

From proto to product launch: a manufacturer's perspective on critical succes factors

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Assemblics – Harelbeke (BE)

- Full suite of manufacturing services (EMS)
- No design services but we are a partner for co-engineering

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Successful launch

- Plan for the right lifecycle stage
- Great design includes manufacturability
- Manage your BOM or pay more than you need

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#1 Plan for the right lifecycle stage

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Plan for the right lifecycle stage

- Proto: be as close to the desired end result, keeping in mind:
 - Price
 - Quality
 - Time

First proto for functionality

→ from then on, keep industrialization in mind

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Plan for the right lifecycle stage

- Pre-series / clinical trial
- Series
 - Scaling up mostly yields incremental changes
 - Not managing revisions = mistakes in every step

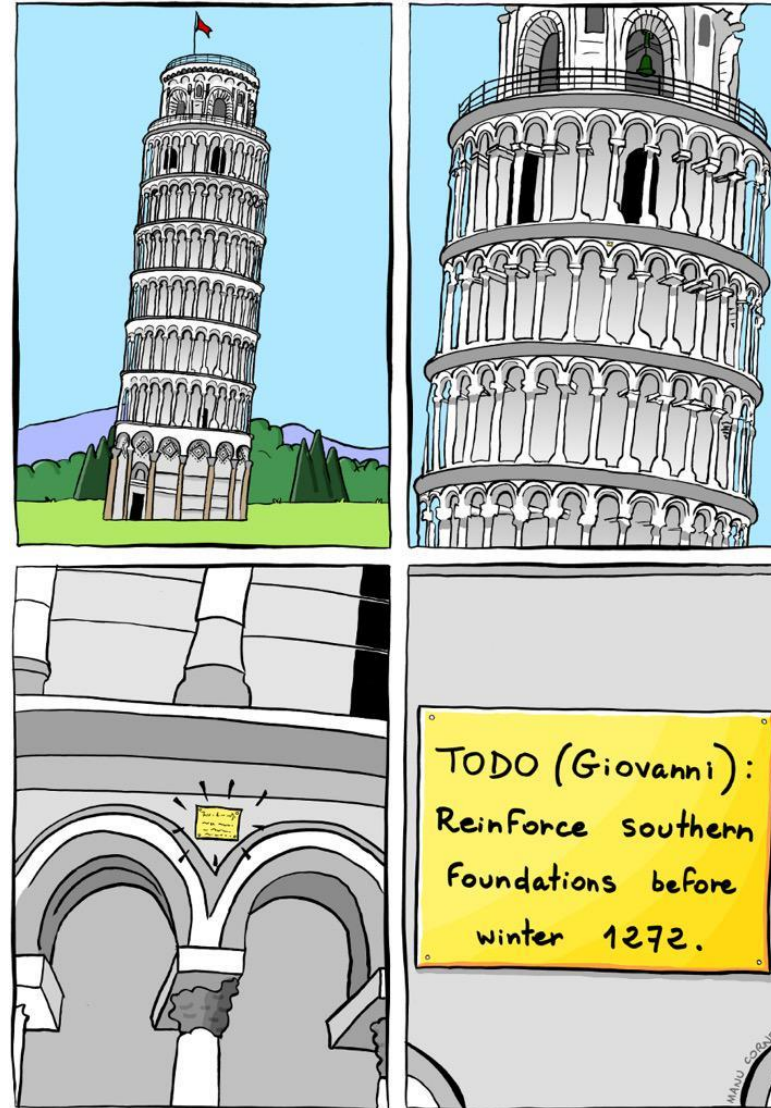
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“We can fix it later” is the most dangerous quote in any project



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#2 Great design includes manufacturability

