UQ MARS Individual Project:
Custom Marco Board/Keyboard v0.1

Project Overview

Subsystem: Embedded Systems
Authors: Oscar Lloyd (2025), Slater Sammut (2025)
Mentor(s): Slater Sammut, Ganeshe Srinivasa.
Discord Help: Projects Channel
Time Estimate: 3-5 Weeks

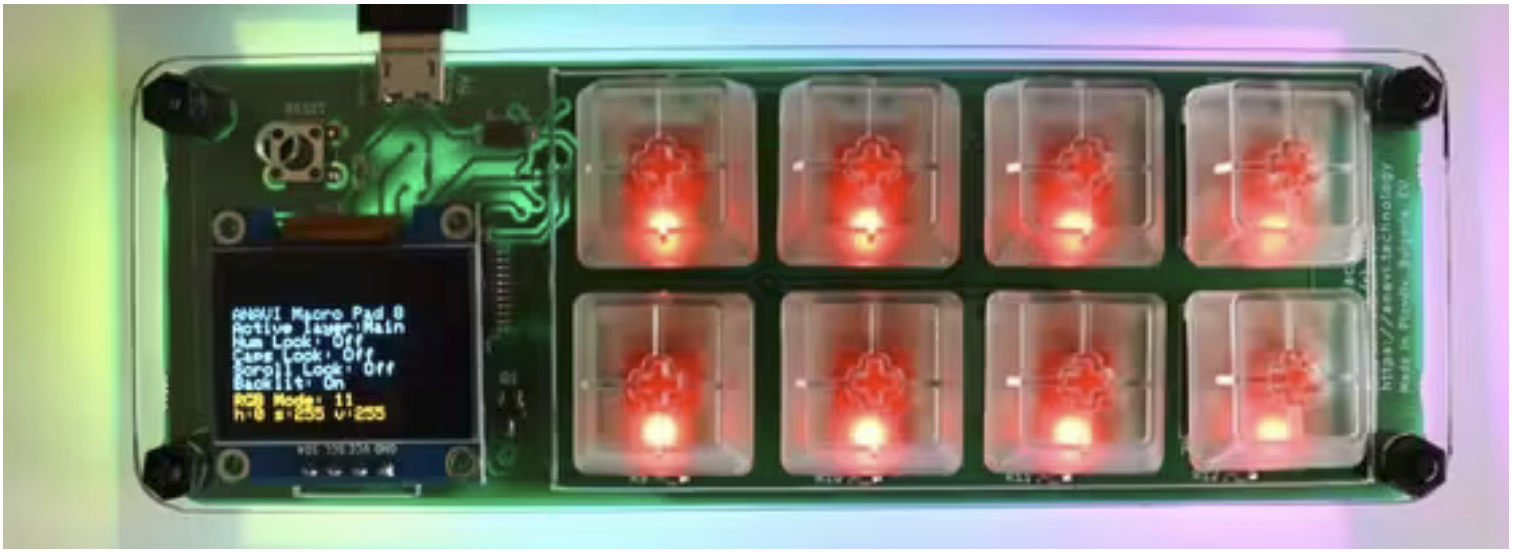
Project Difficulty:

Mechanical - ★☆☆☆☆
Electrical - ★★★☆☆
Software - ★★★★☆

Project Context

Ever tested a keyboard at Umart and wondered why yours doesn't feel as smooth? Why not build your own? A custom macro pad lets you fine-tune the feel, function, and aesthetics to match your exact needs.

This project is more than just a cool addition to your setup—it's a hands-on introduction to electronics and embedded systems. You'll work with switches, microcontrollers, and firmware to unlock amazing customisation.



Getting Started Resources

- UQ MARS Workshops - Our beginner-friendly UQ MARS workshops, highly recommended to have completed the CAD, PCB, and Microcontroller workshops.
- **UQ MARS Projects** - If this project's difficulty is too high, try our other UQ MARS Projects first. Beginner projects involving PCB Design or Microcontroller work are highly recommended skills.
- **UQ MARS Materials List** – A list of UQ MARS components available for use in this project. Anything not included in this list must be ordered yourself.
- **JLC PCB Capabilities** – Ensure your design follows their manufacturing constraints (rigid PCB).

Have you followed these resources and you're still stuck? Jump into the **UQ MARS Discord** and post in the **#Projects Channel** for help from mentors and fellow members!

Project Objective

By the end of this project, you will:

- Gain [specific skills or knowledge, e.g., CAD design, soldering, etc.].
- Learn [specific concepts or tools, e.g., engineering processes, problem-solving techniques, etc.].
- Complete [specific deliverable, e.g., a functional prototype, a documented design, etc.].

Project Requirements

In Scope:

- [List clear and specific tasks or components of the project that are in scope.]

Out of Scope:

- [List elements explicitly not covered in the project, to clarify boundaries.]

Functional Requirements and Constraints

Functional Requirements:

- Must be able to send and receive commands and execute them as a macro key would (think of the windows key or ctrl+c).
    - Optional: Build a GUI (Graphical User interface to accompany the project.
- Design and submit your own PCB design (with schematic).

Specifications/Constraints:

- No more than 16 keys.
- Hardware cost within reason (this is a predominantly electrical project so costs should not exceed $100)
- Must use a custom PCB (No breadboards :)
- Must submit a design report with your Bill of Materials (BOM).

Project Phases and Timeline

1. **Phase 1: Understanding the Problem**
    - Group formation and research.
2. **Phase 2: Design and Planning**
    - [Details on tasks like creating schematics, CAD models, or other planning work.]
3. **Phase 3: Implementation**
    - [Tasks related to building, coding, or creating the project.]
4. **Phase 4: Testing and Refinement**
    - [Tasks for evaluating and improving the project.]

Additional Considerations

- **Cost Efficiency:** Aim to minimise project costs while meeting requirements.
- **Manufacturability:** Ensure the design can be realistically manufactured with available tools.
- **Aesthetics:** Consider how the final product will look and align with the project goals.

Deliverables

- [List the specific items to be delivered at the end of the project, e.g., working prototype, design documentation, etc.]

Mentor Notes

- If you really wish to
