ROCKET PCB

HDI PCB manufacturing process

ROCKET PCB

AGENDA

1. Detail Manufacturing 4-65

- Process Flow (Photo)
- HDI Products

2. Technology Roadmap for PCB & HDI 66-70

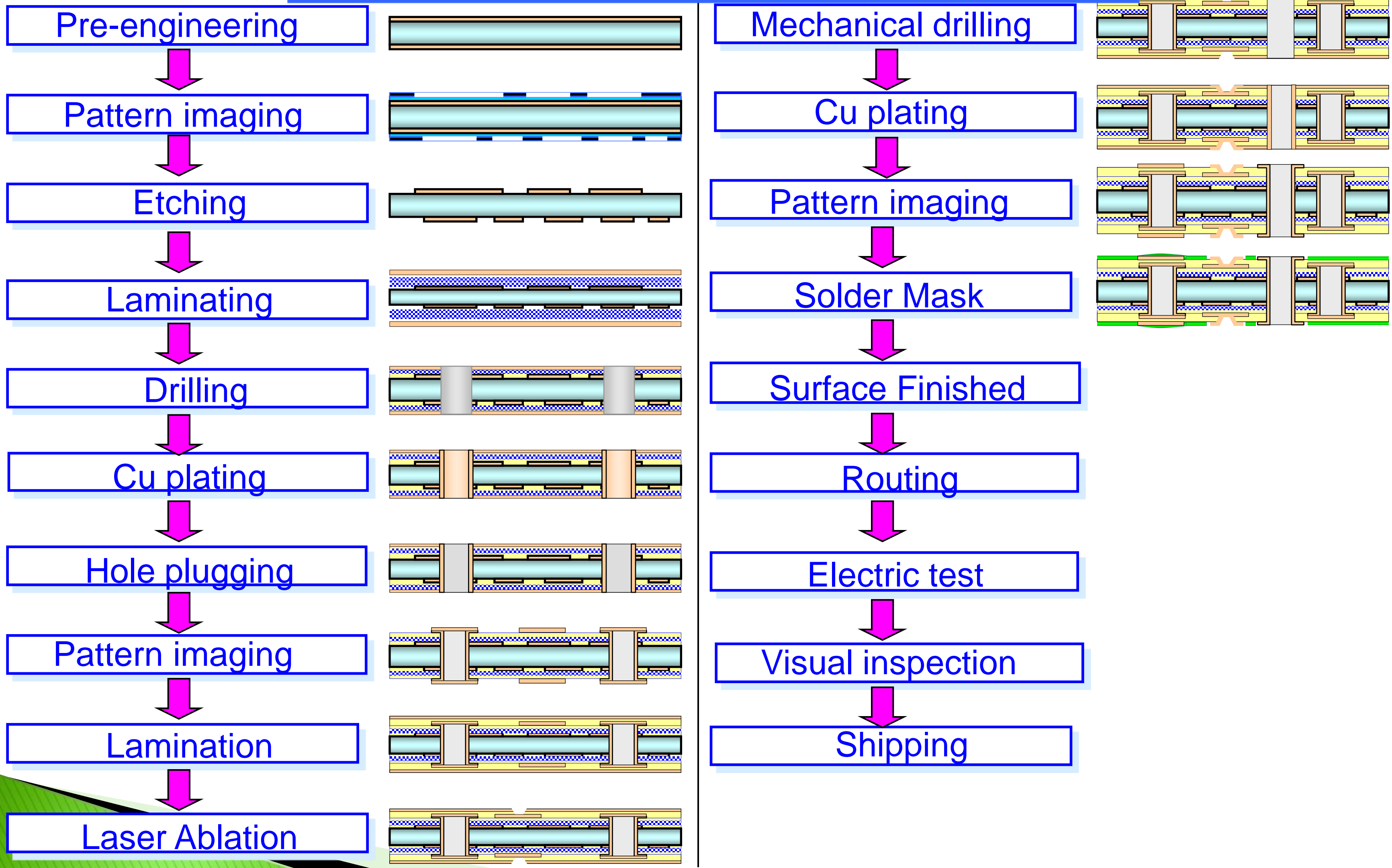
- Technology Roadmap
- Process Capability

