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Document link: <https://www.jonjutech.com/WhitePapers/PML.pdf>

Date: 16th December 2021

Title: Guest Lecture: Practical PCBA Manufacture

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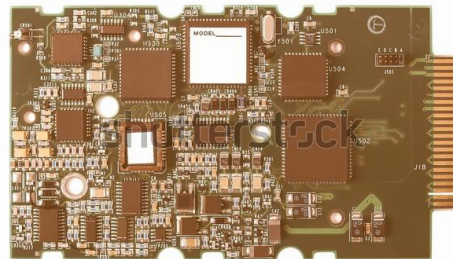
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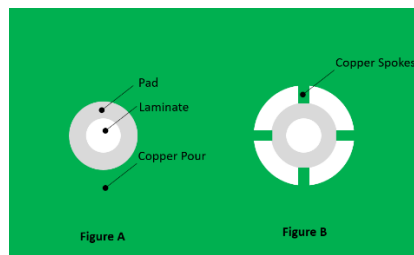
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1. Introduction (me + time constraint) 1717
2. What it is all about 1719
 - Overview of Printed Circuit Book Handbook (https://www.amazon.co.uk/Printed-Circuits-Handbook-Seventh-Coombs/dp/0071833951/ref=sr_1_1?crid=1X1CM9IOZ5WZL&keywords=printed+circuits+handbook&qid=1639647459&srefix=printed+circuits+%2Caps%2C152&sr=8-1)
 - Let manufacturers use their expertise, but also try to understand their limitations and restrictions
 - Time allowed means a lighting overview without true depth, but ref in first bullet point is bible.
3. Ordering 1721
 - Sales people
 - ODB++ or Gerbers, drill files, XY pick and place, BoM and PCB board specification
 - Eurocircuits
4. Design CAD 1725
 - CAD Eye
 - Slots and Routing



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- Thermal relief (rf and thermal trade-offs)





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- Track and gap
- Proximity of components
- Edge of PCB
- Silk screen

5. Production CAD

1727

- Panelling
- Drilling
- Etching

6. Lamination

1729

- Core/prepregs/copper foil
- FR4 properties/Rogers

7. Drilling

1731

- Traditional and laser
- Micro-vias – get real about diameters (0.15mm)
- Hidden and blind vias – avoid if possible – but use if necessary – bga



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8. Etching

1735

- Copper balance



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9. PCB Testing

1737

- Electrical test



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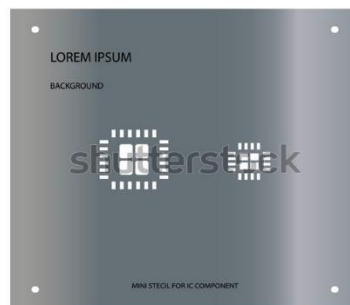
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10. Silk Screen 1739

- Small PCBs/height/needed?

11. Stencilling 1740

- Let manufacturers do it
- Thickness/stepped thickness (laser cut)
- Wendy house



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12. Paste 1741

- What it is and how it couples with stencilling.
- Different grades
- Let manufacturers specify

13. Pick and Place 1742



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- Heavy components on one side
- Fiducials
- Train stock

14. SMD Soldering – ovens 1743

- Reflow (IR/convection)
- Vapour phase
- Wave



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15. Hand Assembly The rest 1745
- That which can't be done with SMD
 - Skilled – leave it to them
 - An engineer sitting at a bench soldering is wasting money and time - usually
16. Conformal Coating
- High dielectric strength
 - Protection against moisture/dust
 - Protection against ESD
 - masking
 - Don't use on prototypes
17. Testing and IPC Standards
- AOI
 - Xray
 - Visual
 - Flying probe/Lab View
 - IPC (class 1 to 3[highest])
18. Questions