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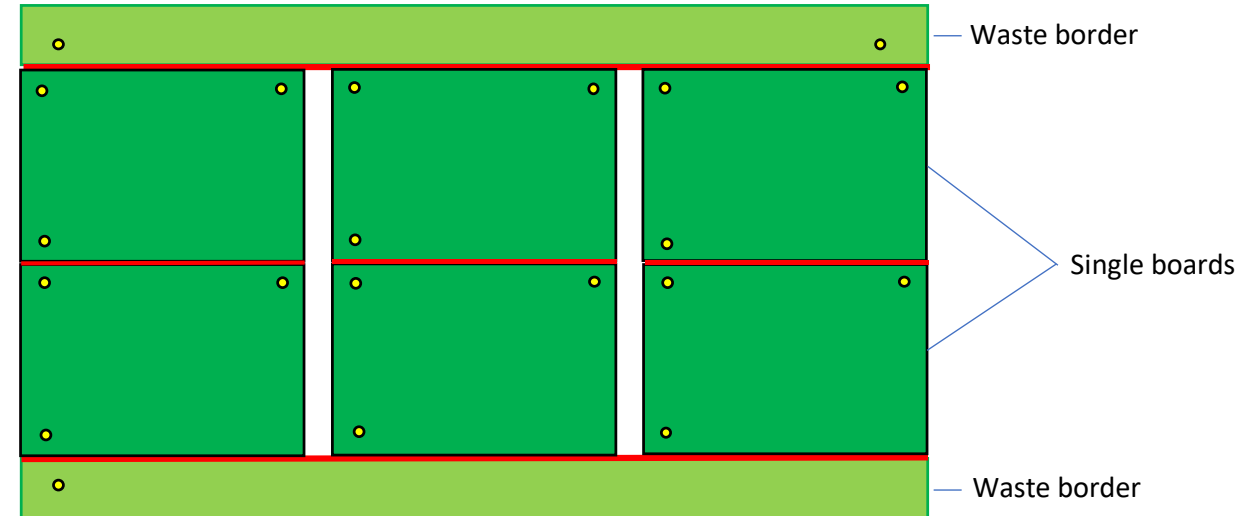


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Fiducials

- Min 3 pcs on the waste edges of a board panel
- Min 3 pcs on each single board
- Fiducial marks are not necessary on components



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Test points

- Small effort, big **impact**
- Specific components
- Bare pad or via
 - Size & pitch
 - On every net



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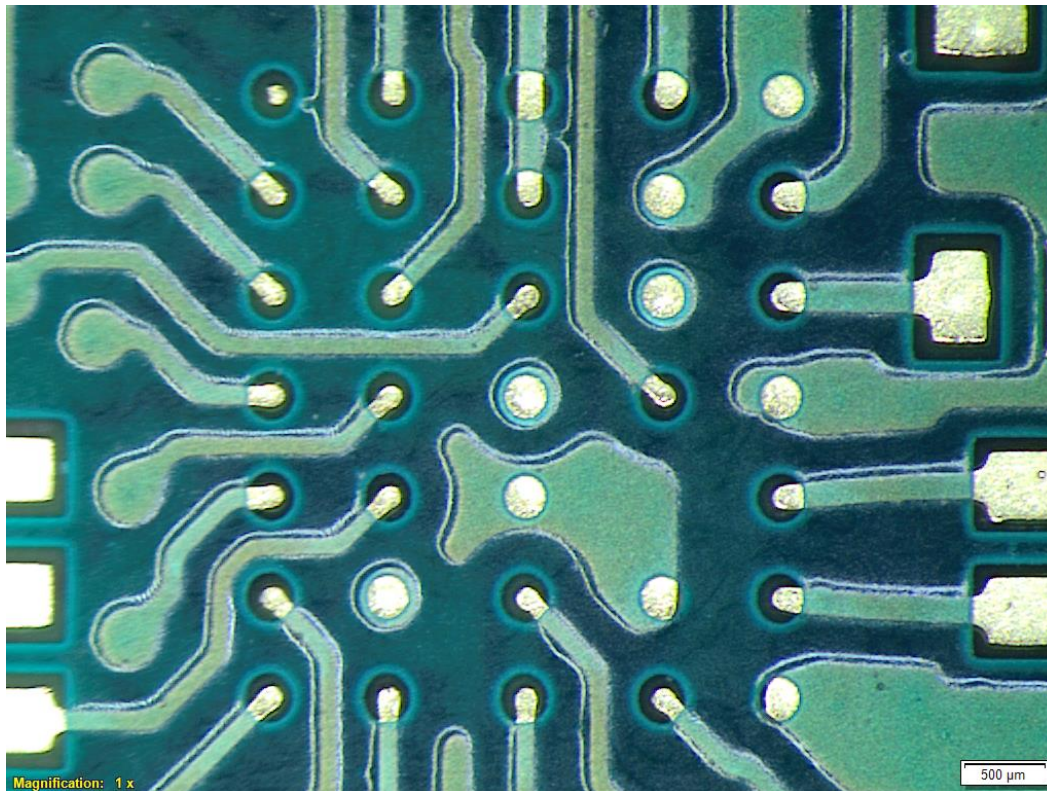


