Right first time in practice

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19-04-2023 – D&E event

Right first time - Goal

- The first prototype
  - Meets the specifications
  - Is in time
  - Is within budget
  - Can be produced in series within the proposed budget

Keep on dreaming…

Real life

- The specifications are not complete/clear when the planning and budget are made
- Specifications change during the development cycle
- Planning/deadlines are based on incorrect assumptions
- Interpretations of “When will it be finished?”
  - Management
  - Development engineer

Best practices (1)

- Get organized
  - Specifications
  - Planning
- Solve the issues before they become a problem

Typical scenario

- Engineer orders the prototype(s)
  - Initial deadline is already passed

Typical scenario

- Problems are detected by the manufacturer
  - Component issues
    - Component cannot be identified from the BOM data
    - Components are not available (with a short delivery term)
    - Component footprints do not match the board layout
    - Position information is not clear
    - Component rotation is not clear

Typical scenario

- Problems are detected by the manufacturer
  - PCB data is not complete
    - Outline is missing
    - Drill data is missing
    - Mixed formats, units
    - Multiple datasets

Typical scenario

- Problems are detected by the manufacturer
  - PCB data does not match the board specifications
    - Trackwidth
    - Isolation
    - Annular ring
    - …

Typical scenario

- Problems are detected by the manufacturer
  - The design cannot be produced
    - Thick copper with fine tracks
    - Plating issues
    - Unsupported Blind/Buried via definitions
    - …

Typical scenario

- Result
  - Best case
    - Communication between designer and manufacturer
    - Ping-pong
    - Delivery date shifts while the communication goes on
  - Worst case
    - Back to the drawing table
    - Prototype order cancelled

Typical scenario

- Why do you ask so many questions?
  - Some manufacturers “solve” problems without asking questions or notification
  - Working prototype supplied
  - The issues are not solved in the design data
    - They will turn up again in the next production run

Is there a better scenario?

Best practices (2)

- Early involvement
  - At the start of the design
  - Communicate with your manufacturer
  - Use the available tools to check your design decisions
- Virtual production
  - During the design
  - Submit your data for verification before ordering

Best practices (2) – Early involvement

- Component selection
  - Use the available web sites to check
    - Component specifications
    - Availability
    - Price
    - Use reliable component libraries
  - Do not use denser technology than needed
    - Available board surface
    - Higher price
    - More difficult to produce/repair

Best practices (2) – Early involvement

- Determine technical board specifications
  - Avoid conflicting specifications
  - Select a proven buildup
  - Define blind/buried vias
  - Check price implications
  - Know your CAD system

Best practices (2) – Virtual production

- Virtual PCB production
  - Upload board data as soon as a version is available
  - Check if correctly read in
  - Check for conflicts

Best practices (2) – Virtual production

- Virtual assembly production
  - Upload board and assembly data as soon as a version is available
  - Component matching
  - Availability/pricing
  - Footprint matching
  - Manufacturing checks

Best practices (2)

- Pre-order components
  - Make sure the components are available for assembly in time

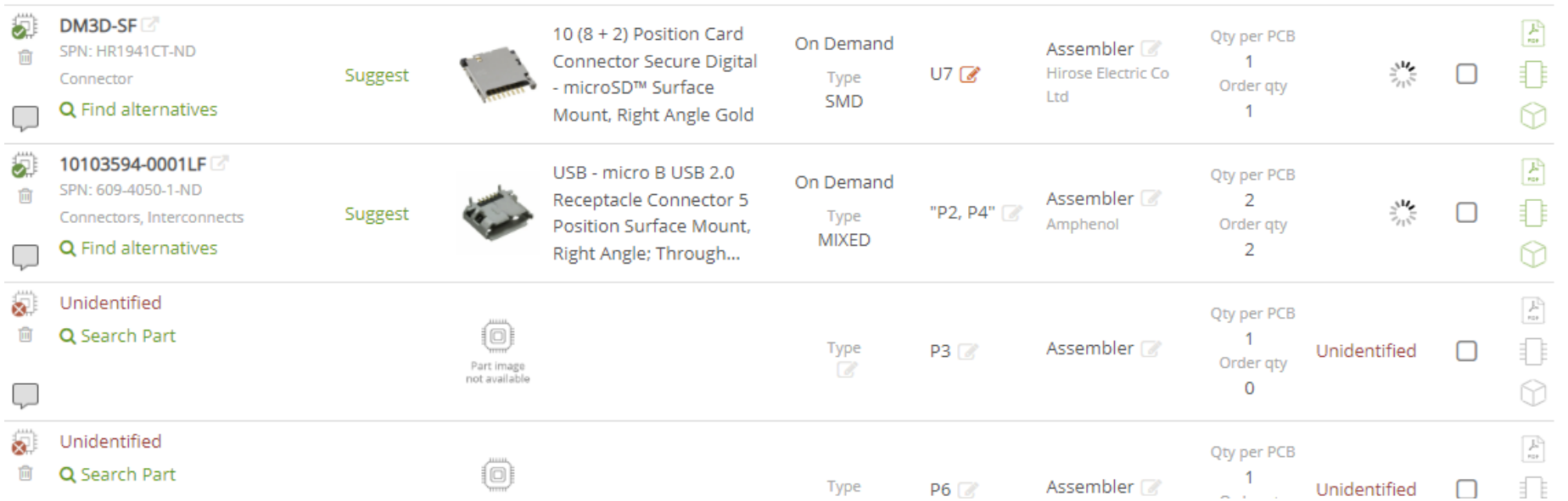
Nice theory, but how does it work in practice?

