Designing a Badge Add-on in KiCad

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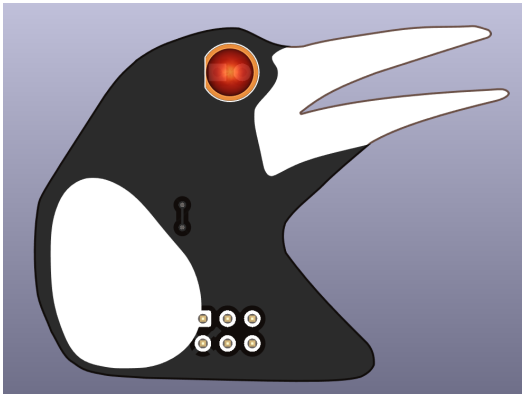
BSides Canberra 2023

Overview

- Install KiCad: kicad.org
- Open the workshop instructions: joshajohnson.com/bsidescbr23-workshop/
- Download the KiCad library linked in the workshop instructions
- Files also available on USB drives
- Use a mouse
- Ask and any all questions!



Presenters

Josh

- Electronics Engineer
- Day job: automotive, telecommunications, aerospace
- Arvo job: LEDs, keyboards, RF, FPGAs, workshops, FIRST Robotics
- Fun: Mountain biking, running

Peter

- Security Researcher
- Hardware and Firmware for bPod
- Repurposing old iPods, iMacs

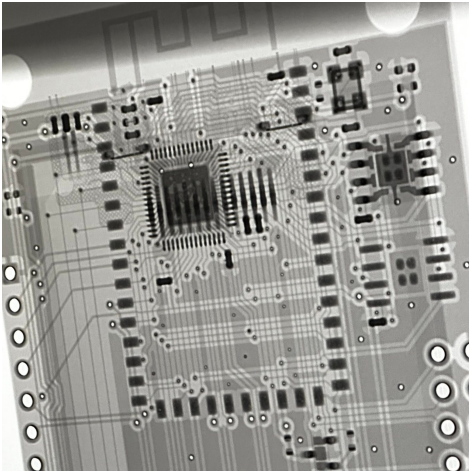


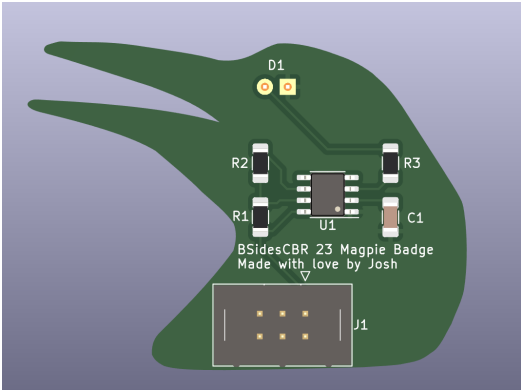
Image: Infosect

Schedule

- Introduction
- Schematic Capture
- PCB Layout
- Assembly

Each section consists of:

- One slide summary
- Demo of the required steps
- Time to do it yourself



Scope

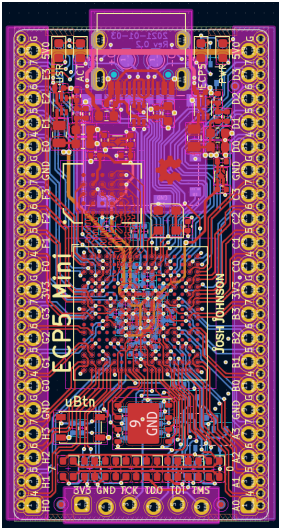
In scope

- Schematic capture in KiCad
- PCB layout in KiCad
- Exporting Gerbers from KiCad
- Prototype assembly

Out of scope

- Circuit design
- PCB design best practices
- Generating magpie artwork
- Using other CAD tools
- Mechanical / enclosure design

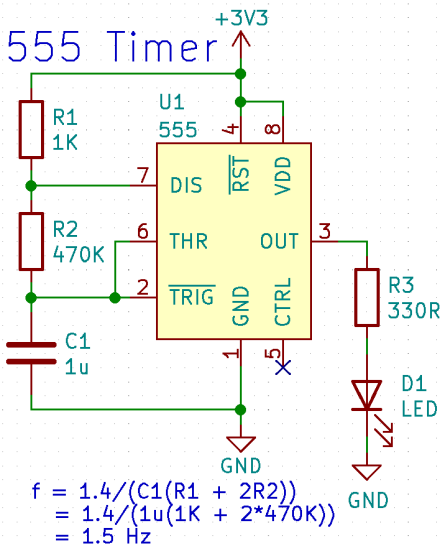
Happy to chat about anything after the workshop!



Schematic Capture

What: Abstract representation of circuit / components.
Why: Communicates purpose and documents design.
How:

- Symbol creation
- Symbol placement
- Connect everything with wires
- Add notes to your design
- Run electrical rules checks (ERC)
- Footprint association (may be done in symbol placement)
- Bill of Materials (BOM) generation



PCB Layers

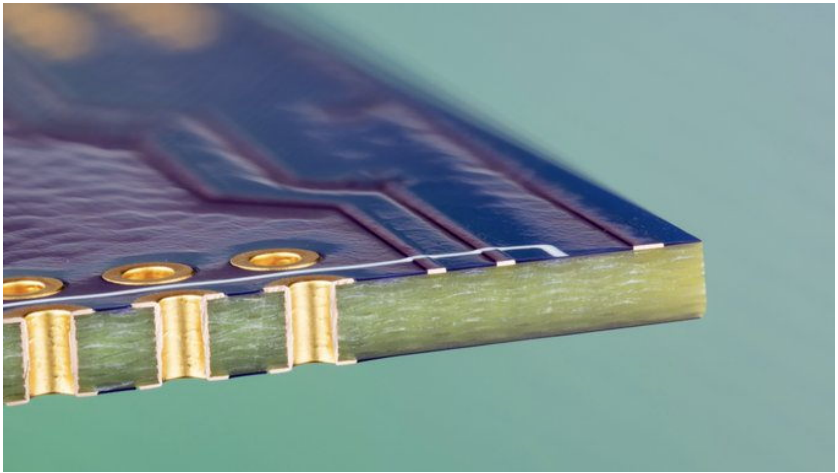
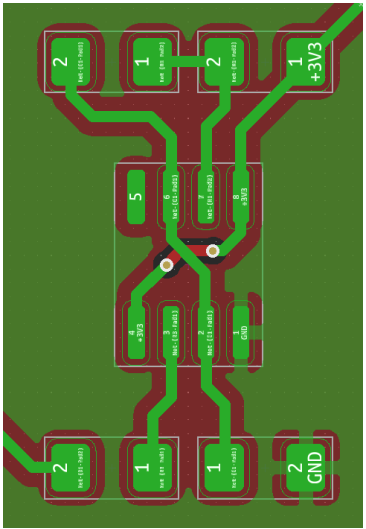


Image: EMSL

PCB Layout

What: Physical representation of circuit / components.
Why: Ensures electrical and mechanical function.
How:

- Configure design rules per manufacturer guidelines
- Draw board outline
- Place connectors and mounting holes
- Place electronic components
- Route critical nets, power, then everything else
- Run design rule checks (DRC)
- Add decorative features
- Review in 3D viewer / check mechanical fit
- Export Gerbers



Prototype Assembly

- Solder surface mount
- Solder through hole
- Inspect for defects
- Smoke test