

## Assignment 2: Damper & Picker Group Demonstration and Individual Report

### INTRODUCTION AND DESIGN OBJECTIVES

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Your group's task is to develop, test, demonstrate, and document two new mechatronic chordophone mechanisms: a string picker and a string damper. You should draw upon your knowledge gained during your individual literature reviews (Assignment 1) during the development of these mechanisms.

While this project focuses upon the development of these new musical mechanisms, the overarching learning objectives of this project are for you to:

- think critically about an engineering problem and develop a plan to address it using mechatronics
- identify and develop suitable evaluation techniques for analysing and enhancing a mechatronic system.

*Your demonstration should show, at minimum, that your picker is capable of actuating the string to achieve at least three different levels of amplitude when actuated. Similarly, the damper should be demonstrably able to, at minimum, return the string from its picked state (0.25 seconds after string picking) to its at-rest state within 0.25 second of contact with the string.*

*High-scoring demonstrations will also examine different guitar pick thicknesses/materials and use suitable music information retrieval techniques to detail these differences. Similarly, high scoring demonstrations will also examine different damper materials and use suitable music information retrieval techniques to detail these differences.*

*A key consideration in any musical mechatronic mechanism is acoustic noise emission. High scoring presentations will show that you have characterised this acoustic noise emission using suitable music information retrieval techniques and have taken steps to address it.*

*Finally, your picker and damper should be demonstrably able to pick and damp at a rate of at least 120 picks/damps per minute.*

It is up to your group (under the leadership of the group leader) to organise a suitable workflow that results in the successful completion of this project.

### INDIVIDUAL REPORT BRIEF

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60%	25%	15%
INDIVIDUAL REPORT	INDIVIDUAL PRESENTATION (Your own contribution to your group's presentation)	GROUP PRESENTATION (The overall quality of your group's collective presentation)

This assignment is worth 40% of the overall course mark. Your individual report should contain the following:

- Brief overviews of your group's picking and damping mechanisms, complete with design criteria and objectives
- A brief discussion of the different roles of each group member.
- Focused documentation detailing your contribution to the project.
  - How your work contributed to the overall project
  - How you organised and planned your contribution
  - How your work has been evaluated and tested
  - Areas for improvement and future work
- Note: Group leaders' reports should detail the overall project and focus upon project organisation and management.

Your individual report should be 2000 words or fewer (not counting bibliography/references), and may include diagrams and images.

Your report should contain references to datasheets, related works, and other relevant sources. These should be cited according to the IEEE format (<http://www.ieee.org/documents/ieeecitationref.pdf>) and should be included in a “References” section at the end of your document.

## DEMONSTRATION/PRESENTATION BRIEF

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The presentation should include the following:

- A demonstration of your group’s picker and damper mechanisms
- A project overview, complete with design criteria and objectives
- The group members’ roles
- The electronics & actuators used
- Details about the assemblies’ design and construction
- Characterisation and evaluation of the picker and damper
- A comparison with prior dampers/pickers
- Areas for improvement and future work

In addition to the demonstration of the mechanisms, presentations should include some form of slideshow; presenters are strongly encouraged to include diagrams, figures, and other media that illustrate the project’s design lifecycle. Successful presentations will involve each group member presenting her or his contribution to the overall project.

The presentation/demonstration should be no more than 15 minutes long, and will be strictly timed.

## DEADLINE & SUBMISSION

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11:00 am, Friday, 3 September 2021. Worth 40%.

Upload your completed report on Blackboard in the following format “**LastName\_ECEN426\_assignment2.pdf**”.

Only your group leader should send your group’s presentation slides to [jim.murphy@vuw.ac.nz](mailto:jim.murphy@vuw.ac.nz) - These slides should be in .pdf format and should be named according to the following format:

“**GroupLeaderLastNameECEN426\_assignment2\_presentation.pdf**”