Practice – Component selection

- Before layout design
- Upload BOM file

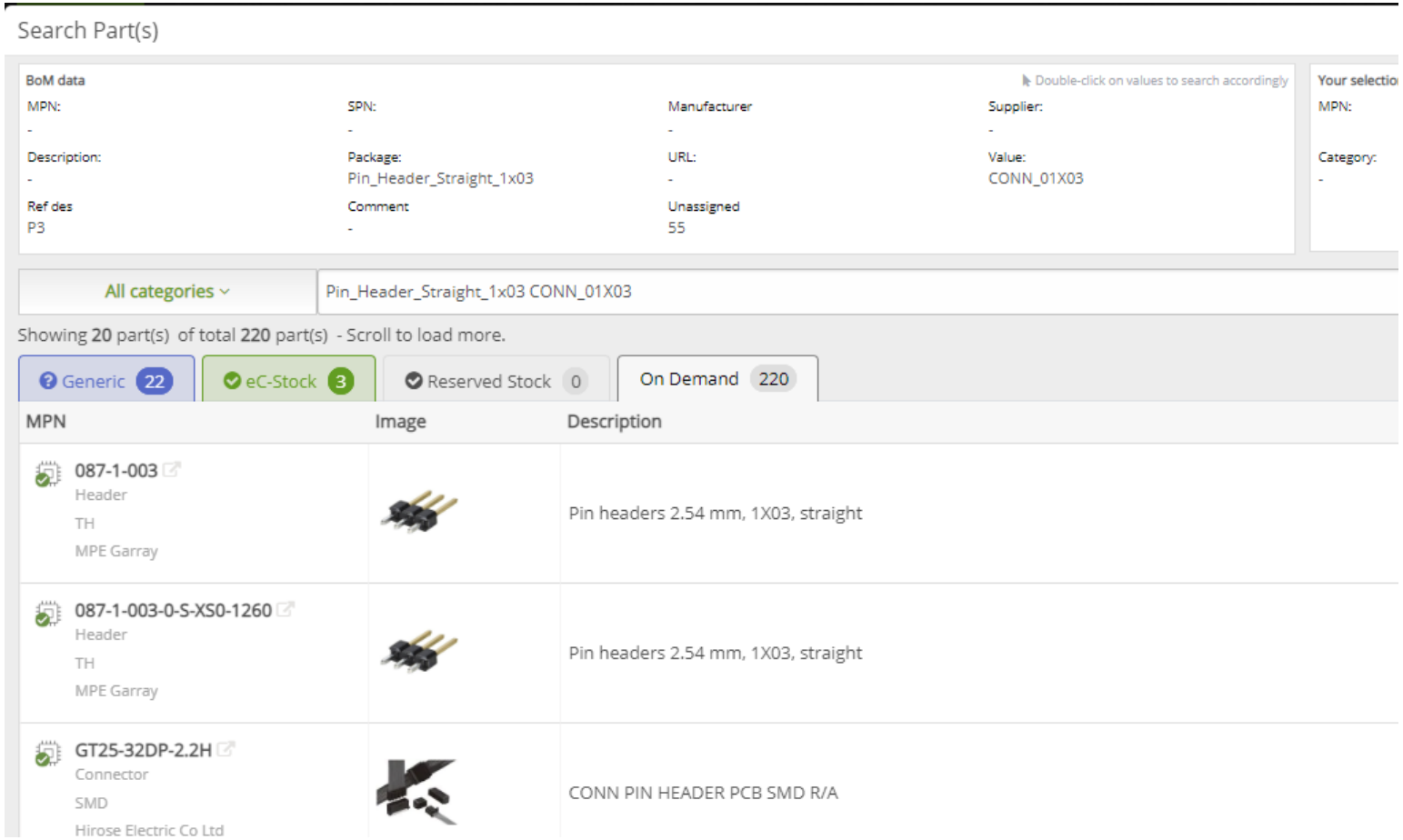
Practice – Component selection

- Check component identification



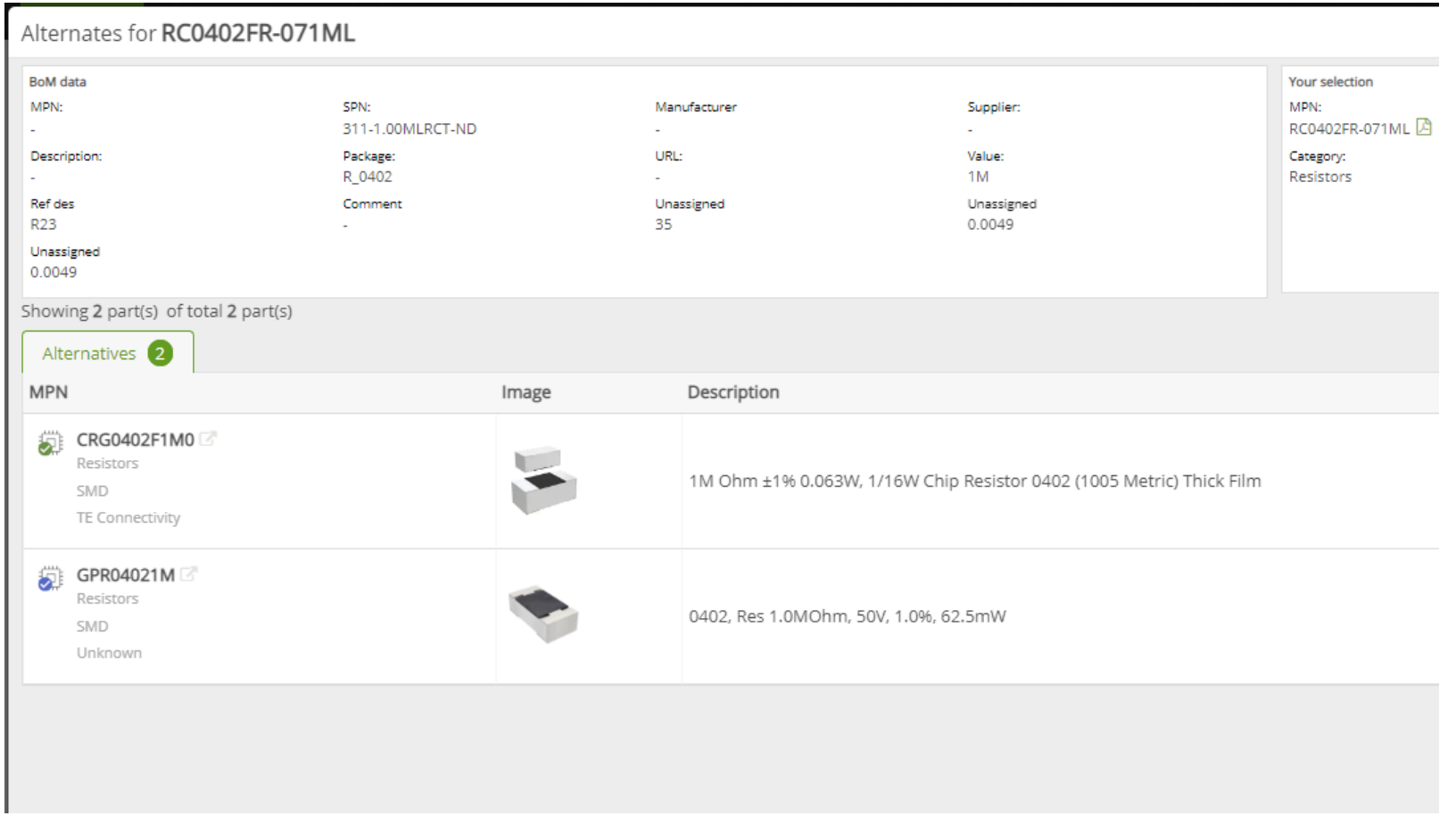
Practice – Component selection

- Find alternatives



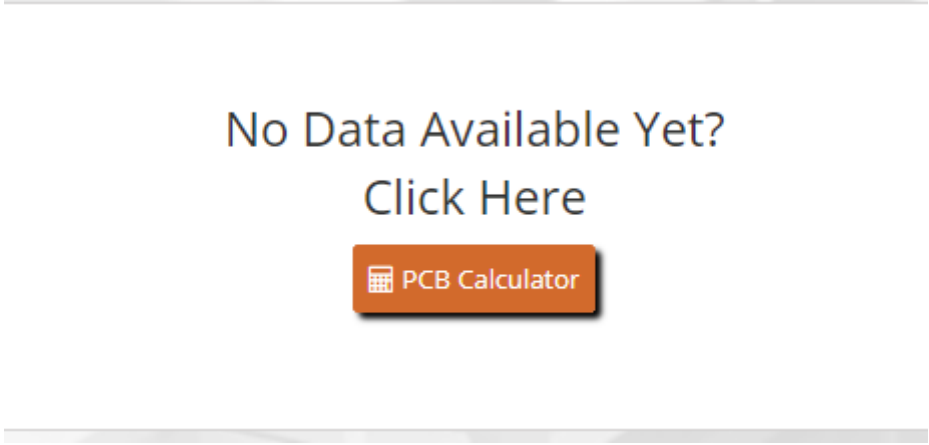
Practice – Component selection

- Find alternatives



Practice – PCB specifications

- Before layout design
- Check specifications without board data required



Practice – PCB specifications

- Immediate price + alternatives

