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Audio Restoration of Dubplates: Cleaning and Digital Processing Lacquer Records from Reggae/Dancehall Culture

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Introduction

- The archiving of legacy audio formats is an activity that has been recognised as important for many years.
- Institutions such as the US Library of Congress and others have been participating in this process for many years to save sounds that represent the many different cultures and peoples of the world for future generations to enjoy, appreciate and study.
- Along with issues finding legacy playback equipment and physical deterioration of the recordings, the question of which media is more important to process is a complicated one. Although the endeavour is to save every piece of audio on legacy formats, this is not something that is currently possible owing to the loss of playback equipment, fatal deterioration of the media and lack of sufficient digital storage space.
- Furthermore, deciding which specific media to restore digitally also brings up ethical issues such as what is important to society to keep versus what is not. Legal issues regarding copyright ownership can also create problems for restoration laboratories if artists, media owners or other interested parties do not agree to the processing.

Introduction

- There are several reasons for not digitally restoring a specific piece of legacy analogue media.
- Arguably, the most important reason is the pre-existence of a digital copy of the audio with a high enough bit and sample rate.
- Also, storage space in the digital domain should always be considered.
- Taking this idea into account, if the audio held on a specific piece of analogue media exists in another format that has fewer negative issues (such as playback equipment availability and/or physical condition), it would be pragmatic for the restorer to digitise the audio on the less problematic format.
- For example, if there is a specific song that is to be digitised, it would be better for the restoration engineer to transfer the original multitrack tapes over the vinyl version of the audio because the options for digital processing are greater using individual instruments or stems, especially if the vinyl is damaged and would require extensive physical restoration.
- However, where certain tracks are being digitised to preserve the overall mix version (such as a remix by a certain producer), the vinyl would be preferred.

HISTORY OF DUBPLATES AND REGGAE SOUND SYSTEMS

- Sound Systems (or Sounds) have been an integral part of the Jamaican music scene since the 1940s when they were employed to play music in clubs instead of live bands.

- There were two main reasons for this: firstly, the appetite of the audience in the dancehalls at the time was leaning more towards the new music coming out of America on vinyl and shellac discs. This meant that local live bands usually could not keep up with audience demand for this new American music where Sound Systems, could import the newest music and play it.

- Secondly, live musicians were much more expensive to promote, whether it was a band being flown into the country to play or a local live band. Sound Systems, at the time, employed fewer people than a live band.

- The way that Sound Systems differentiated from each other was, firstly and most importantly, by what music they played.

HISTORY OF DUBPLATES AND REGGAE SOUND SYSTEMS

- A sound system, historically, is made up of many parts and members, each of which has a specific role.
- Firstly, there are the physical parts such as turntables, amplifiers, and speakers, which can be used to specifically characterise a Sound. Everything from clarity of the sound, to what it looks like when stacked can be the difference between whether a Sound has a following or not.
- Each Sound historically would have its own set of equipment, some emphasising bass, others clarity, while others still would focus on the higher end of the frequency spectrum. This would lead to vastly different speaker constructions, amp selections, placement, and stack structure.
- This whole system was usually controlled and set up by the 'Box man' or 'sound man'. Other members of the collective include the ‘Selector’ who chooses the music that will be played. The ‘Mixer’ who actually plays the tracks selected and the ‘Deejay’ who is the voice of the sound.

The “Richochet Sound System (Bermuda)” in front of their Box

HISTORY OF DUBPLATES AND REGGAE SOUND SYSTEMS

- The secrecy around the music owned by a Sound continued into the next phase of Sound culture. In the early 1960s, when Jamaican music was being played far more often than the American Rhythm and Blues or Jazz from the previous era, promoters and owners of Sounds began expanding into record production.
- The use of the lacquer master records from the vinyl production process became a vital part of any Sound.
- These records (known as Dubplates) were played in the dancehall to gauge crowd reaction to a new production.
- Dubplate cutting studios became more prevalent, often run by a single person who was the mastermind of how the dubplate was cut.
- The cutter would also be able to adjust his methods so that the dubplate sounded its best when played specifically on a Sound's box.
- As time and technology has moved on, the use of the lacquer disc for these 'dubplate specials' has become less prevalent, with Sound Systems moving to digital media, resulting in the lacquer dubplates being placed into long storage and/or simply forgotten.