*P*rocess *F*low

(PCB&HDI)

ROCKET PCB

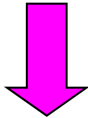
Process Flow Chart (1)



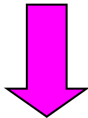
ROCKET PCB

Process Flow Chart (2)

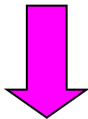
Pre-engineering



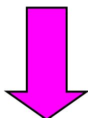
Pattern imaging



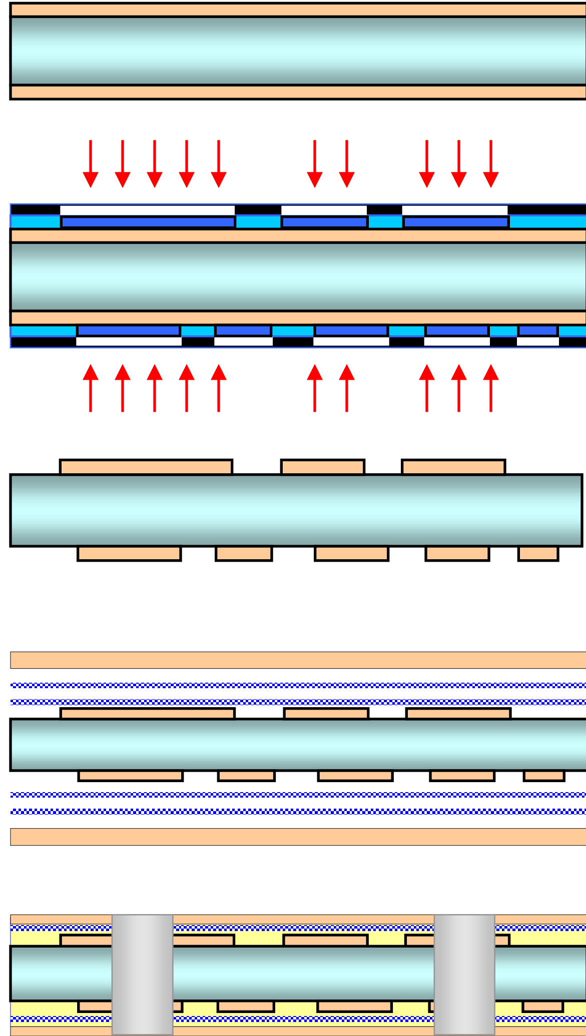
Etching



Laminating



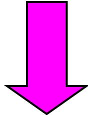
Drilling



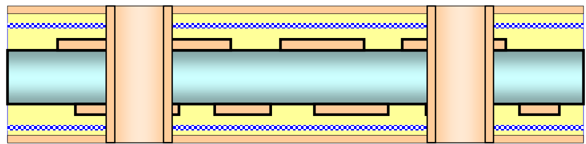
ROCKET PCB

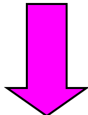
Process Flow Chart (3)