PCB proto service

PCB quantity	1 PCB(s)
Lead time	Default (3 Working Days)
Board surface / Order surface	0.80 dm² / 0.80 dm²
Est. shipment date	20-04-2023

Prices	Net
Single PCB	€ 52.67
Total boards	€ 52.67
VAT	€ 11.06
Total Gross	**€ 63.73**

Alternatives — Expand

Working Days	PCB quantity 1	2	5
2 WD	Net € 130.55 / € 130.55	Net € 88.59 / € 177.18	Net € 48.46 / € 242.30
3 WD	Net € 52.67 / € 52.67	Net € 38.77 / € 77.54	Net € 20.63 / € 103.15

EURO CIRCUITS

D&E EVENT

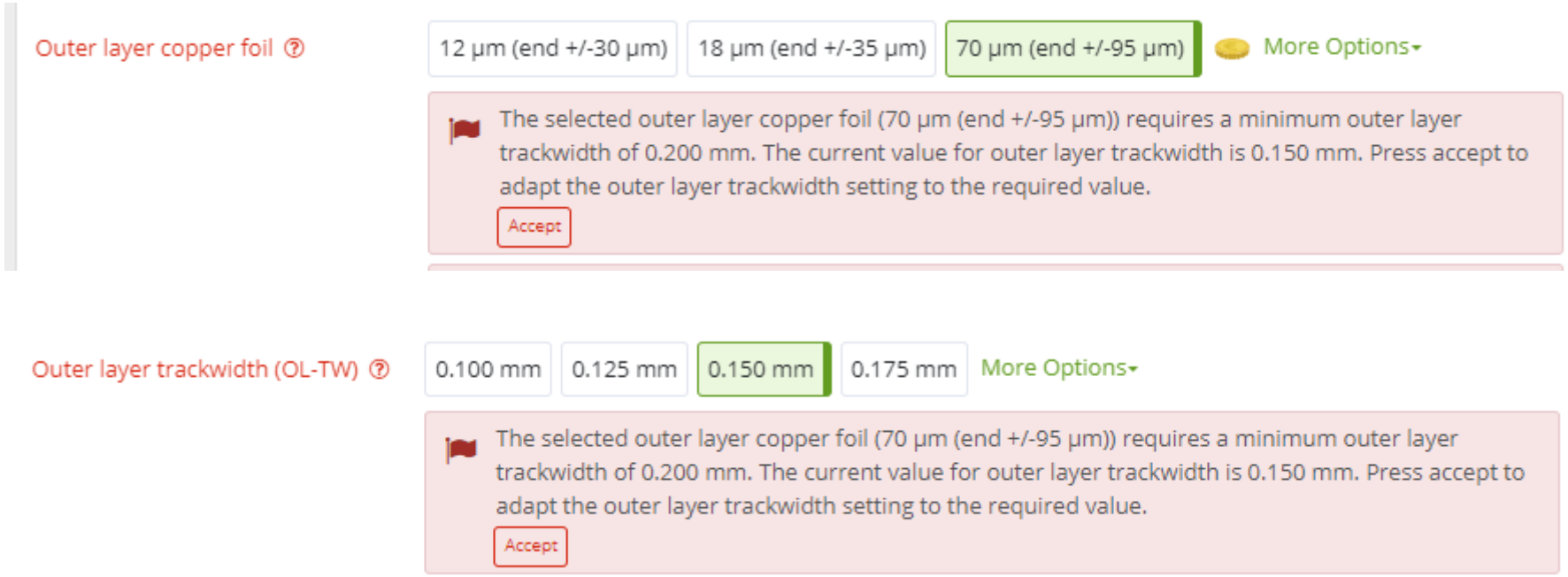
Het ontwerpen van innovatieve elektronica

