Project Method

The following is a step-by-step list, including explanations, into the how and why of what methods will be used to create this project.

Notations:

W.C. = Week Commencing.

Green = Weekly project meeting.

Red = Deadline present.

**February 2022**

1. W.C. 28th Feb: Finish programming Echo (Delay), and Reverb effects. Purchase necessary remaining components for power, control etc.

* These tasks are in place in order to finalise the most important effects into the project before beginning the housing construction. This is deliberately at the bare minimum in order to ensure there is sufficient time for the other deliverables (such as the Final Report) - there will be additional time at the end for further effects if progress is strong.

**March 2022**

1. W.C. 7th March: Construct breadboard. Solder header pins on *BlackFin* and wiring on control switches (use stripboard if necessary).

* Breadboard is a must to test that all circuitry operates as intended outside of the support of the PC running *CrossCore* whilst connected to the electric guitar. Particular focus will be paid attention to the area of power supply during this stage to ensure it offers sufficient charge. Since there is now no longer a need for a PCB, the only soldering during the project will take place at this stage specifically on the SIL pins on the *BlackFin* and on jumper wires to control switches. Stripboard usage shall be considered to reduce wire ‘mess’ whilst keeping costs at a minimum.

1. W.C. 14th March: Code all control switches/buttons to work concurrently in real-time. Test rigorously. Start recording results in Final Report template.

* After soldering is done, before a housing build is attempted, this stage will use the same breadboard to code the correct button presses/macros to each effect (this will likely invoke the case switch function from C/C++). Further testing to ensure reliability and robustness of code will start getting recorded in the Final Report, well before the PRM 4 deadline.

1. W.C. 21st March: Design housing in suitable CAD software. Send designs for fabrication.

* This stage will likely use *Solidworks* (for which I have some minimal experience) to construct a simple foundation for the *BlackFin* to be mounted upon. Some research will need to be carried out to verify the best way to mount this housing onto the electric guitar. These designs will be fabricated, perhaps only using Acrylic due to low costs and ease of manufacture with only a 2D lasercutter (along with it only being a prototype), however, considerations shall be given to more environmentally sustainable approach using recyclable materials. An important aspect during this design step will be to ensure the *BlackFin* cannot overheat and break during sustained periods of high real-time processing, meaning heatsinks and ventilated conditions should be implemented where needed.

1. W.C. 28th March: Build housing. Test rigorously in a variety of conditions ready for Easter. Ensure Final Report is well populated for PRM 4.

* Since the housing will contain minimal parts, this step should be fairly quick, allowing time to catch up if there are any delays in preceding project deliverables. At minimum, the parts of the housing should be out of the fabrication stage (built or not built) to allow me to take home the project and test it and also give ample time to build up the report before other deadlines become apparent (nearly all of which are after Easter).

**April 2022**

1. W.C. 4th April: Add testing results into Final Report.

* As before.

1. W.C. 11th April: Continue populating Report for rest of month. If progress is good, program tremolo, chorus and flange effects (in that order). If progress is very good, consider an additional unorthodox effect e.g. octaver, looper or wah-wah.

* This stage in the Easter holiday is the same as before (Final Report work), with the one exception that this is the time to possibly add in additional effects to the system in order to help raise the quality of the product and also commercial potential. It is very important at this point that, if timings have allowed, the newer effects do not affect the integrity of the audio signal produced by the guitar – testing process should include scenarios where all the effects are being used at once, or, in other words, the *BlackFin* is being pushed to the greatest processing power the program could demand of it. Given my musical background, I should be able to assess immediately whether there is an unacceptable drop in signal quality or an unsatisfactorily long delay between plucking a string and hearing the response through the speaker system.

1. W.C. 18th April: As before.
2. W.C. 25th April: As before.

**May 2022**

1. W.C. 2nd May: Submit Final Report. Prepare for Final Presentation.

* The presentation will entail a full assessment of the project in a real-time setting, and will therefore demand that I am sufficiently prepared in dialogue/presentation (perhaps with a PowerPoint), along with the necessary equipment being arranged and fine-tuned to suit the nature of the performance well in advance (i.e. keeping the guitar in good shape + bringing suitable amplifier if needed).