METHODS AND RESULTS

Digital Ingestion and Cleaning

- Once chosen the record was, once photographed, immediately digitally ingested.
- The equipment used for this was an Audio Technica LP120 turntable with an Audio Technica VM95E (bonded eliptical) stylus.
- The turntable platter was deadened using an NAO Acoustic Isolation Mat.
- The turntable tonearm was also balanced to ensure accurate tracking forces would be applied.
- A Focusrite Scarlett 2i2 audio card was used to convert the signal from the turntable's internal preamp which was set at the standard RIAA position. The digital file was captured using Audacity (audacityteam.org).
- The turntable levels and balance were tested using a HiFi News Calibration record (hifinews.com), providing a thorough check of the frequency response, input levels and input balance before digital transfers occurred.

METHODS AND RESULTS

Deathmark Sound Dubplates

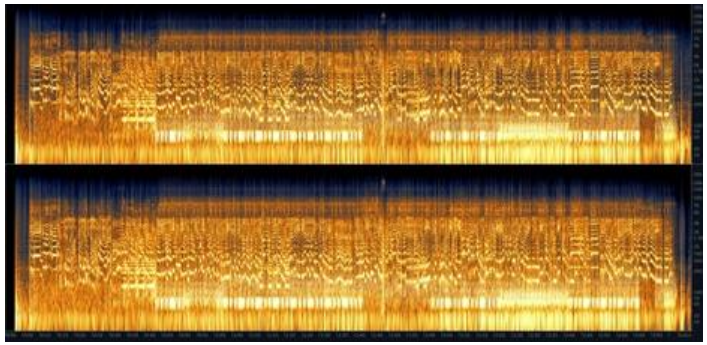
- Performed by Monty Gallis and Kojah Mon, a duo from Bermuda who no longer perform together. It was recorded over 20 years ago in a home studio in Bermuda and cut in Florida from DAT tape. The cutting process remains unknown.
- This record was in poor condition, with severe damage on the leading edges which appeared to be missing pieces of the lacquer coating that makes up the playing surface of the record.
- The record had been stored badly initially as well as played many times, so it was expected that the audio held would be poor condition.
- However, it was unknown how well the initial recording sounded as the DAT has disappeared: thus it was important to digitally capture the track as it exists nowhere else.
- The dubplate was digitally ingested, however, since the grooves were in worse condition, the transfer speed was dropped from 45RPM (the intended playback speed) to 33⅓RPM to increase groove adherence by the stylus.

METHODS AND RESULTS

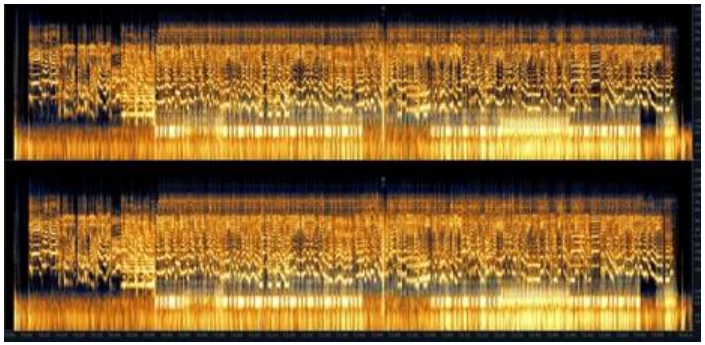
Track: '*Kiss From A Rose*'

- The track was ingested at the lower speed of 33⅓RPM and processed in Audacity to correct the playback speed.
- It was found that the digital file created after wet cleaning was less contaminated and thus was used for further processing in RX8.
- The first process undertaken was de-clip, processing any clipping in the track and interpolating the relevant wave forms to be less square. De-click was then used to remove many unwanted pops and clicks. Spectral de-noise was applied to remove unwanted surface noise that had been ingested with the audio.
- This process left a few unwanted noises on the audio file. The centre extract tool was used at this point to attempt to remove these artefacts. Interestingly, this seemed to make the noise levels, subjectively, acceptable although it was a compromise as there was also a loss of atmosphere in the track.
- The track was then normalized, which increases the gain on a track so that its peak level reaches a target peak level.

Before



After



DISCUSSION

Cleaning methods

- Used simple household solutions to the problems of cleaning, since this will be useful to Sounds that do not have access to cleaning machines or commercial cleaning solutions. Although the results from the cleaning methods for this project were somewhat successful, there are many ways to improve this process and its outcomes, such as discussing options with chemical scientists to analyse the contaminates found on the lacquer surface.