Woensdag 19 april 2023

1931 Congrescentrum 's-Hertogenbosch

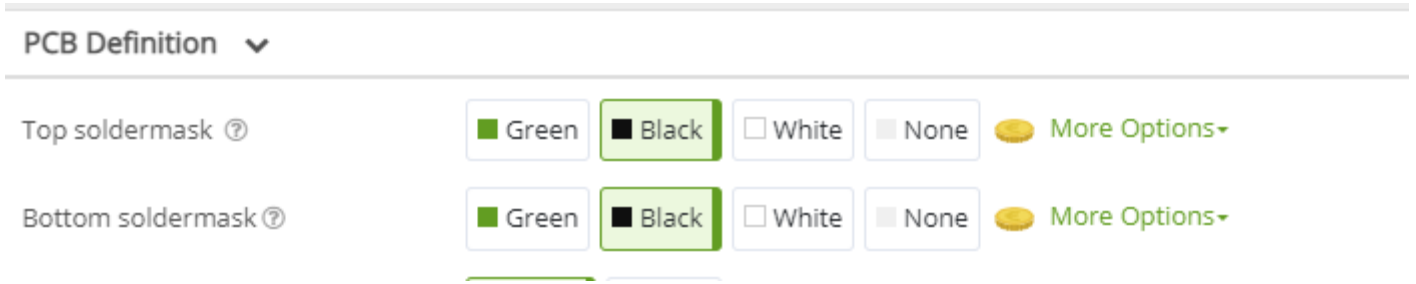
Practice – PCB specifications

- Conflict reporting



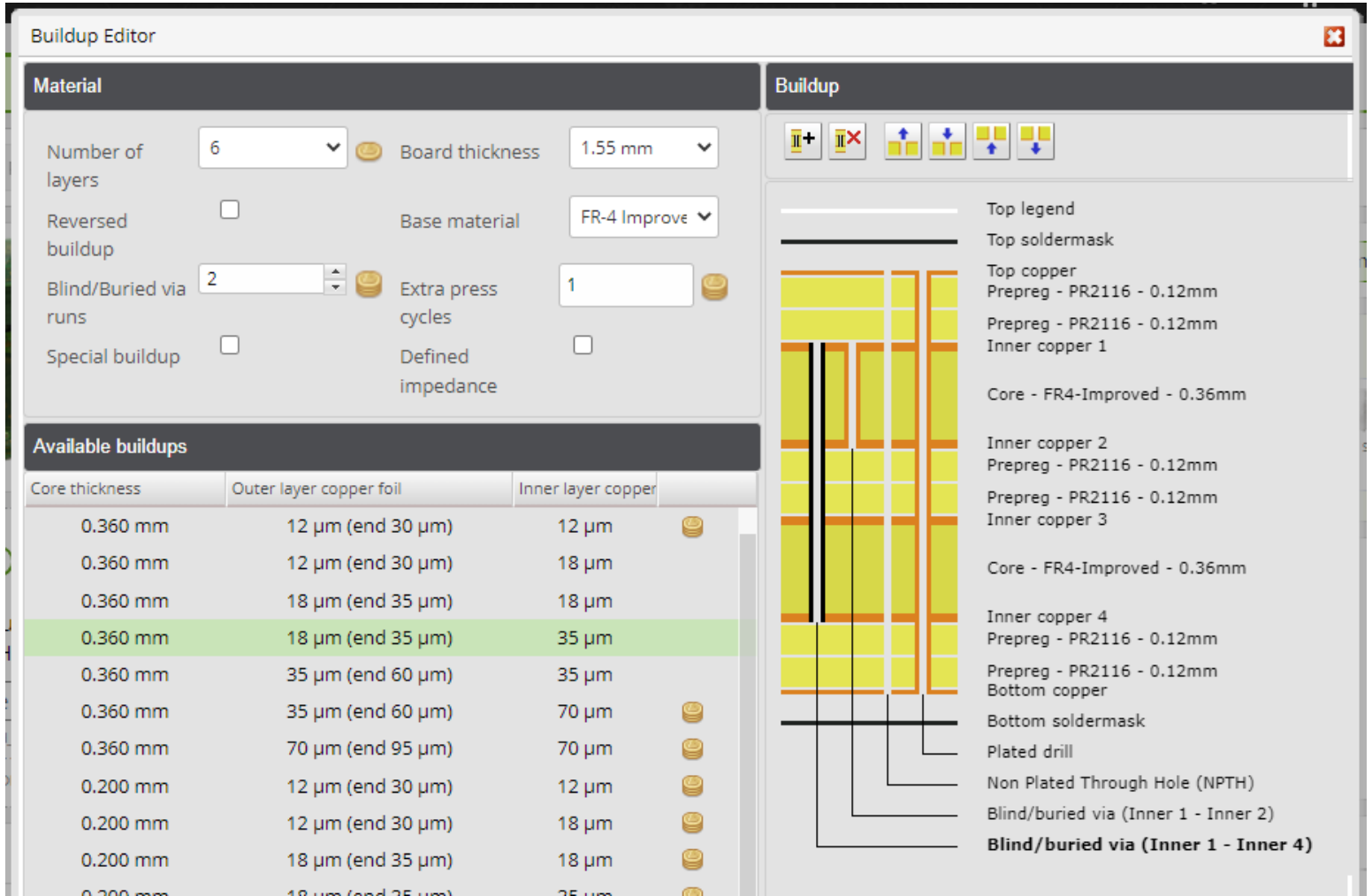
Practice – PCB specifications

- Price increasing options



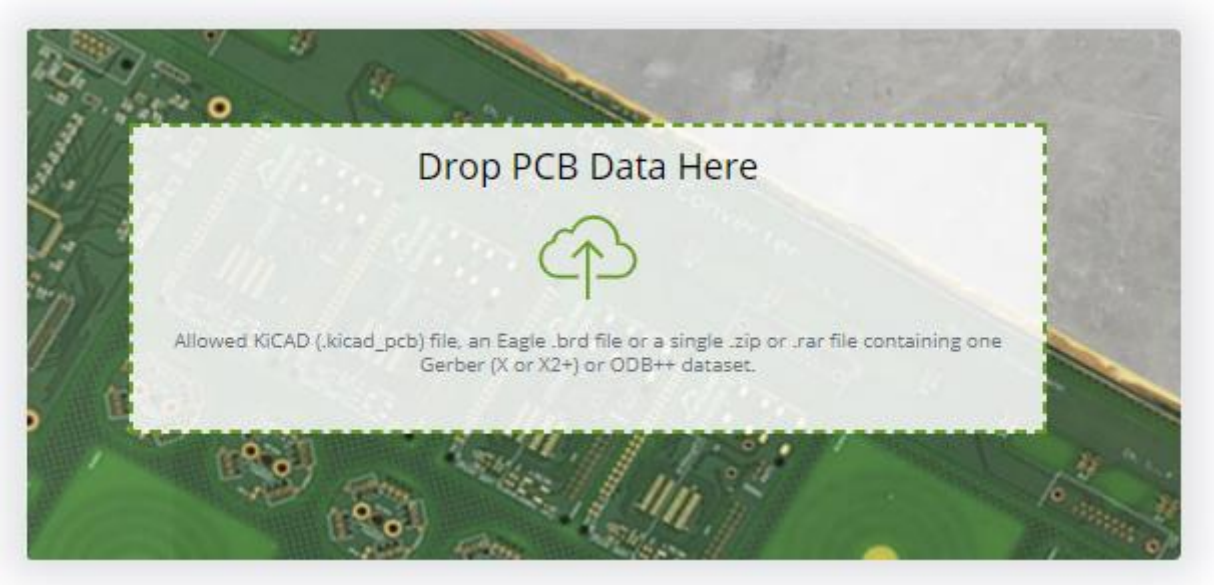
