

Physical Modeling for Tape Machines

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January 17, 2019

1 Abstract

For this project I plan to research and implement a physical model of a 1967 Sony Tape recorder TC-260. This project will have four phases: research, measurement, implementation, and evaluation. Each phase will be described in more detail below. The project will result in both a software implementation of the physical model, as well as a paper describing the process involved.

2 Research

The research phase will consist of mining the available literature for information regarding the physical aspects of analog tape recording. Additional research will include learning about existing models of analog tape machines, specifically about methods of implementation, and the accuracy of those implementations. A preliminary list of research sources can be found below.

3 Measurement

Measurement will involve taking extensive physical and acoustic measurements of my own TC-260.

4 Implementation

A physical model of the TC-260 will be implemented based on the measurements taken during the measurements phase as well as the methods learned in the research phase and from in-class material. The implementation will be done in C++, as a VST plugin.

5 Evaluation

The evaluation phase will consist of a series of comparisons between audio recorded through the TC-260, and the same audio processed through the implemented physical model. Evaluation will take place first through simple A/B listening tests evaluated by myself, and then through blind listening tests evaluated by myself and others. If necessary, the implementation will be adjusted for optimized performance.

References

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- [4] H. N. Bertram. *Theory of Magnetic Recording*. April 1994.
- [5] Marvin Camras. *Magnetic Recording Handbook*. Van Nostrand Reinhold Co., New York, NY, USA, 1987.