 - there is also an option to reboot the system) This can be enabled by clicking the "Shutdown OS" option in the license dialogue checkbox. Closing down Z-LiveRec from a remote session will close the VNC session. (If not rebooting the host - the VNC client will be rebooted - ready for connections again.)



## Enable VNC Remote session directly in Z-LiverRec

New functionality added in V2.26. (Improved in V2.27)

The story behind this function is to be able remotely to control Z-LiveRec when the recording/playing from an external device like iPhone or the same iPad where the mixer application is running - so you can keep the Raspberry PI running Z-LiveRec at the mixer location but controlling the recording standing in the audience. A perfect function when doing virtual soundchecks!

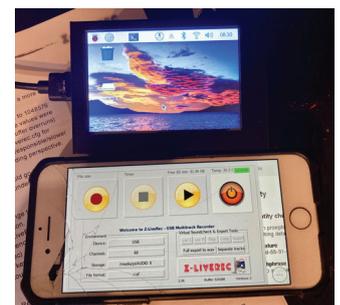


So in this displayless/headless VNC mode...

the Raspberry handles recording/playing connected to the mixer - and the Z-LiveRec application is running as a virtual session on the Raspberry - and the display controlling Z-LiveRec application is the iPad or iPhone etc.

To turn the remote session function "on" - just go in to the license/settings dialog in Z-LiveRec and in the bottom of the panel you see the checkbox "VNC".

By just clicking on it - a virtual remote session is created and you will see the ip-address for the VNC session showing up. The session will be active until unchecking the checkbox. Even if you reboot the Raspberry PI the virtual VNC session will start automatically if the checkbox is enabled in Z-LiveRec. Important: To enable so the Z-LiveRec application always starts on the Raspberry PI when a VNC session is active - please also enable the "Autostart" checkbox in Z-LiveRec.



**Notes:** To access Z-LiveRec in a virtual window from an iPad etc...please make sure that a VNC client is on the same network as the Raspberry PI. (Wireless or wired)

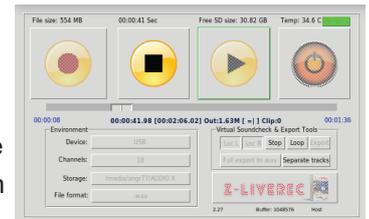
From your external device - download and start the RealVNC client on your phone/pad. When starting RealVNC - You will be prompted for the ip-address (The host IP shown in Z-LiveRec e.g. "xxx.xxx.xxx.xxx:1"), please use the address showed in the Z-LiveRec license/settings dialog. Use the admin user (often "pi") and the associated password for your Raspberry PI to setup the session. Pay some attention of the security risks - if your pi is exposed to internet and have VNC enabled.

Now your Z-LiveRec session will show up remotely on your device. Just to record or play!

**Notes:** If trying to run Z-LiveRec as a native application on your raspberry PI and at the same time running it in a virtual session - only one application session is allowed - reason is that only one session can access the USB device port and the actual USB Sound Device at the time. The session which is recording will control the USB access.

## Z-LiveRec - the ultimate virtual soundcheck tool!

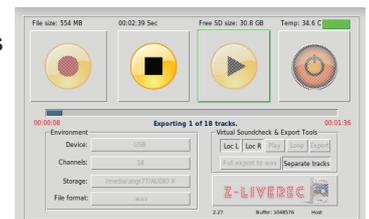
Added in v2.25 is a complete section called Virtual Soundcheck & Export tools is now available. Added now is the ability to set fixed locators when replaying recordings in the GUI. So when in play mode – the new Virtual Soundcheck & Export tools shows some new buttons. First the left & right locator which will set the play-area of an existing recording. Pressing “Play” will replay the recording between the locators. Pressing “loop” will keep playing repetely between the set locators. Very useful when doing virtual soundchecks.



Keyboard shortcuts are also added to set left/right locator by pressing ctrl F1 and ctrl F10. Ctrl F2 will start playing between the locators. Ctrl F3 will turn on “loop” replay - Ctrl F4 will turn off loop replay.

## Export functions

The export function found in the Virtual Soundcheck & Export tools – works like this - by pressing “export” when replaying sound files in locator mode – the selected area between the locators can be exported to a new wave file. (This can be done from any file format like \*.wav, \*.W64 or \*.caf and these can be exported to any defined audio format. The exports can be done to both to a single multitrack file or be split by channel to separate wav files. See button “Separate tracks”. This function is extremely useful when been recording a complete concert with 32 channels and you want to export a part or a song to a new separate file. By splitting all channels to separate files – any DAW on the market can be used for post-production tasks.



