

Audio Format Superiority: Manufacturing Pretentiousness?

Defining the properties of analogue and digital formats and processing in music, identifying their desirable characteristics.

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Abstract

The era of analogue recording and consumption was at one point considered the height of music technology. Over time, digital means of recording and consumption took over as the more practical alternative. However, a new wave of self-proclaimed vintage audio aficionados have caused the resurgence of analogue media such as Vinyl and Tape. (Savage, 2017) The project focusses on historical analysis of analogue and digital media, the testing of analogue recording equipment, as well as the public opinion of changing formats over the time, their quality, practicality and aesthetic. Much appeal for analogue formats depend on the aesthetic qualities of the medium, which arguably, should negate any opinion of audible superiority? This project has been undertaken to highlight the aesthetic appeal towards analogue media, and where digital recreation of analogue artefacts can far improve the practicality, whilst maintaining the audible quality of analogue media.

Aims

The aim of this project was to investigate recording and consumer media of the 20th century up until modern technologies, comparing the quality, practicality and aesthetical characteristics of each medium. This would provide an insight to the functionality of differing media, and where artefacts could occur in each. This analysis would identify the responsive nature of the analogue signal, offering inspiration for the practical implementation of these characteristics to a digital medium. An online survey aims to highlight a multitude of factors and popular consumption methods. The initial intention was to utilise the public's perception of audio in listening tests to assess their ability to identify the digital recreation, though this was impossible under the current circumstances. In place of this is a theoretical recreation and its level of expectation to replicate the desired analogue sound.

Method

- This investigation analyses the introduction of analogue recording artefacts in reproduced sound, the assessment of the subjective perception of differing formats, with an public insight into format preconception and opinion, and with the intention to employ listening tests, comparing the perceivable quality of a digital recreation of analogue characteristics.
- The analysis of analogue media comprised of assessing cassette and reel-to-reel tape recordings. This is due to the ease of use, accesibility, and general performance ability. Creating digital test tones to measure differing aspects of the tapes performance, such as pink and white noise, sine tones of varying frequency, inharmonic tones, square tones, and sine sweeps. This in turn measures the dynamic frequency range, saturation, total harmonic distortion and intermodulation distortion of the signal. (Zölzer, 2002) These artefacts were intended to be replicated using high sample rate and bit depth, and digital plugins such as EQ manipulation, tape saturation, and introduction of noise via dithering.
- The subjective preconception employs the use of an online survey comprised of 19 questions, used to detail popular opinion of varying formats, as well as the hierarchy of importance regarding qualitative, practical and aesthetical aspects of audio.

Results

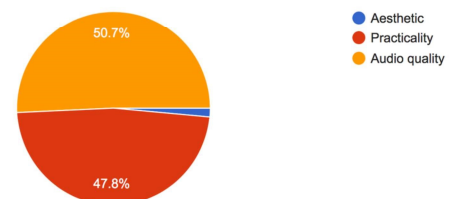
The analysis of historical changes in recording and consumer media gave an insight into the functionality of various formats. This in turn assisted with the investigation into analogue system testing and comparison to digital, resulting in the confirmed introduction of harmonic and intermodulation distortion saturation of a digital signal. The variation in test tones provided a simulation as to how the unit would respond in the playback of music. The best results were those of the AKAI 4000DB.



- Though expected, the intermodulation distortion response of the original signal was significant in comparison. With the versatility of each machine, the use of Dolby Noise Reduction was employed to demonstrate the affect on the noise floor. This presented significant change in the noise floor being around -10 dB, and the signal being boosted in amplitude.

What would you argue is more important in music consumption?

69 responses



- The online survey results provided some worthy statistics to back up the notion of analogue superiority, though were not as clear in identifying the aesthetic perspective. This did, however, suggest in comparison to the question of replicaiton capability, that a biased opinion could influence the perception of audio and disregard any digital alternative.

Conclusion

In conclusion, the preference of analogue over digital is a perfectly reasonable opinion to have. The digital recreation of these analogue artefacts are theoretically a valid alternative in order to achieve the reduced frequency range and colouring of signal that is so sought after. In hindsight, the ability to employ subjective listening tests could have been critical in displaying the quality comparison and support the theory of analogue recreation becoming a valid consumer option in future trends. Regardless, an intriguing yet subjective topic open to interpretation has somewhat displayed the effect of a biased opinion.

References

- Zölzer, U., 2002. DAFX - Digital Audio Effects. John Wiley & Sons, pp.127 - 133.
- Savage, M., 2017. UK Vinyl Sales Reach 25-Year High. [online] BBC News. Available at: <<https://www.bbc.co.uk/news/entertainment-arts-38487837>> [Accessed 9 March 2020].