Practice – PCB specifications

- Buildup and Blind/Buried via selection



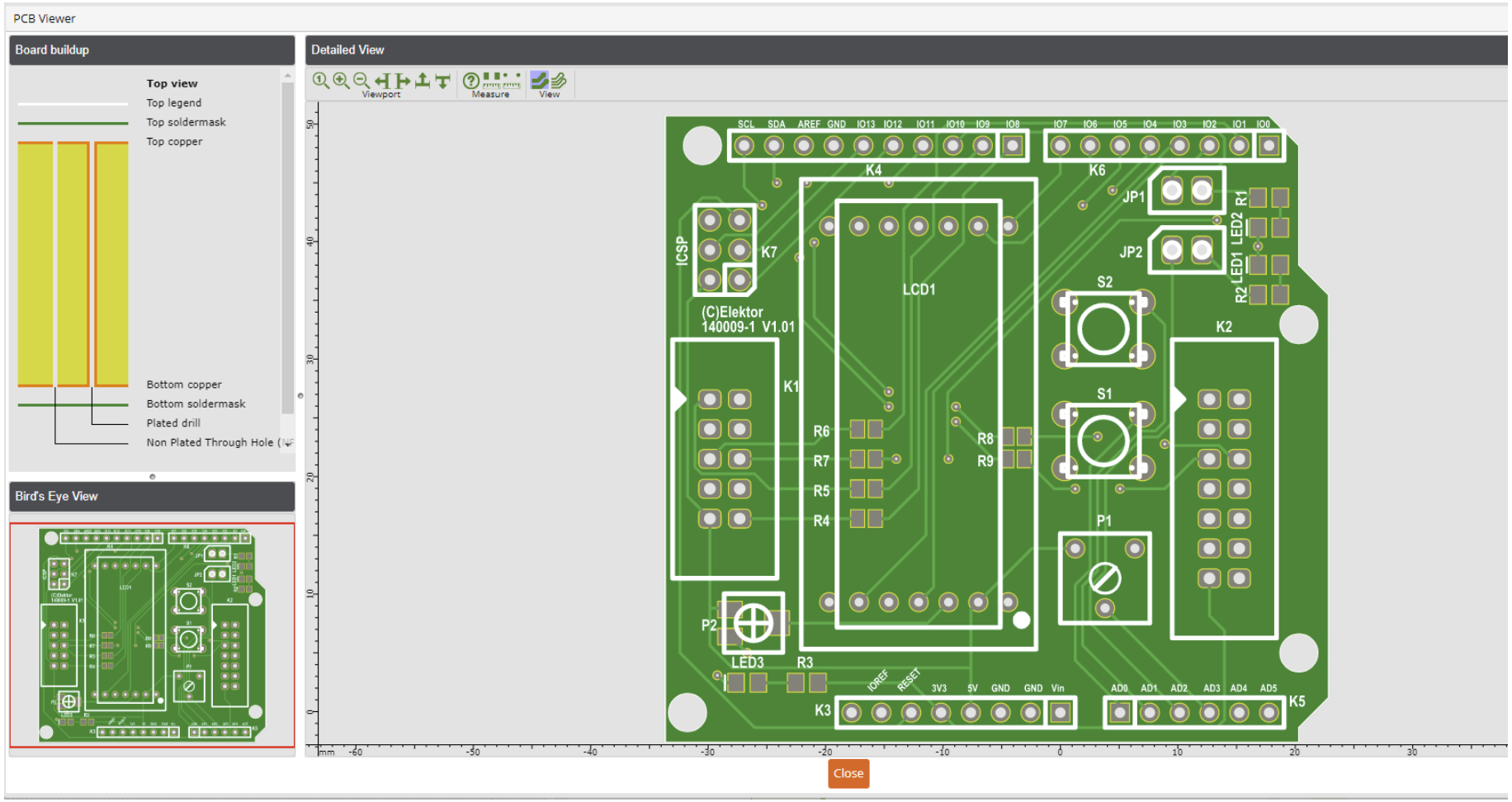
Practice – Virtual PCB production

- Can be done with intermediate versions of the board design
- Upload board data



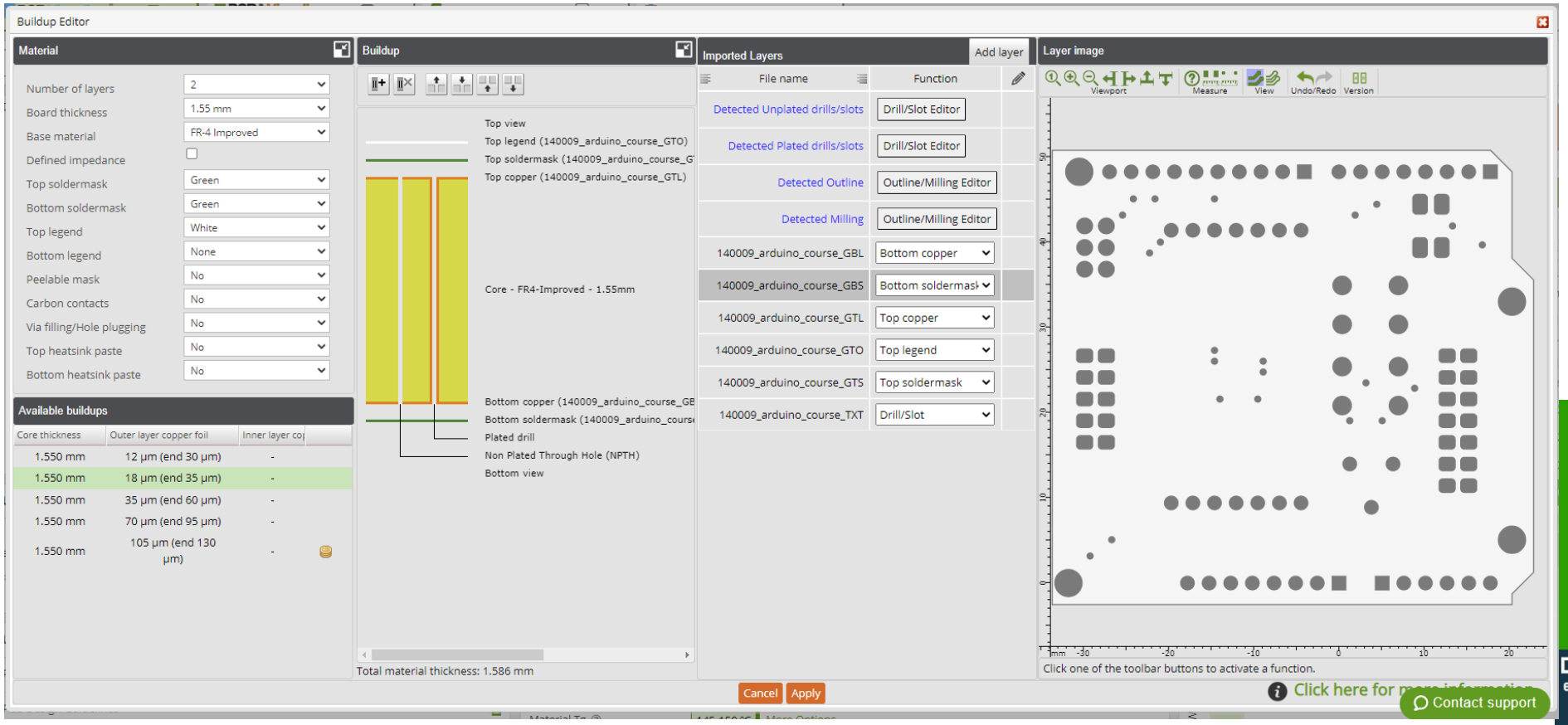
Practice – Virtual PCB production