Virtual Soundcheck & Export tools – when in main screen – an export function is now available to export a complete recording from any file format like \*.wav, \*.W64 or \*.caf to \*.wav format. This can be done to both a single multitrack file or been split by track/channel to separate wav files. See button “Separate tracks”. Note – free storage space is needed on the same drive as the original file.

You can read and store exports to any directory on the same storage device or other attached drives. Just check that you have enough of free storage space, before executing any export tasks.

**Hint:** You can record a complete concert with 32 channels in CAF or W64 format...and then use the export function to cut and export the parts or songs you want to a single multitrack wave file or to 32 separate wave files.

## Supported Audio Formats in Z-LiveRec

- 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. The split is done completely without any delays or glitches. 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.
- 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. Tested and verified with Steinberg Cubase 11. (Please Note: W64 takes slightly more CPU power consuming than wav & caf)
- pcmwave - for experimental uses.
- AIFF - older version of CAF.
- SOX - SOX native format, handles up to 48 channels, 48kHz, unlimited filesize.

**Notes:** Multitrack file formats can be read directly by most DAWs on the market - no need to export it to separate wave files. If you need to export channels to separate wave files - Z-LiveRec can do this from version 2.25. From V2.26, Z-LiveRec can export to any defined audio format. Wav, W64, CAF etc.

## Changes in version 2.27

- Fixed a problem with the filename dialog, so that pressing "Cancel" will abort the recording process.
- Changed the filename dialog when running remotely in VNC - so the focus maintained and can be editable.
- Addressed a problem when toggling between harddisk/storage devices when in touch mode.
- Added a function so that a VNC session terminates when the VNC client is stopped.
- Added a function so that a VNC session restarts after termination of a VNC Client/Session
- Added so that the VNC Session uses the actual user at the VNC Host and be created in the users home directory.  
Added a function to determine if Z-LiveRec is running in "Host" or in "Remote" mode. Visible in the GUI front page - "Host" or "Remote". (The actual IP address can be seen in the license page)
- Added a shutdown dialog to give options to reboot or only shutdown the system.
- Investigated and found the issue why Bullseye have disappearing taskbars when attaching multichannel ALSA Sound Cards. See separate post at Z-LiveRec.com - Not implemented in Z-LiveRec - this is a OS patch.
- Fixed a problem seen in PI OS Bullseye - Where Z-LiveRec did not store/read the saved harddisk path.
- Updated the GUI on the license page.
- Added a process to handle terminations of a Z-LiveRec window - like pressing Windows "X" when not running in touch mode
- Checked so that the autostart process uses the right credentials when created on the system.

## Some General Notes/Recommendations

The system will warn if buffer over-runs occurs. All warnings are counted and logged in Z-LiveRec.log and these are visible in the Z-LiveRec app as a red counter behind the status bar.

## Tested Environment

- Raspberry PI 3, 4, 2GB or more, PI 400, 4GB
- Raspbian GNU/Linux 10 Buster & Bullseye (September-2022 version tested)
- Raspberry PI OS 11 Bullseye 64 bit. (Separate version of Z-LiveRec - included in the full version of Z-LiveRec)
- See our post - [how to build a multitrack recorder](#)

## Tested audio devices

- Zoom U24 (2 Channels), Zoom H6 (6 Channels), Behringer Flow 8, Scarlett 4i4 Gen 3 (4 channels), Mackie DL-32S, DL32R (32 Channels), Mackie DL-16S (16 Channels), Behringer XR18, X32 Rack and Behringer Wing.

## Memory Cards

- SANDisk USB Ultra Fit 64GB USB 3.1 - 130 MB/s read / 55MB/s write, (Can generate buffern overruns in W64 with more channels than 18.)
- SANDisk USB Extreme Go 64GB USB 3.2 - 395MB/s read/100MB/s write (Recommended media!)
- 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](#) -or [case](#) and [display](#) from Waveshare.com a special box with a 3.5" touch display for Raspberry PI 4 + instruction + display drivers.

- 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

## License, Support & Limited Warranty

[SoX library](#) 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 and if facing problems please have a look in the QA section on <https://www.z-liverec.com/qa/>

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## Credits

The [Raspberry PI Forums](#), Mikael Svennungsson, Andreas Bilén, Kaj Grönlund, the great [Peter Dikant](#) and all lovely users of Z-LiveRec.

## More information

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