**Iteration Plan Document**

TeensyAudio Wavetable Synthesis

Iteration #3

**Abstract**

The purpose of this project is to provide a C++ library and accompanying Python utility scripts allowing realistic instrumentation audio to be synthesized on the Teensy 3.2 Arduino Digital Analog Converter (DAC). This library will be exposed to developers, and will allow pitch shifting, looping, tremolo, and vibrato effects to be imposed on a raw byte buffer of recorded samples.

**Document History**

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Description | Date | Modifier |
| 100 | Initial Version | 11/18/2016 | Ryan Mellmer |

**Project Team**

Ryan Mellmer - Team Lead

Connor Delaplane - Infrastructure Manager

Aida Keifer - Scheduling Manager

Nicholas Craig - Requirements Manager

Josh Bucklin - Design/Architecture Lead (Teensy Library)

Jonathan Jensen - Developer

Xuan Tang - Developer

Note: All members also acting as developers.

**1.0 Introduction**

The purpose of this document is to describe the schedule and iteration artifacts for Iteration 3 of this project.

**1.1 Purpose**

The completion of this iteration completes the following milestones for the project:

* Tremelo
  + Provide functionality for tremolo.
* Vibrato
  + Provide functionality for vibrato.
* Intensity
  + Vary intensity based on user input (more force used → more intense sample playback).

**1.2 Context**

The focus of this iteration is to use the basic Teensy code developed in Iterations 1 and 2 to develop more complex synthesizer functionality. Completion of this iteration will add the following use cases to the Teensy microprocessor: applying tremolo to a sample, and applying vibrato to a sample.

**2.0 Plan**

**2.1 Schedule of Iteration Workflows**

|  |  |  |  |
| --- | --- | --- | --- |
| **Workflow** | **Start Date** | **End Date** | **Duration (days)** |
| Requirements | 02/03/17 | 02/07/17 | 4 |
| Analysis and Design | 02/03/17 | 02/07/17 | 4 |
| Implementation | 02/07/17 | 02/21/17 | 14 |
| Testing | 02/07/17 | 02/21/17 | 14 |

**Table 1 :** Iteration Workflow Schedule

**2.2 Iteration Schedule Breakdown**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task Name** | **Start** | **Finish** | **Assigned To** |
| **Requirements** |  |  |  |
| Update any new requirements | 02/03/17 | 02/07/17 | Requirements Team |
|  |  |  |  |
| **Analysis and Design** |  |  |  |
| Update Design plan | 02/03/17 | 02/07/17 | Everyone |
|  |  |  |  |
| **Implementation** |  |  |  |
| Tremolo | 02/07/17 | 02/21/17 | Tremolo team |
| Vibrato | 02/07/17 | 02/21/17 | Vibrato team |
| Sample Intensity Change | 02/07/17 | 02/21/17 | Intensity team |
|  |  |  |  |
| **Testing** |  |  |  |
| Test for algorithm correctness | 02/07/17 | 02/21/17 | Divided among subteams responsible for each algorithm |
| Perform latency testing over integrated tremolo, vibrato, and sample intensity | 02/07/17 | 02/21/17 | ... |
|  |  |  |  |
|  |  |  |  |
| **Developer Documentation** |  |  |  |
| Extend developer documentation to reflect added functionality | 02/17/17 | 02/21/17 |  |
|  |  |  |  |

**Table 2:** Iteration Plan Task Breakdown by Workflow

**2.3 Iteration Artifacts**

|  |  |  |
| --- | --- | --- |
| **Task Name** | **Deliverable** | **Responsible** |
| **Requirements** |  |  |
| Update any new requirements | Potentially updated requirements document | Requirements Team |
|  |  |  |
| **Analysis and Design** |  |  |
| Update Design plan | Potentially updated design document | Everyone |
|  |  |  |
| **Implementation** |  |  |
| Tremolo | Tremolo function/algorithm added into Wavetable.cpp class | Subteam 1 |
| Vibrato | Vibrato function/algorithm added into Wavetable.cpp class | Subteam 2 |
| Intensity Sample Change | Functionality which switches sample for different intensity | Subteam 3 |
|  |  |  |
| **Testing** |  |  |
| Test for algorithm correctness | Generate unit/integration tests for added functionality |  |
| Perform latency testing over integrated tremelo, vibrato, and sample intensity | Execute test plan for testing latency |  |
|  |  |  |
|  |  |  |
| **Documentation** |  |  |
| Extend developer documentation to reflect added functionality | Developer documentation documents for Teensy Library | Subteam 1 (Teensy) |

**Table 3:** Artifacts to be Delivered in this Iteration