# Jacdac and MakeDevice

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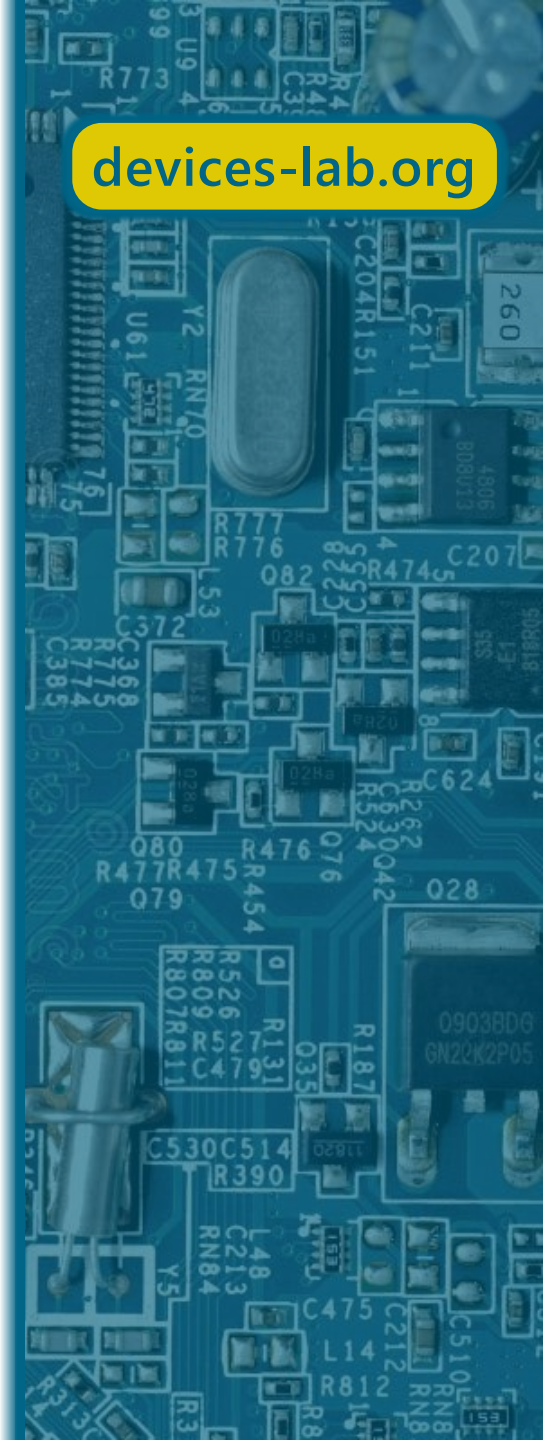
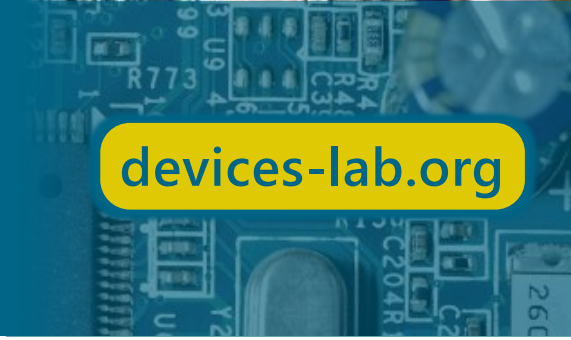


# Prototype-to-product challenges




- Hardware is hard… But prototyping is getting easier
- Transitioning a prototype to a robust, replicable form creates numerous barriers for users:
  - Often requires a complete redesign for robust product
  - Sourcing of components, enclosures, packaging
  - Creation of testing infrastructure
  - Potential for niche and low-volume products is never realized