- PCB Viewer - Check PCB images



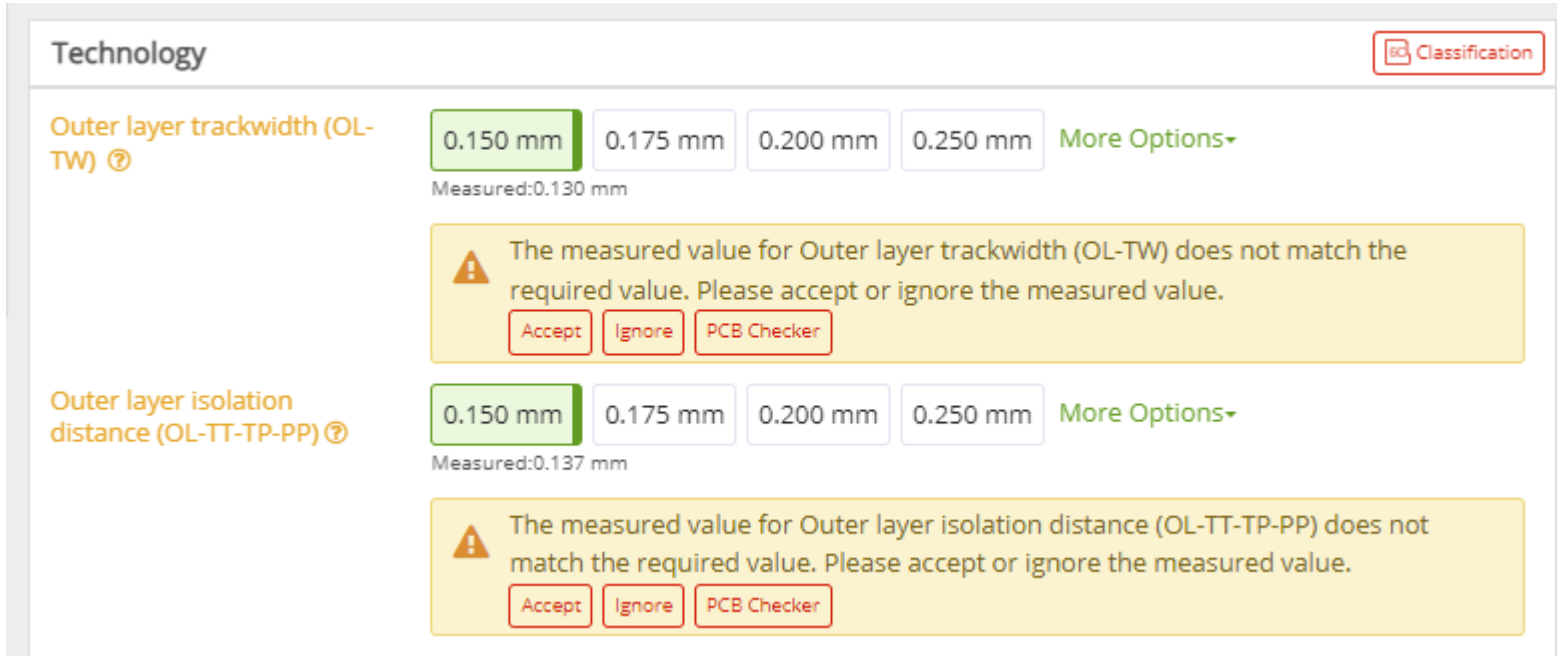
Practice – Virtual PCB production

- Buildup Editor – Check/correct import + layer assignment



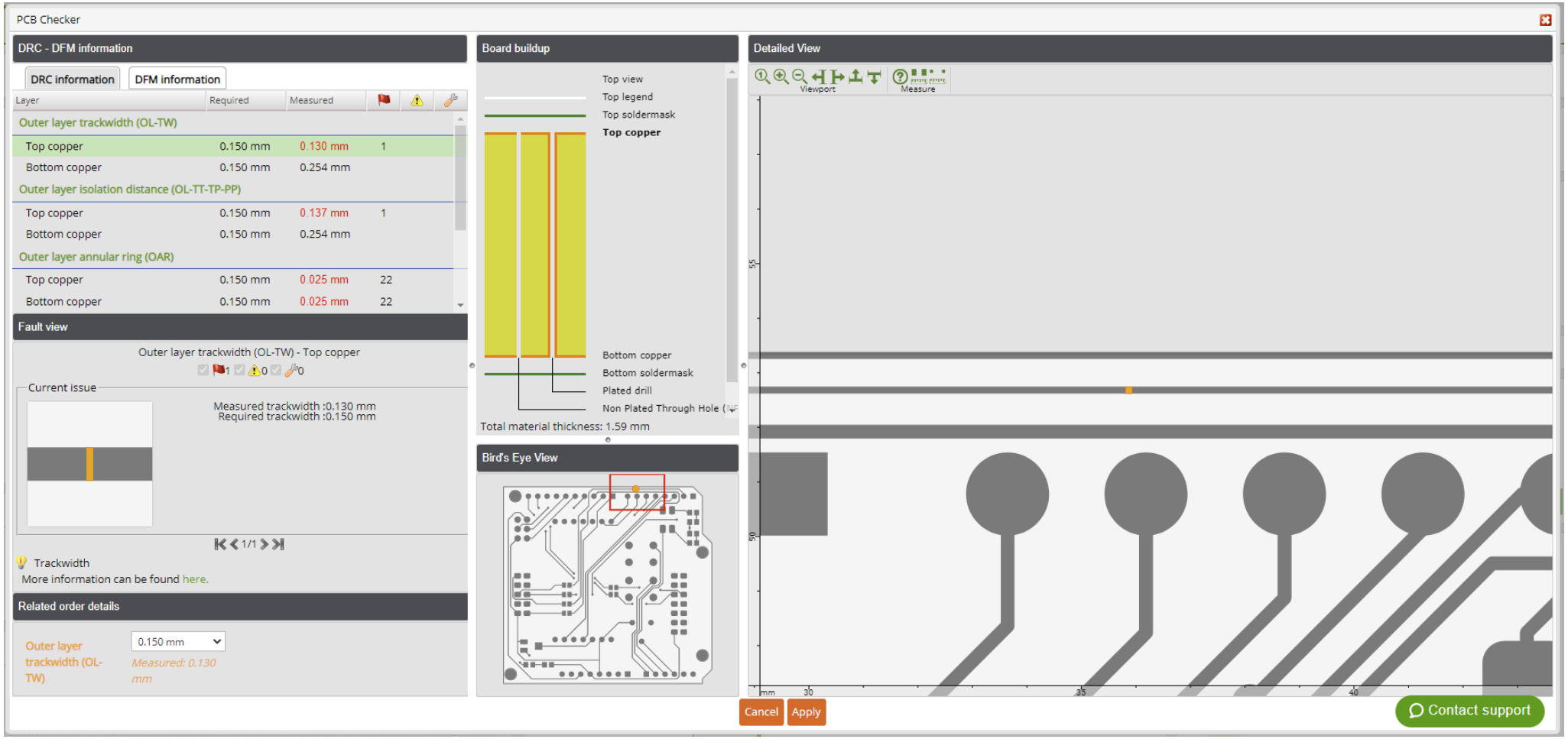
Practice – Virtual PCB production

- Compare measured values against target values