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Design mistakes

- Inconsistent pad size for BGA / flip chip



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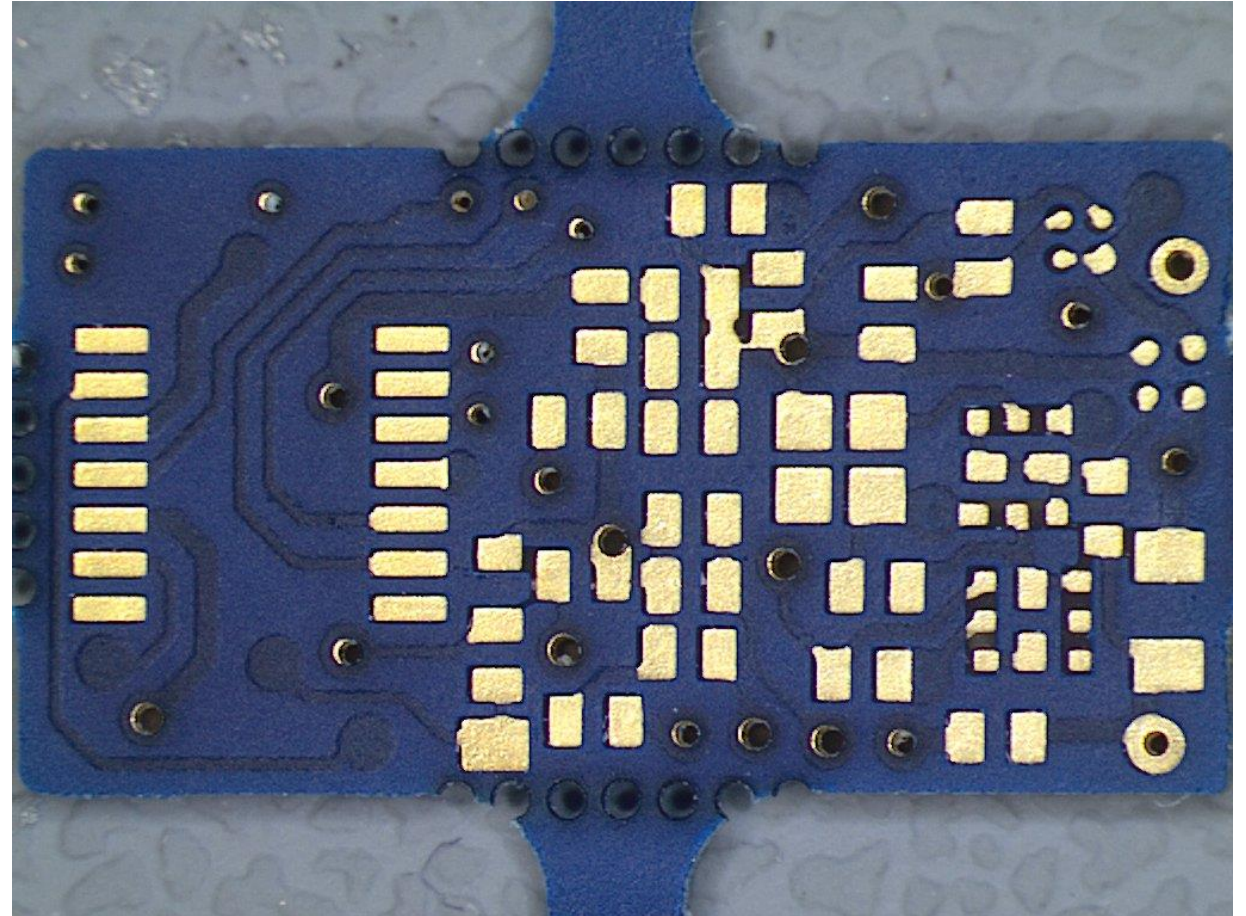