Desmear

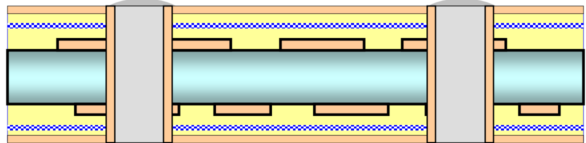


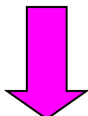
Cu plating



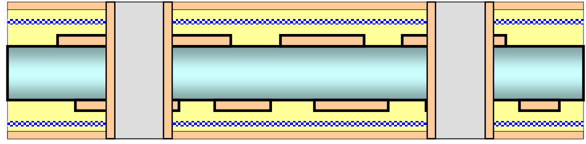


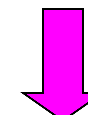
Hole plugging



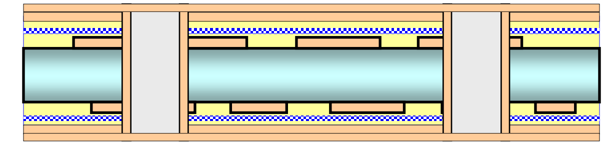


Belt Sanding





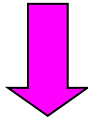
Cu plating



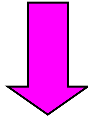
ROCKET PCB

Process Flow Chart (4)

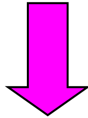
Pattern imaging



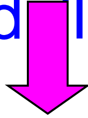
Lamination



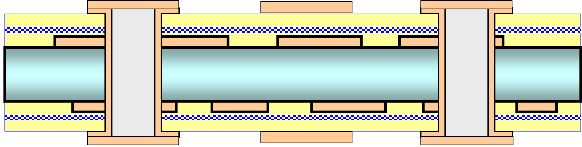
Laser Ablation

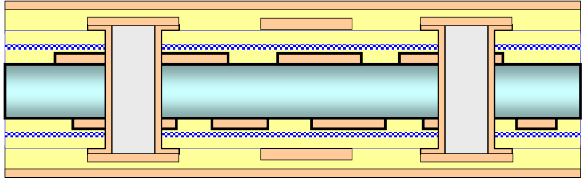


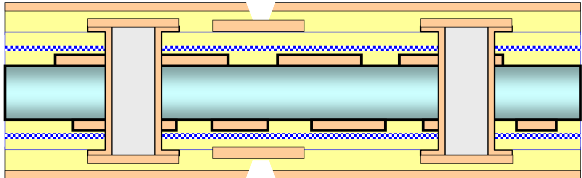
Mechanical drilling

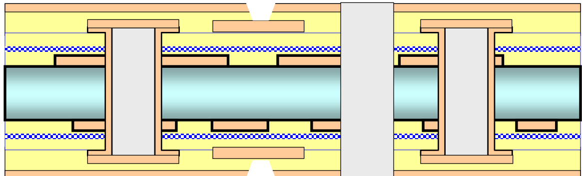


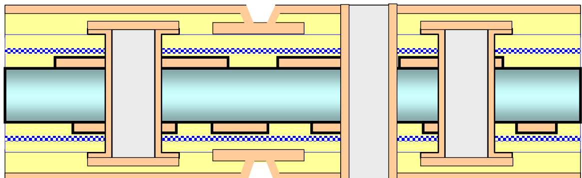
Cu plating







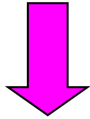




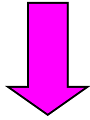
ROCKET PCB

Process Flow Chart (5)

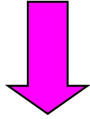
Pattern imaging



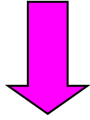
Solder Mask



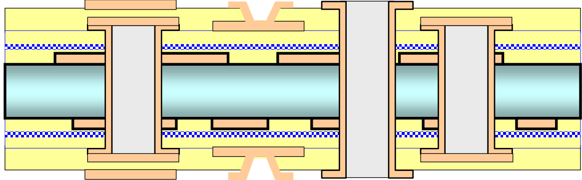
Gold plating

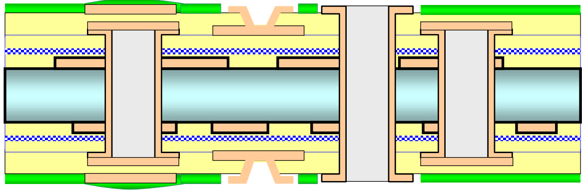


Routing



Electrical test

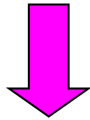




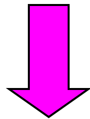
ROCKET PCB

Process Flow Chart (6)