Turntable and Stylus

- Turntable used for this project was an excellent, home use turntable. It is designed for home applications and as such it is on the lower end of professional restoration applications. Although the platter was deadened on the turntable, a higher end turntable would have better noise related specifications.

Preamplifier

- Leading on from the turntable and stylus discussion, a flat preamp may have been useful for this work. One of the issues with grooved recordings is that low frequency signals create larger grooves which can cause the stylus to leave the groove.

- In many situations, Dubplates were recorded in situations that were not conducive to audio recording. This meant that microphones, mixing desks and other recording equipment may have been less than optimal for the intended purpose.

DISCUSSION

Software Processing

- Once the dubplates were committed to the digital domain, processing to remove unwanted noise began. It is important when processing to know how far to push and when to stop. Over processing leads to distortion in the audio signal as well as loss of frequencies fundamental to the audio file.
- Audacity has powerful effects within it and an especially useful filter curve effect. It was used as the capture program for digital ingestion, and to change the playback speed of tracks that were ingested using a slower than intended RPM.
- The interface for RX8 Advanced can display either the waveform of a track or the corresponding spectrogram.
- Extensive use was made of the spectral de-noise function, to remove any unwanted broadband and or tonal defects from the audio signal. This function requires a large amount of finesse as it is possible to remove or suppress frequencies from the true audio signal.
- Another tool used in this project was the center extract plug-in. Although not designed for use with stereo tracks, this plug-in was used to remove extraneous noise from tracks with relative ease. However, there was a compromise. It was very easy to remove atmosphere and depth. When overused while processing the dub plates for this project, it was noticed that some reverb was removed along with the noise that was being targeted.

DISCUSSION

Subjectivity versus Objectivity

- One of the biggest obstacles faced was the question of when to stop audio processing.
- Regardless of software being used, it is quite easy to overdo the processing of a file. This is not the over processing previously mentioned, but instead the search for perfection in the processing.
- When digitally restoring an audio file, regardless of medium or genre, it is important to know when the file is *'good enough*'.
- However, the definition of this varies depending on if one looks from a subjective or objective point of view. Something perceived as a flaw in an objective observation may be pleasant to the listener and thus should not be removed.
- The question with restoring dubplates could be as simple as '*how much of surface noise should be left in the mix*'. Many people enjoy the sound of the crackle associated with grooved recordings.
- Just as the cutter and their client may discuss how much bass to add to the dubplate they are producing, it is important to keep in mind who the end product is aimed at. Grooved media is enjoyed by many because of the warm harmonic distortion that accompanies it.
- Fundamentally, it has to be understood what the purpose of the restoration is.

Conclusions

- The novelty in this work involves bringing together of a number of aspects, such as signal processing, cleaning, audio processing procedures and so on, to formulate a proposed methodology for restoring dubplates from the Reggae/Dancehall culture of the West Indies.
- Dubplates (in their lacquer form) will eventually become impossible to play as their design was not meant to last very long or even be played very often.
- Many of these records have already disappeared owing to storage issues and accidents.
- They are more fragile than vinyl records and as such should be treated with the utmost care and attention.
- They are also representative of a culture that has expanded around the world and has been deemed worthy of protection by the United Nations.
- As with all audio restoration and archiving, it is important not to waste either time or space in the digital realm on unnecessary transfers.
- One should endeavour to transfer those artefacts that are in the most danger of fatally deteriorating.
- It is always important to evaluate the media you intend to transfer and ensure it is the best choice for digital transfer.

Conclusions

At the end of this work, several lessons have been learned.

- The limitations of certain methods of cleaning dub plates were discovered however it was also found that very basic household items can be used effectively when attempting to remove surface contaminants.
- The process of restoring a dubplate is not one that can really be automated since a fundamental element of the process is for the operator to undertake the cleaning process by hand to ensure that damage is not caused to the dubplate
- The operator needs to continuously listen to the track and make a professional (and partially personal) judgement on whether an action undertaken in the audio processing stage improved the listener's experience or not – something automated processes cannot achieve owing to its very subjective nature.
- When digitally ingesting materials it is paramount that the best equipment available should be used.
- Software is a powerful tool in the world of restoration. The technology available makes it possible for Sound men to perform digital transfers in the comfort of their own homes if they have the minimum equipment available.