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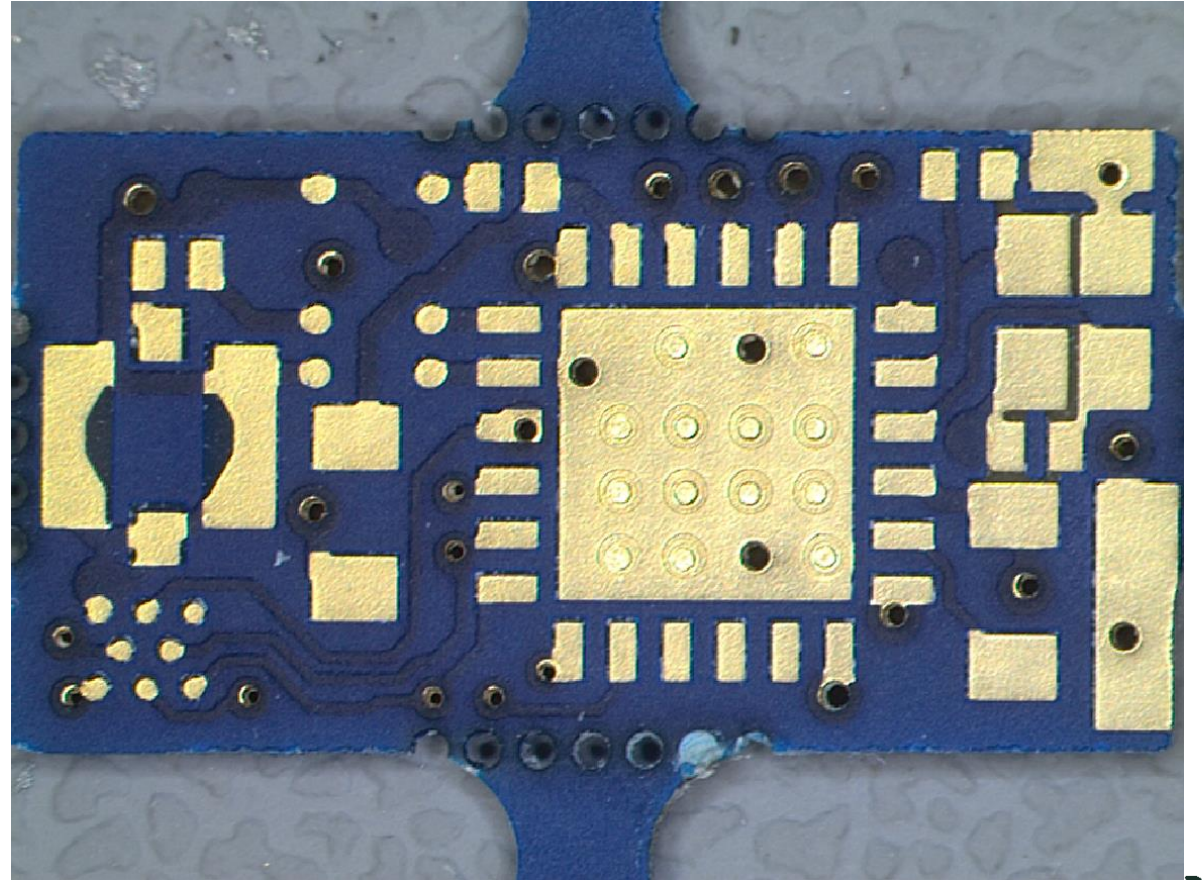
Design mistakes