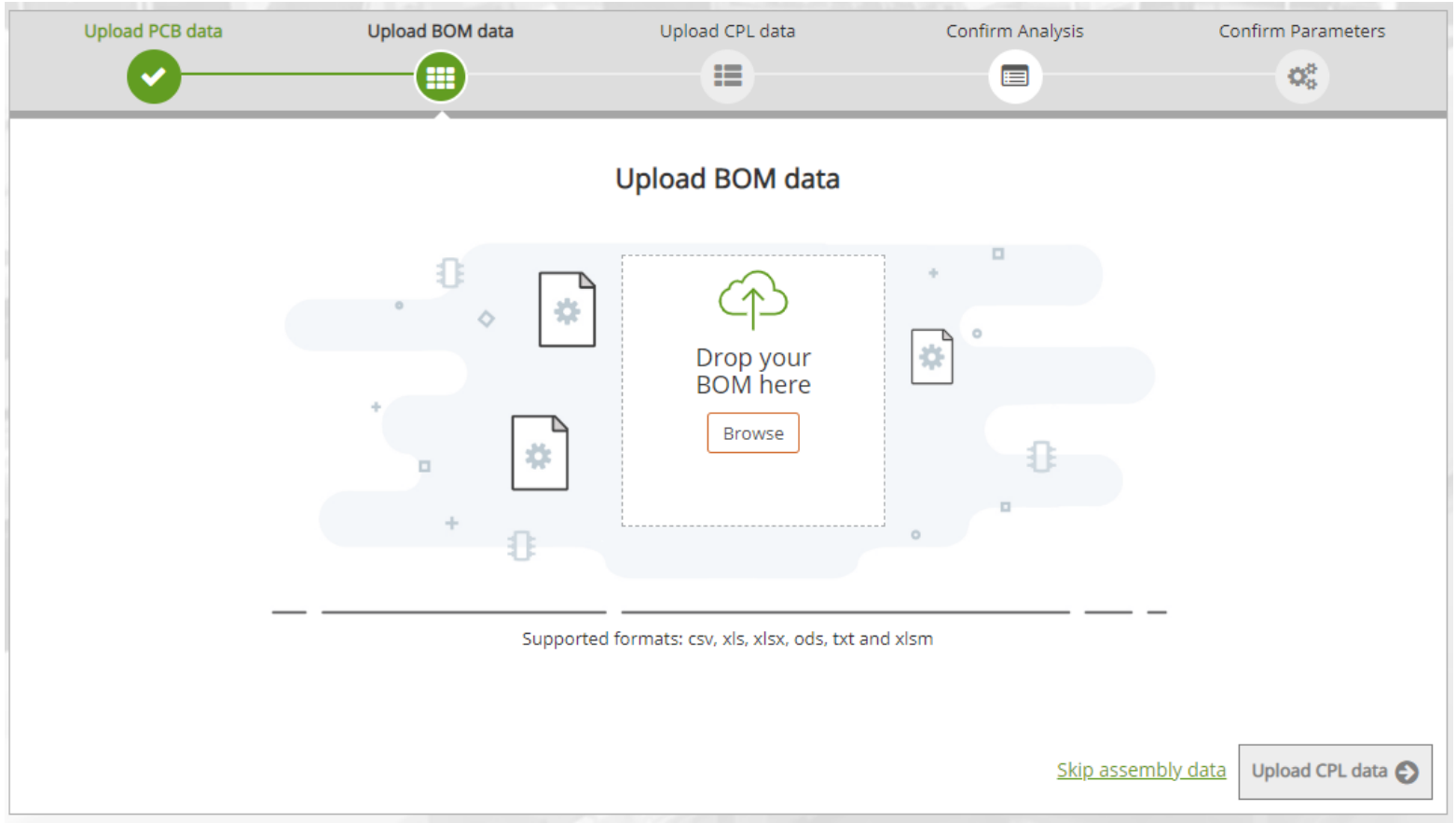
Practice – Virtual PCB production

- PCB Checker – Find DRC violations



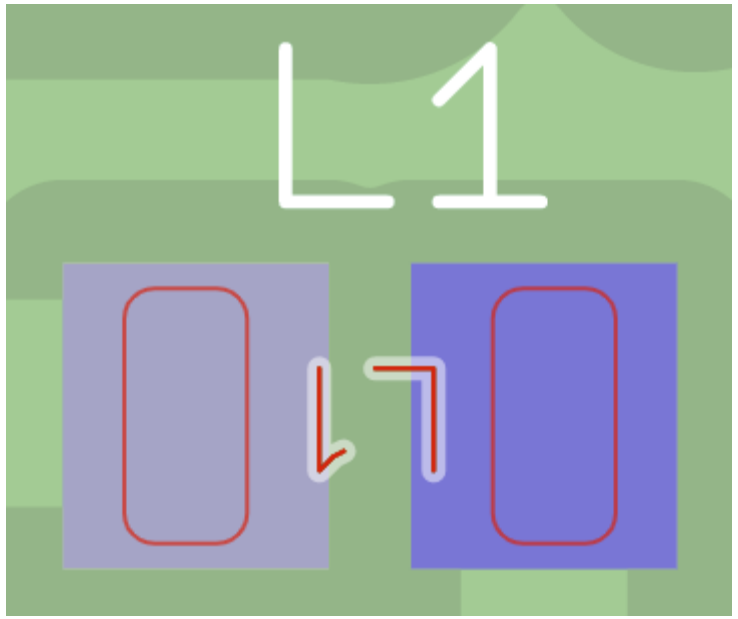
Practice – Virtual Assembly

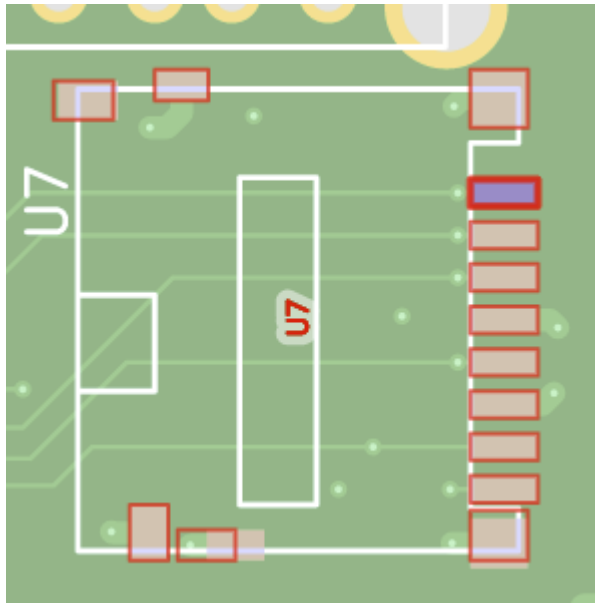
- Can be done with intermediate versions of the board design
- Upload board and assembly data