Visual inspection

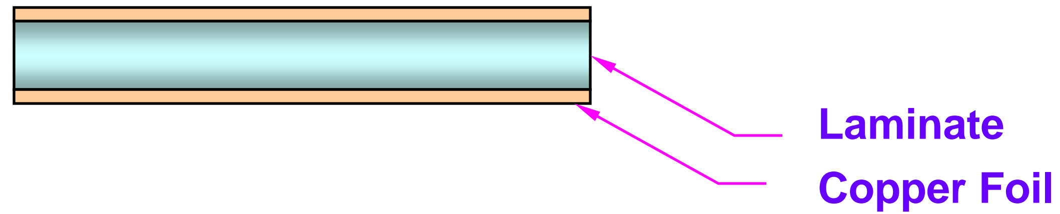


Hole counter

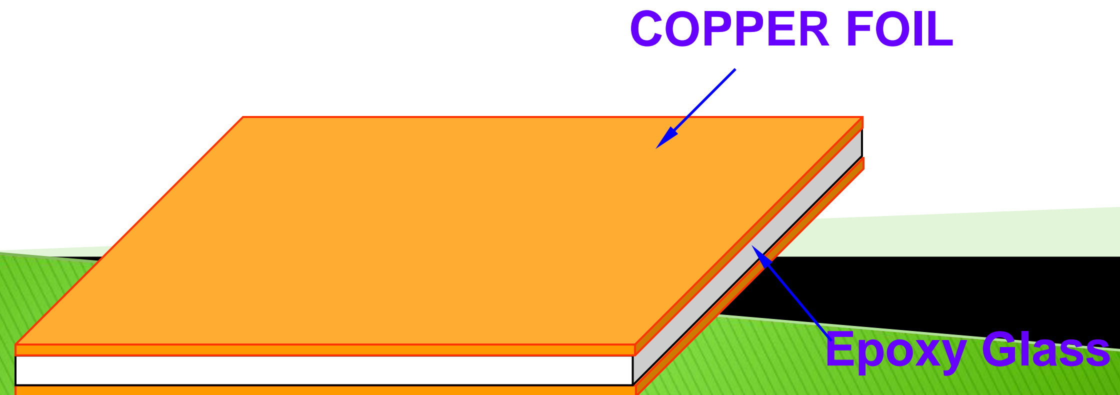


Shipping

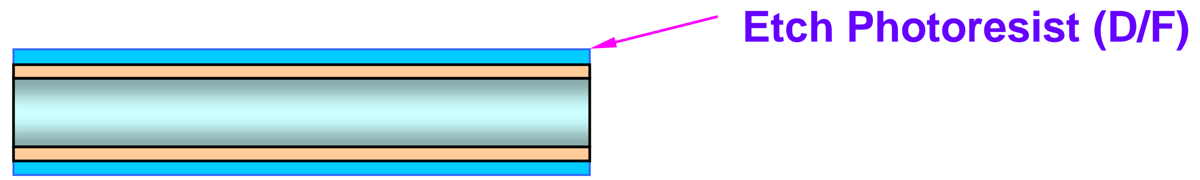
1.內層基板 (THIN CORE)