- Solder paste in via's



Design mistakes

- Insufficient mask barriers



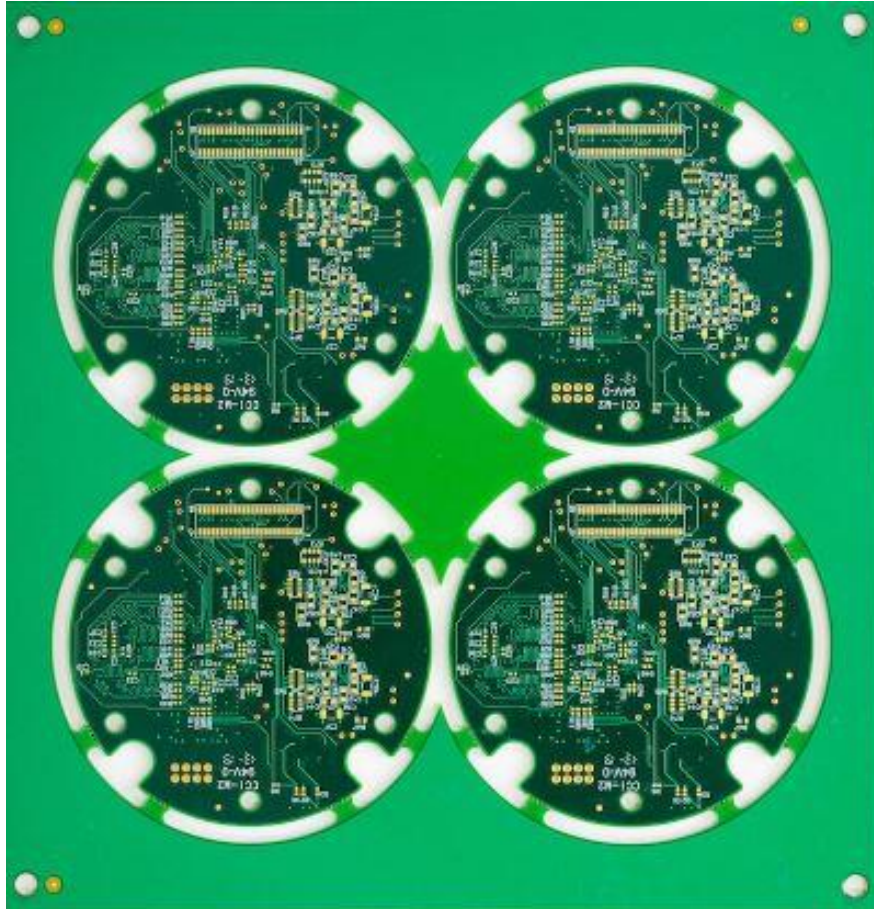
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Design mistakes



- Panelization mistakes:
 - Break tabs
 - Excessive or too little border (clamping)