# Challenges of scaling

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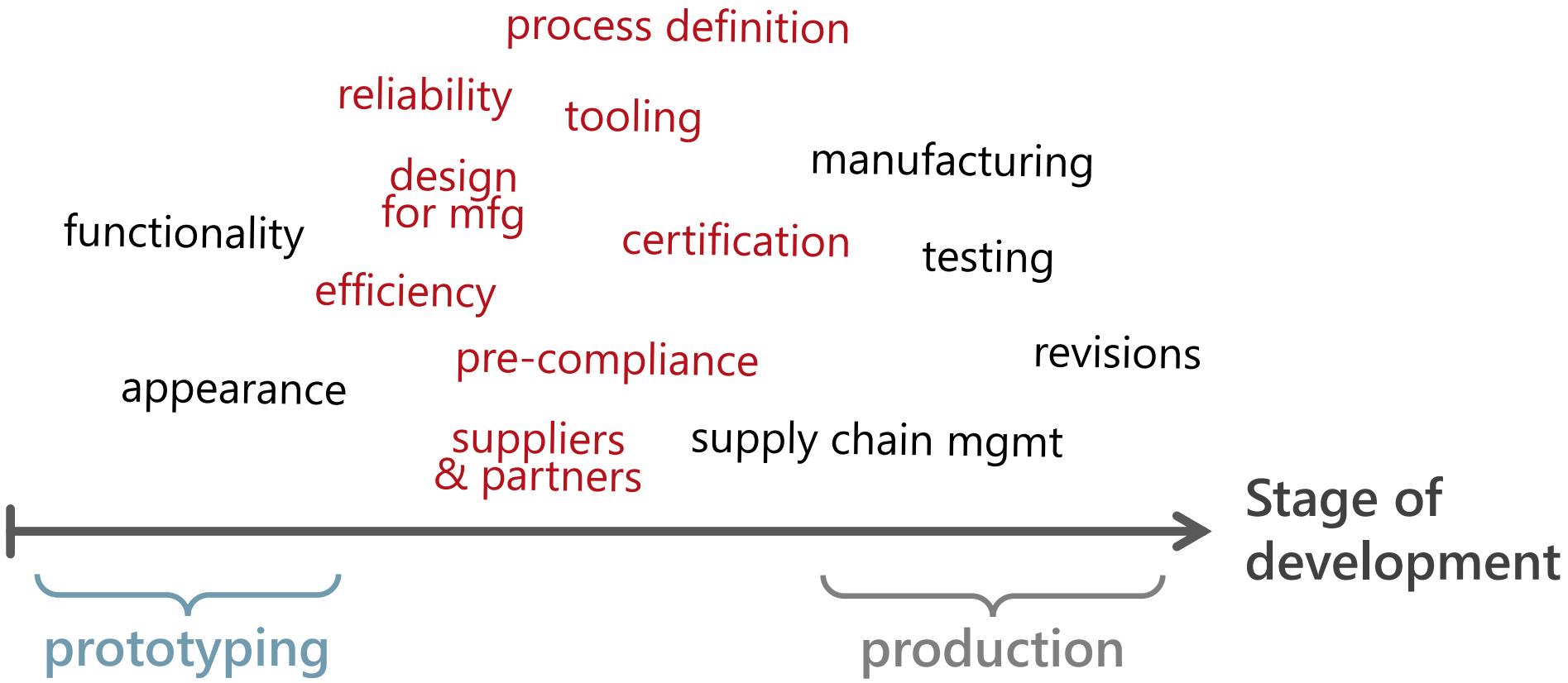

# Accessibility

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- Accessibility challenges are often extremely unique
- Tech solutions are therefore often highly tailored, involve the use of occupational therapists
- Process often highly expensive, limited to areas/people with access
- A large number of those with accessibility needs not adequately served by widely available tech

Button to Speech
Jacdac interface

# MakeAccessible Hackathon

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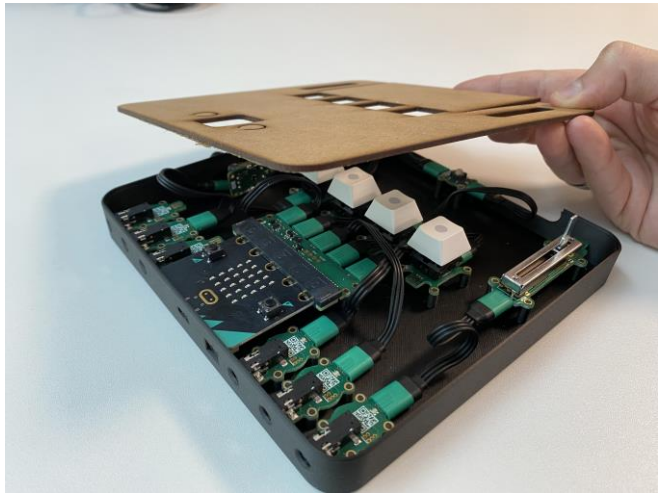