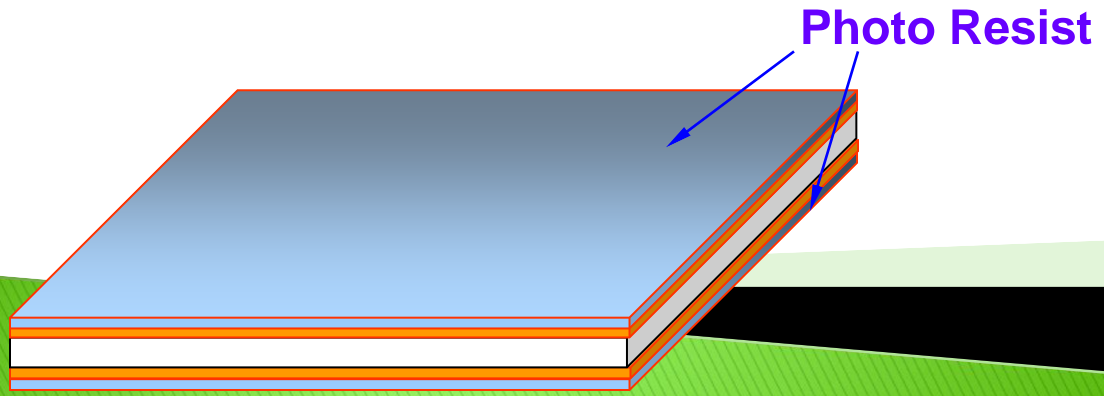


裁板(Panel Size)

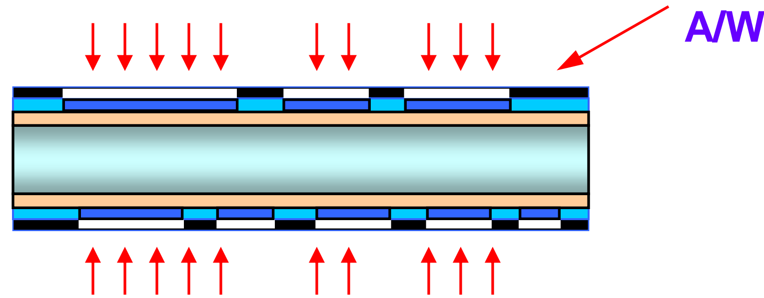


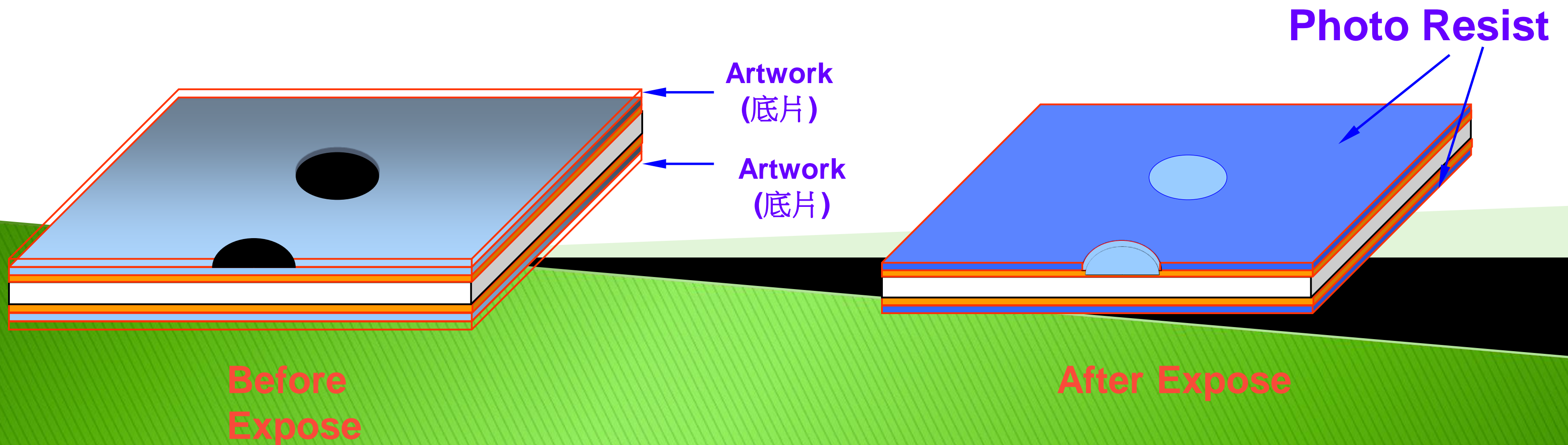
2.內層線路製作(壓膜) (Dry Film Resist Coat)