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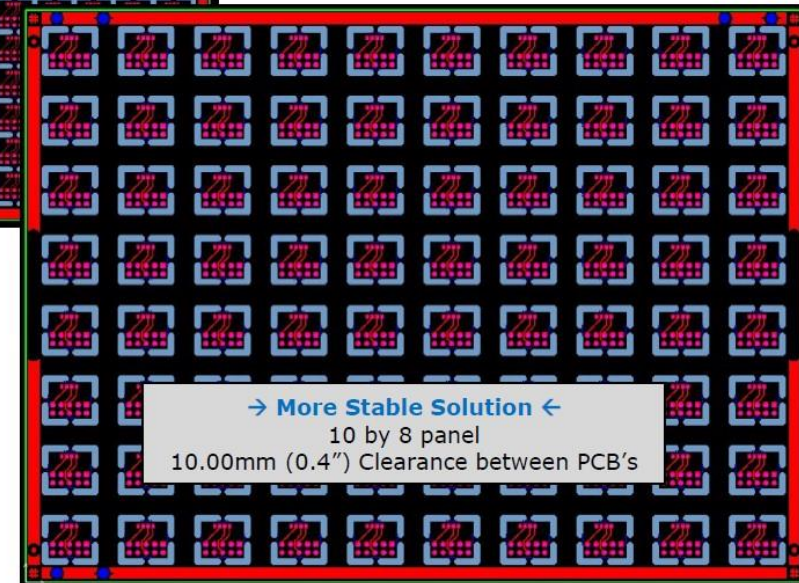
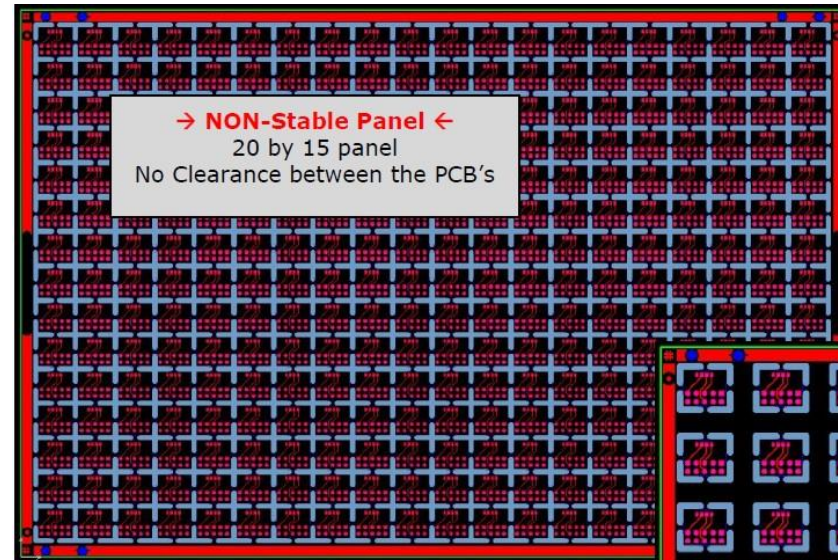


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Design mistakes

- Panelization
Instability due to
insufficient clearing
between boards



#3 Manage your BOM or pay more

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Component management

- Proto
 - No traceability
 - Customer Specs
- Clinical trial or Series
 - Batch traceability
 - Full traceability
 - ID of PCB

→ Define your needs for data beforehand



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Hard cost drivers

- **PCB Size**

Larger is more expensive

- **PCB Layer count**

1 → 2 layer	+40%
2 → 4 layer	+40–45%
4 → 6 layer	+35–40%
6 → 8 layer	+30–35%
8 → 10 layer	+25–30%
10 → 12 layer	+25–30%
12 → 14 layer	+15–20%

- **Build / complexity (example 10L PCB)**

Layer of Microvia	+40-75%
Buried via and microvia	+75-125%
Buried via and microvia with copper fill	+120-150%

- **Via treatments**

Soldermask covered (Tented)	+0%
Soldermask plug	+1–5%
Type VI	+5–10%
Type VII Nonconductive resin	+7–12%
Type VII Conductive resin	20+% + material

- **Panelization**

Best to leave this up to your assembly partner

- **Component/track size**

Smaller is more expensive
e.g. is 0105 necessary?

A S S E M B L I C S



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Soft cost drivers

- **Lead times**

20 days x1 (Base price)

15 days x1.2

10 days x1.5

5 days x2

3 days x2.5

- **Transportation cost**

Air vs Sea freight

Lead times

- **Communication, communication, communication**



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