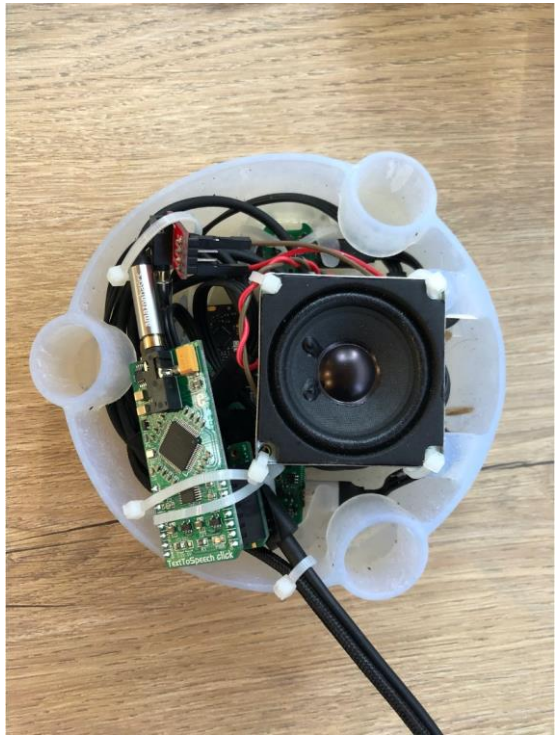

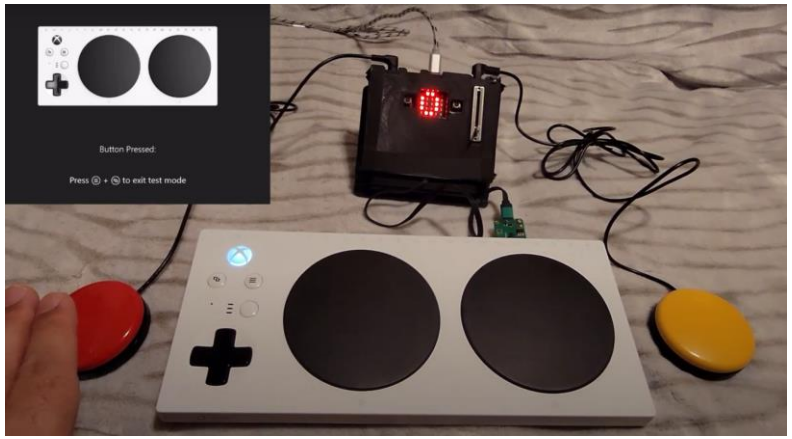


*Devine et al. 2022.* ***Plug-and-play Physical Computing with Jacdac****. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 6, 3, Article 110 (September 2022), 30 pages. https://doi.org/10.1145/3550317*

MustardTek

https://mustardtek.com

IDEO

https://ideo.com

# MakeAccessible Hackathon

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"[I want] a magic button" that would allow "ten magic PCBs [to be] delivered with an enclosure that fits."

# Motivation

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Jacdac/micro:bit are great tools for creating plug-and-play desktop prototypes

But to create robust devices in higher volumes:

- Re-design of device using ECAD software (e.g. Altium, Kicad)
- Enclosure design and fabrication
- Too complex, too time consuming
- How can we empower those who are less experienced?