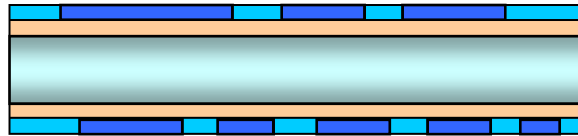


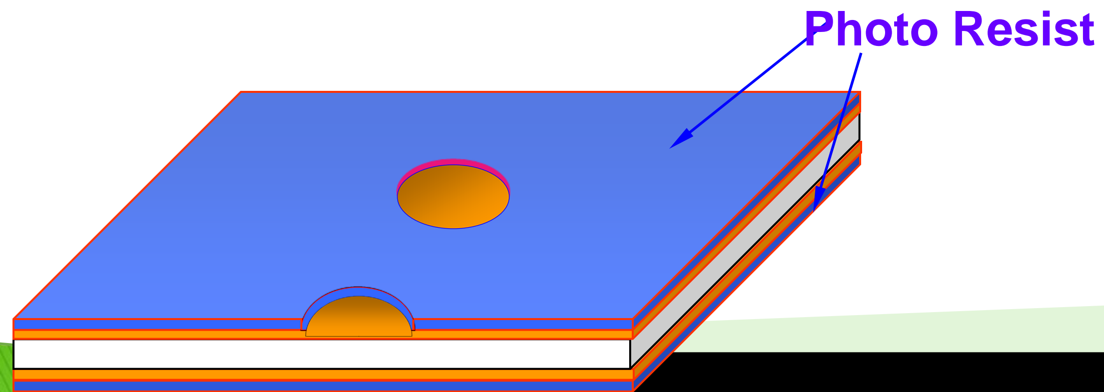
3. 內層線路製作(曝光)(Expose)





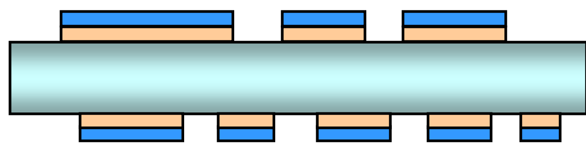
4. 內層線路製作(顯影)(Develop)

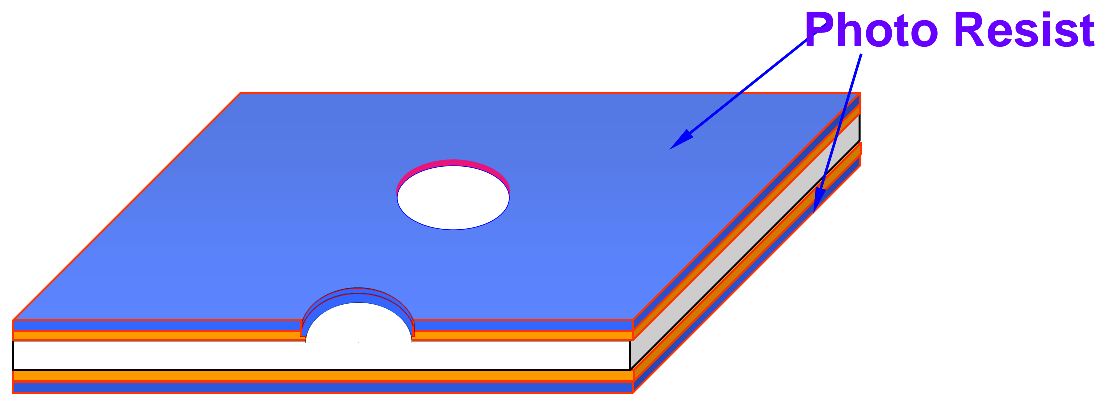




ROCKET PCB

5. 內層線路製作(蝕刻)(Etch)





