Extract tracks from LP (Vinyl Records)

This guide covers everything you need to know to master excellent restauration from Vinyl Records to FLAC and MP3 track files with minimum effort.
(updated 3rd December 2022)

Prerequisites

1. A good phono turntable with a new stylus, or if not new, a stylus in excellent condition. The better your equipment, the better the quality of your recordings. I use a Technics SL-1210MK2 with an Ortofon Concorde 10 R stylus, which is the lowest mass cartridge on the market. The type of stylus you use depends on your preferred music, as well as your preference in sound. Experiment and make sure you are satisfied with the sound before you start recording.
2. A phono preamp with USB connection so you can directly record to your computer. I use the NAD PP4 and the Alpha Design Labs ADL-GT40a. The GT40a comes with higher specs than the PP4, the PP4 is more convenient to use and has an auto-off function which is quite nice, both deliver excellent results.
3. A computer which is sitting close to the turntable and phono preamp. My setup is such that my turntable and amplifier can be accessed on the back side through another service room, in which also a Linux computer is located.
4. A tablet to operate the computer "remotely". I do this through VNC, which let's me access the computer's desktop on the tablet's screen.
5. Audacity open-source software, which is an excellent audio editor available for Linux, Windows, and MacOS. You should install version 3, under Linux that means install the snap instead of the packet manager version, see Install Audacity 3 on Linux.
6. Additional software to facilitate enhancing the resulting audio files. Audacity can do it too, but it is quite labor intensive, be ready to put down hours for each record you intend to extract, except if you tolerate clicks and cracks from dust, scratches, and other imperfections of the some times very old vinyl records. There are tons of programs who claim to do a good job with this, I tried some, but was never happy until I found ClickRepair by Brian Davies. This is a Java application and as such platform independent, it runs on Linux, Windows, and MacOS. I agree with others saying that "It is nothing short of magic at removing clicks, pops, and crackle without damaging the audio", and it does this basically with a single click, even if you leave the tweaks at default settings. It costs USD 40. UPDATE: Brian Davies has given up on maintaining his software, and it seems it's not available for sale anywhere else anymore.
7. You might also want to use DeNoise by Brian Davies to reduce the noise floor, which is so much better than the Audacity built-in noise reduction algorithm. You don't need to do this step as the resulting WAV does already sound very nice, but it adds one more improvement to the resulting audio track file.
8. A DeEsser can improve your audio further, specially if your recordings suffer from very strong 's' and 'sh' sounds, specially within vocal dominant sections of the track. I found 2 DeEssers which work quite well, but you need to play with the settings and hence the processing efforts for each track will increase.
   1. DeBess, a free VST plugin written by Chris from airwindows. This is a VST plugin which can be enabled in Audacity.
   2. Sibilance from Waves. This is a paid plugin ($29.99 as of 23rd February 2021), and you need a 64bit version DAW to use it, for example Audacity 3 or REAPER Version 6 (60 days

trial period - $60 for a license).
9. Audacity Audio Helper to automate tagging and moving the audio track files to their final location.

Preparations

1. Make sure your turntable is setup correctly, How To Set Up A Turntable Properly explains how, you might also want to use a Phono-cartridge alignment protractor.
2. Set up a record cleaning "station". I use a carbon brush to wipe off extensive dust and particles, then clean the record with Spin-Clean which does a pretty decent job. There are other cheaper and less cheaper solutions available on the market, you could also use a do-it-yourself solution like the one in this video which I will try one day when I run out of Spin-Clean cleaning liquid.
3. I use 2 different computers to do the task, a Linux host "server" which records Audio to a network served folder (server or NAS), and a Windows host "client" to do the processing. I also use an Android "tablet" to operate Audacity on the "server", then I am able to operate Audacity without leaving the turntable. Other setups using a laptop might be easier, where you just set the laptop in front of the turntable. But for my setup following are the required software installs.
4. Linux "server":
   1. Install and configure TightVNC
   2. Install Audacity.
   3. If you installed an additional plugin like **Sibilance**, verify that the plugin is recognized by Audacity.
5. Windows "client":
   1. Install Audacity
   2. Install DeBess, a free VST plugin written by Chris from airwindows. Copy DeBess32.dll to Audacity's Plug-Ins folder and enable the plugin within Audacity.
   3. Install ClickRepair
   4. Install DeNoise and DeNoiseLF
   5. Copy Audacity Audio Helper to a portable location
6. Android "tablet":
   1. Install VNC Viewer and set up a connection to display :2. You might need to allow the server's firewall to open port 5902 for VNC Viewer to work.
7. If you don't like Audacity, you might find GoldWave a good and inexpensive alternative, although it's not free software.

Work flow

I refined my work flow with the help of Vinyl Cleanup Best Practice and Sample workflow for LP digitization.

1. **Preparation**: clean the record to be captured, don't put it back into the sleeve but let it dry completely
2. **Audacity**: capture the record which was just cleaned. This delivers the best results as the record will not pick up new dust or static before being captured. Make sure the project settings are at Stereo, 44100Hz, 32-bit float. Capture each LP side into a separate track, which can be in the same Audacity project or in different projects.
3. **Audacity**: Effects –> High-Pass Filter..., 24 db/octave roll-off, cut-off frequency of 20 Hz, which gets rid of sub-sonic garbage

4. **Audacity**: *Effects –> Amplify...* to boost both stereo channels equally
5. **Audacity**: *Effects –>* **Sibilance** (optional). Apply the plugin after *Amplify* but before repairing the audio from clicks and noise.
6. **Audacity**: some badly damaged records might need customized Repair in Audacity, for example tracks with dominant vocals and strong ess'es, which you can repair with the "DeBess" effect.
7. **Audacity**: *Export –> Export Audio...* as WAV, or *Export –> Export Selected Audio...* if you have more than one stereo track in the same project.
8. **Audacity**: *Edit –> Undo* all effects applied to all tracks, or *File –> Close* without saving the project. This leaves your original recording and allows to redo it with different effects or settings should you not be satisfied with the result.
9. **ClickRepair**: process with **ClickRepair** to remove clicks and pops
10. **DeNoise**: process with **DeNoise** to remove the noise floor. Set to default values but Limit reduction to 9 dB.
11. **Audacity**: Import the DeClicked and DeNoised file back into a new project in Audacity
12. **Audacity**: *Effects –> Amplify...* again (the removal of clicks and pops will usually mean you can do further amplification without clipping)
13. **Audacity**: Having done this for both LP sides, use the time shift tool to drag the side 2 recording onto the side 1 track
14. **Audacity**: split the recording into songs by setting Labels 0.2 - 0.5 seconds before the song audio. Use *Edit –> Labels –> Add Label at Selection*, then use *Edit –> Labels –> Edit Labels...* to make sure all songs are labeled and extend with their end time to the beginning of the next song. Use the song's name as label.
15. **Audacity**: check whether you want to silence the gaps between songs if it's not quiet after DeClick and DeNoise. It's done with *Generate –> Silence...*.
16. **Audacity**: export all songs with *Export –> Multiple...* to create FLAC and MP3 track files. Refer to the Audacity Audio Helper Work flow for recommended export settings for FLAC and MP3, which are important if you want to use Audacity Audio Helper to tag and move the track files. You can also use any other format you prefer, as set out in Audacity Audio Helper. Do not add any meta tags except the song's name.
17. Audacity Audio Helper: tag all track files and move them to the destination folder.

To do the best job you need to tweak the DeClick, DeCrackle and DeNoise processes for each LP. I normally do not use DeCrackle, but for some LPs it might be necessary.