

# **The Exploration of Hybrid Synthesizer Architecture and Implementation**

By Collin Champagne and Alexander Scarlatos

Supervisor: Margaret Schedel

Department: Music

The synthesizer has risen in the age of computer music as a fundamental tool for producers and editors in the sound studio, as well as for hobbyists and musicians alike. The late 19<sup>th</sup> century saw the advent of the first analog synthesizers – with digital synthesizers dominating the modern market. Our concept is to explore the necessary construction for the synthesis of these two categories of musical instruments through the application of computer science, electrical engineering, and music. This project uses a microprocessor to receive input from an external keyboard as well as a physical user interface integrated into a custom designed enclosure. The microprocessor then uses this data to generate a MIDI signal that is then converted into an audio signal to be processed by various analog modules. These modules include various filters and oscillators to produce a sound that is similar to that of purely analog synthesizer. The objective of this dichotomous relationship is to simplify the implementation of an analog synthesizer while maintaining an authentic sound and providing a higher degree of customization and precision in sound design.