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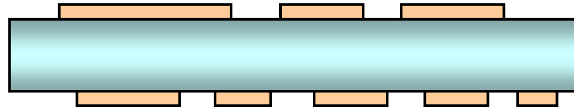
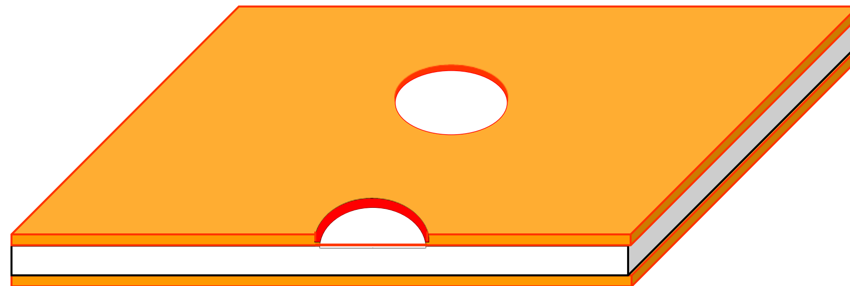
6. 內層線路製作(去膜)(Strip Resist)





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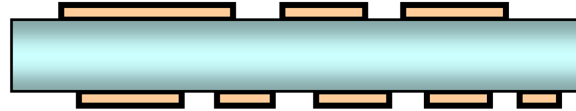
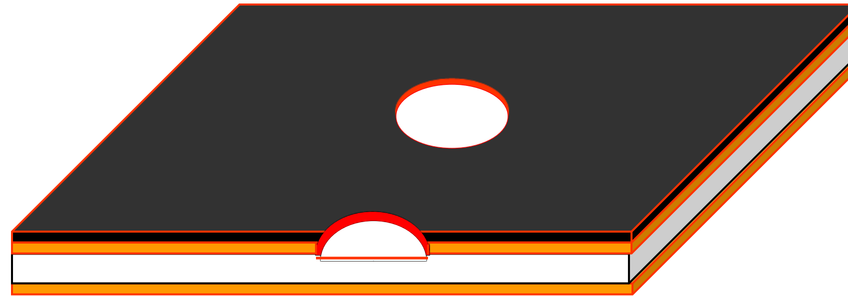
7.黑氧化 (Oxide Coating)