# Jacdac Hardware Design

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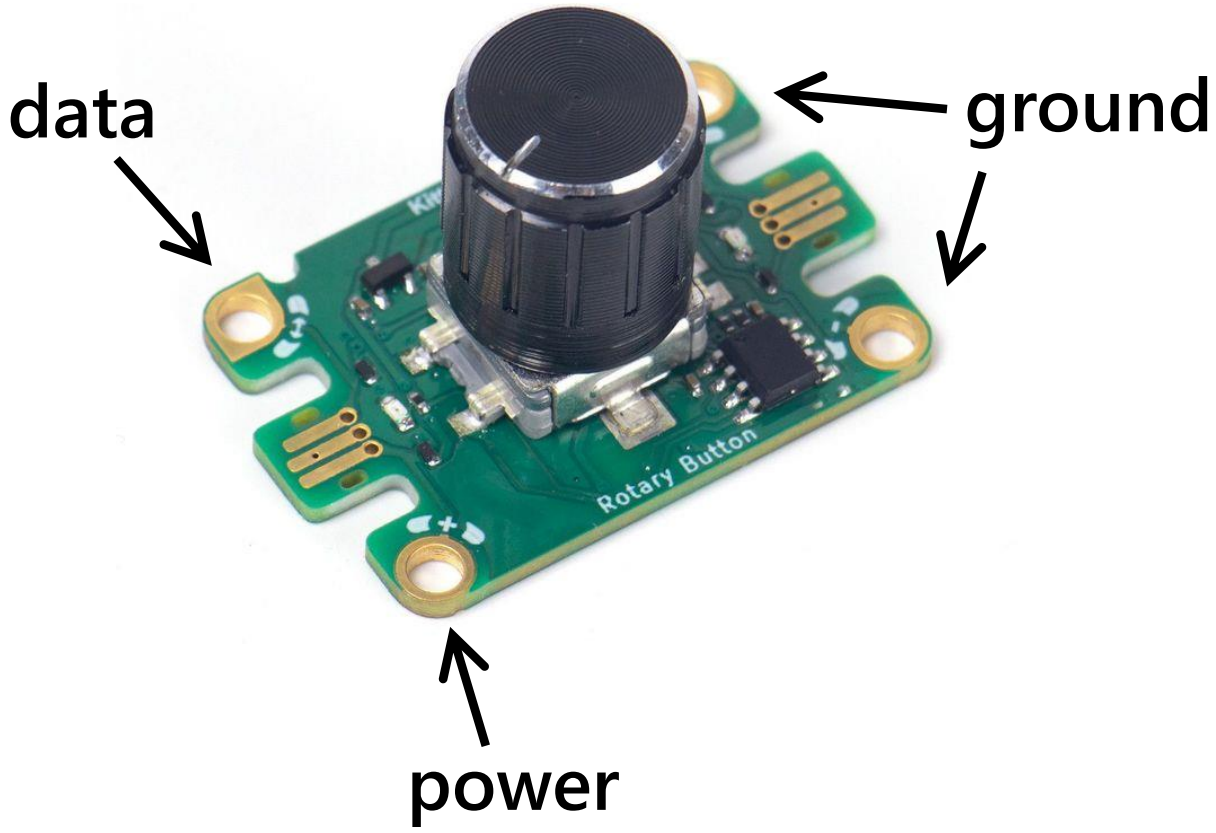
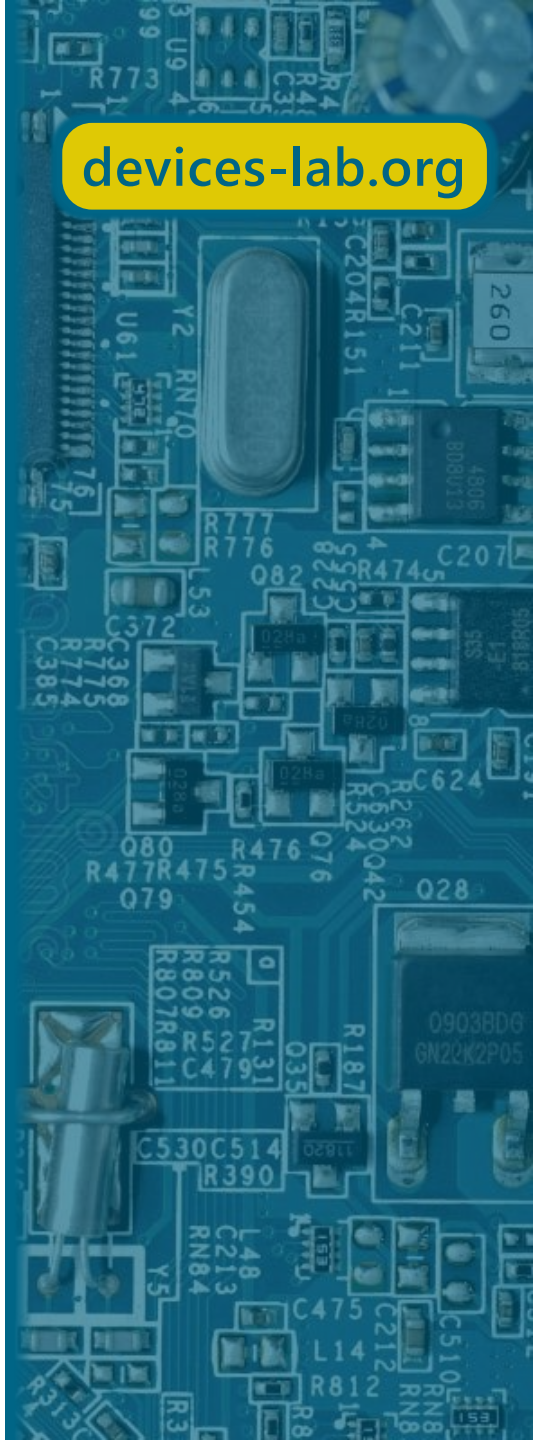