Practice – Virtual Assembly

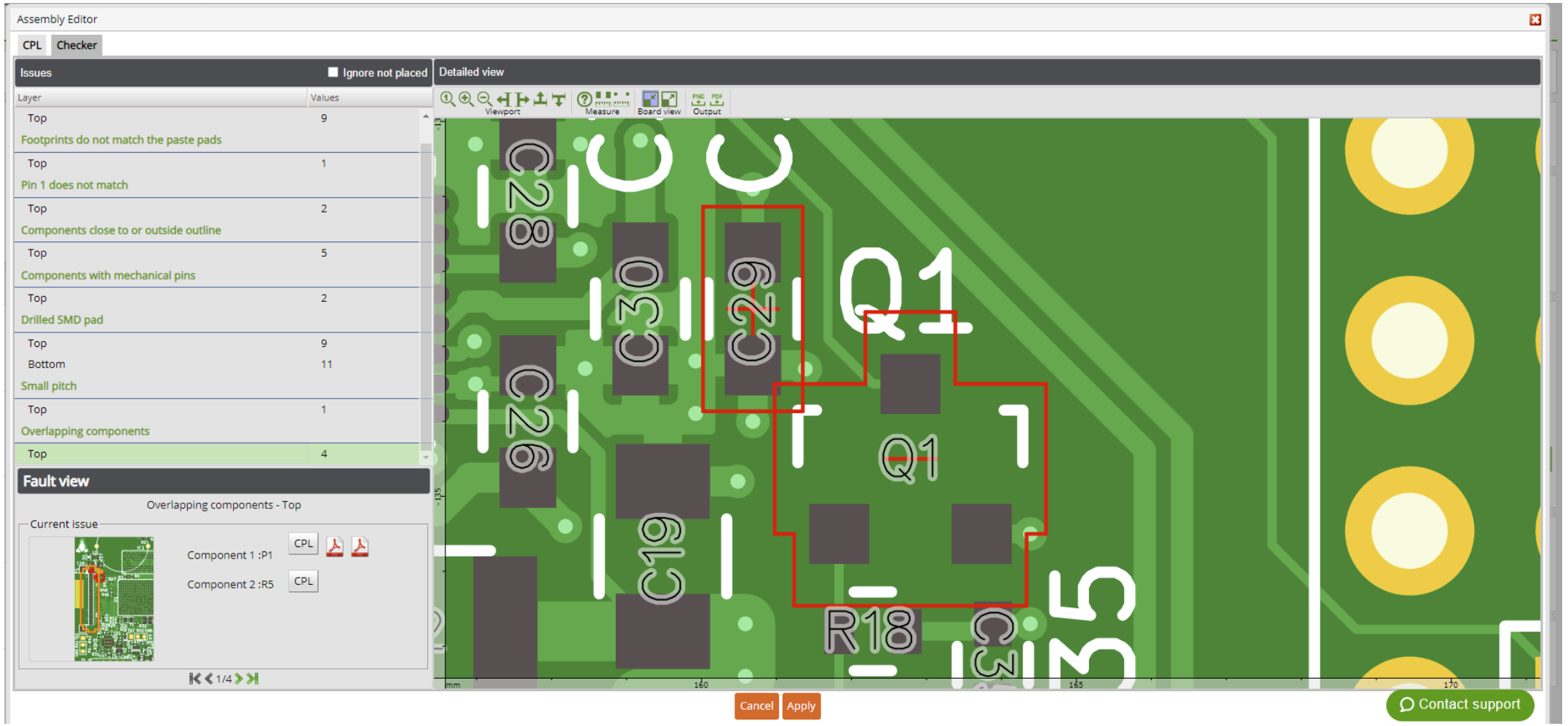
- CPL Editor – Check component footprints





Practice – Virtual Assembly

- CPL Editor – Check manufacturing issues



Right first time is maybe more than just a dream

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