# MakeDevice



# MakeDevice

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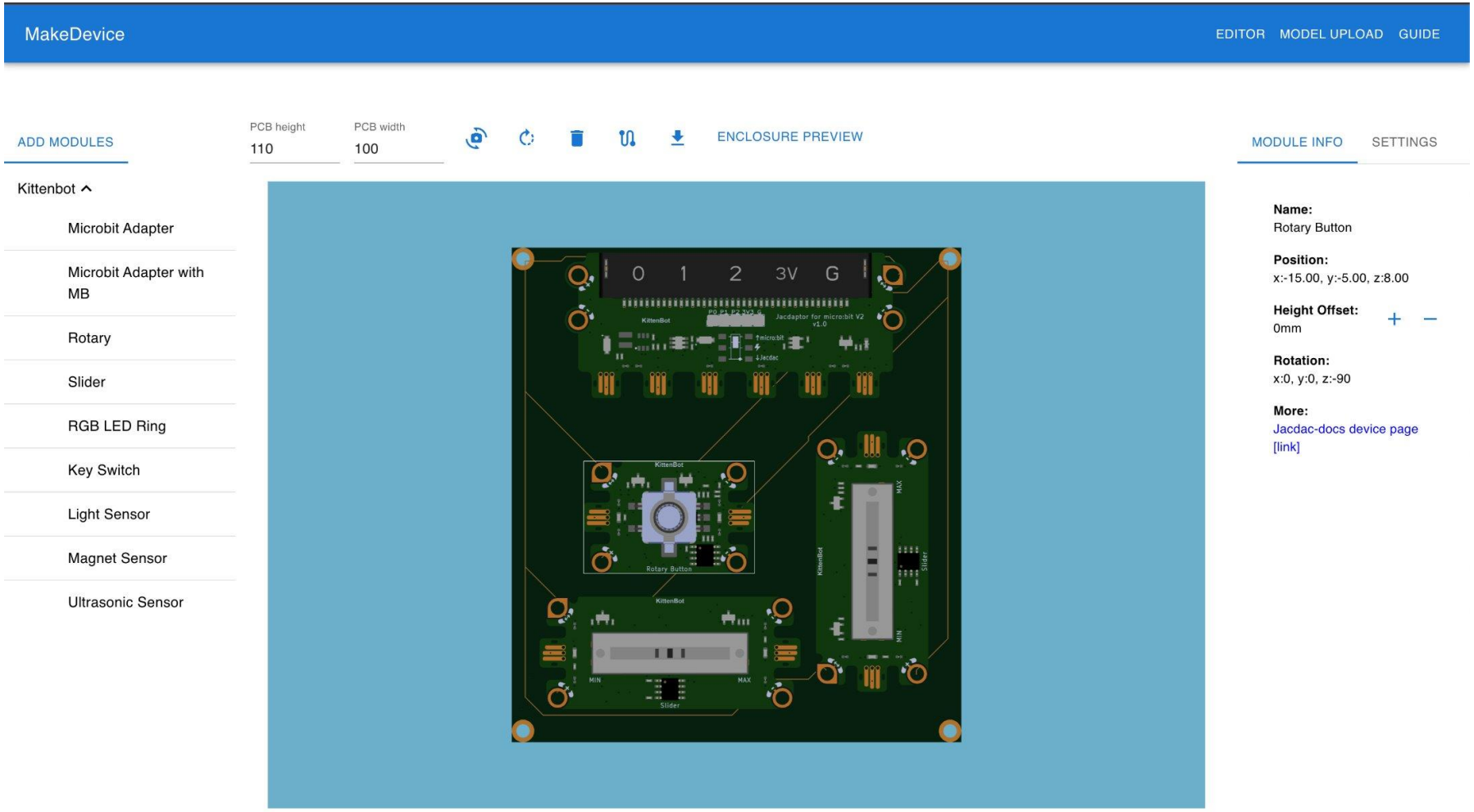

# Flattening

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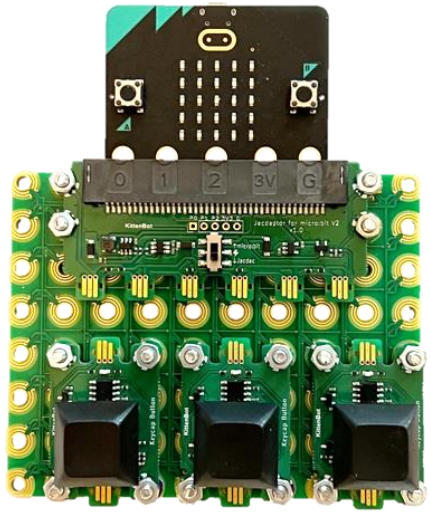
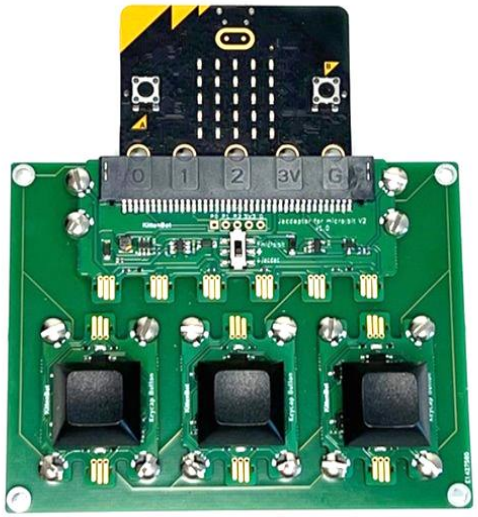
- **Incremental flattening** supports multiple designs of a device as it evolves from a prototype to product…





# Generating Enclosure Data

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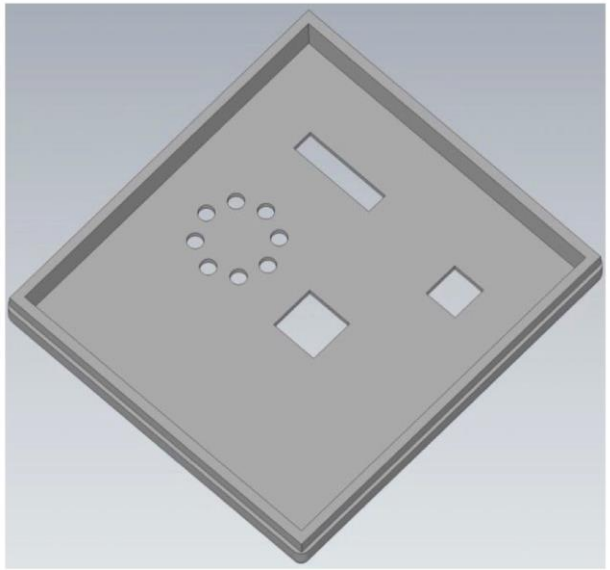

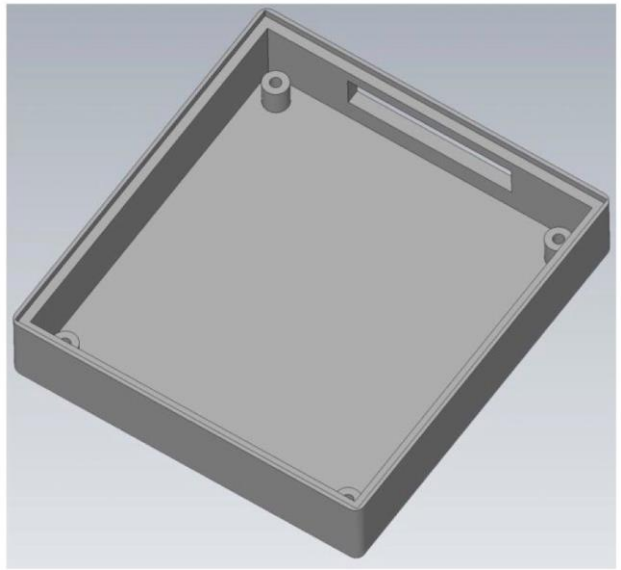

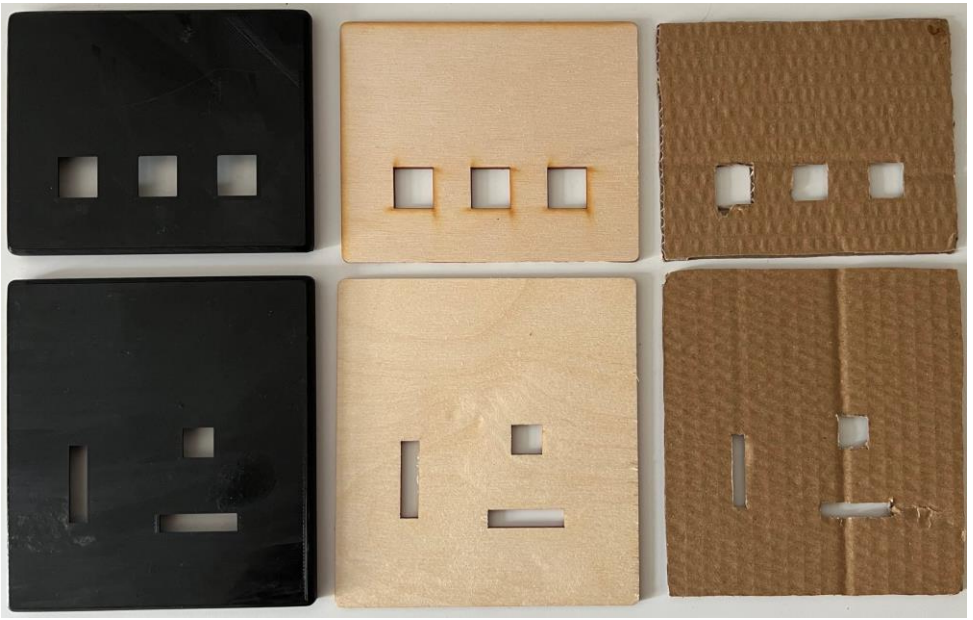

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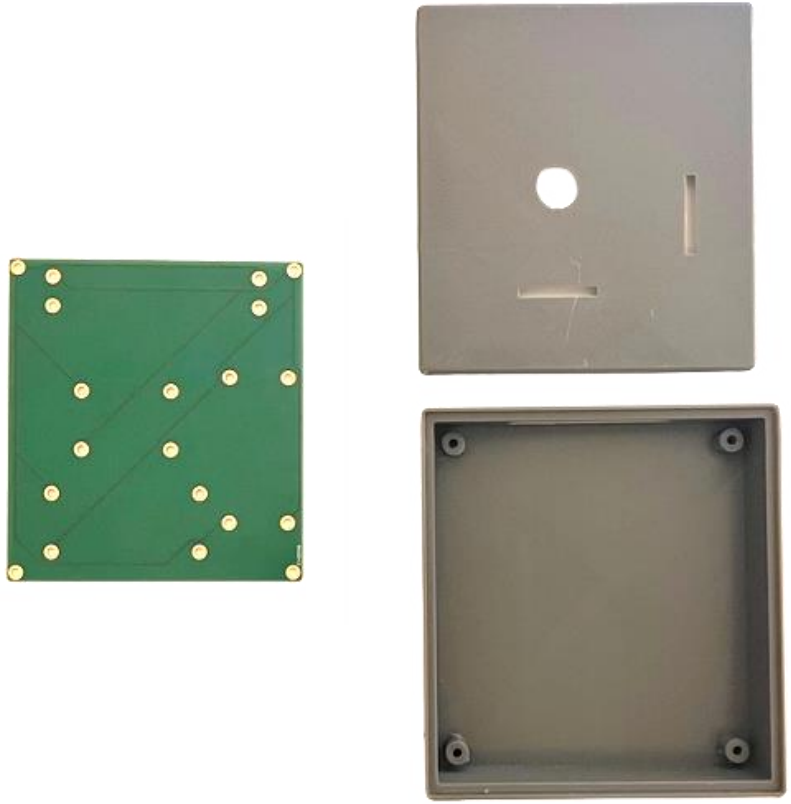

# Opportunities for MakeDevice

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- Education – D&T, undergraduate studies, developing projects
- Applications in Maker/Craft practices
- Deployment at scale, in-the-wild
- Further flattening of existing Jacdac modules and Jacdac designs

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Lancaster University, UK