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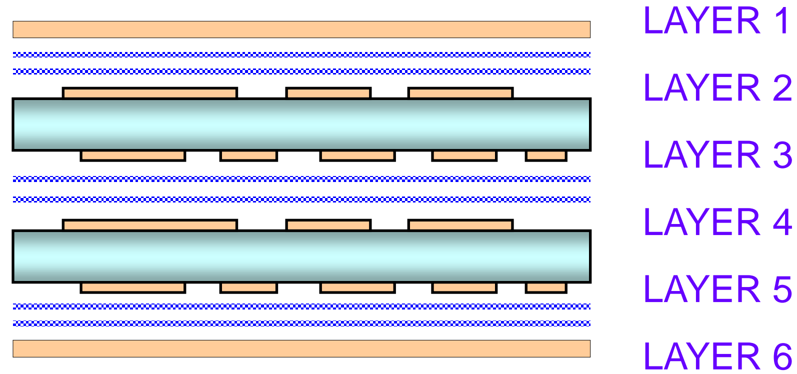
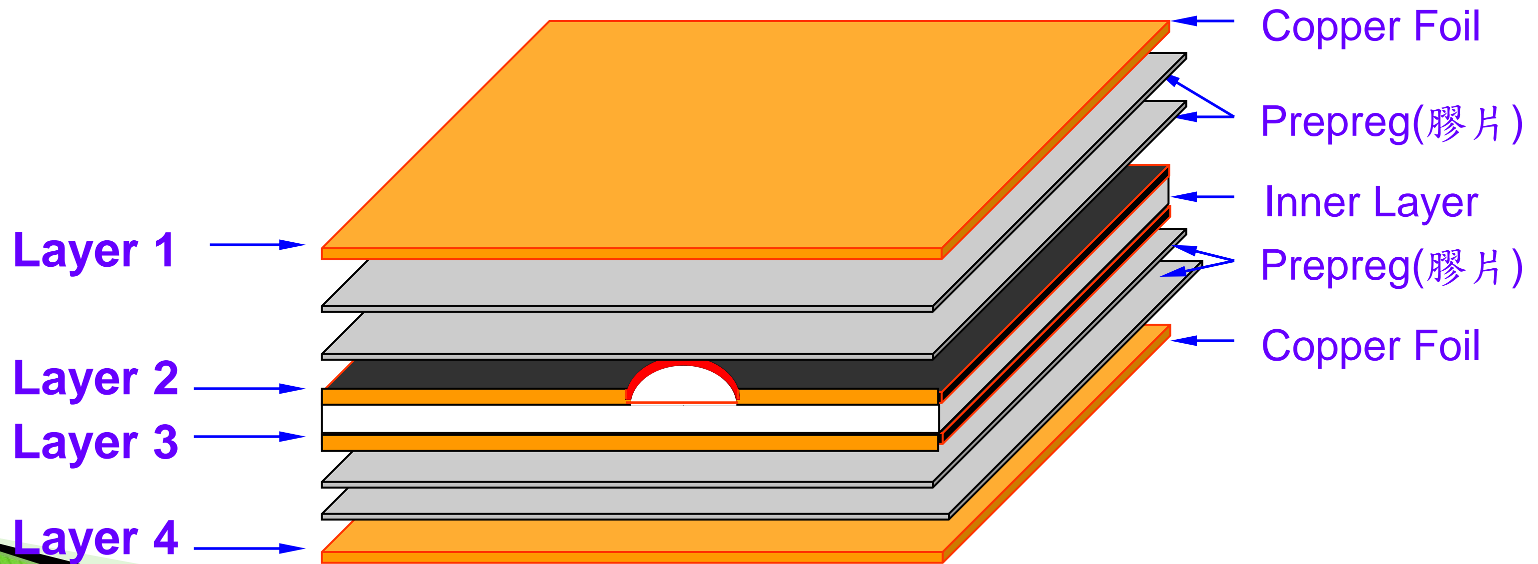
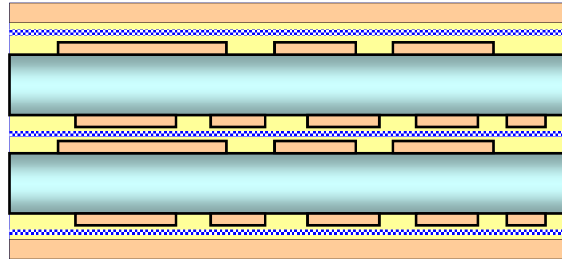
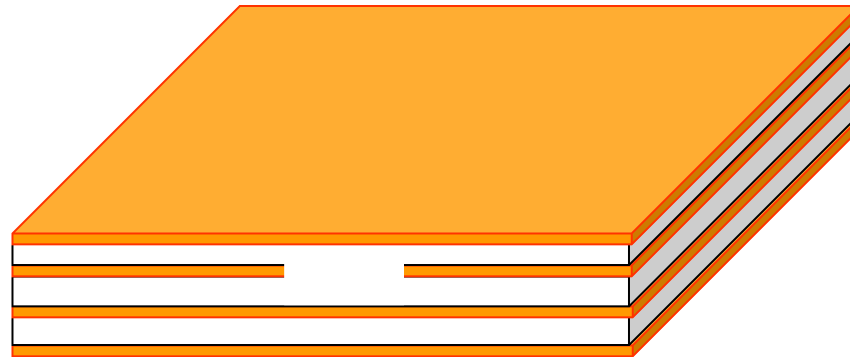
8. 疊板 (Lay-up)



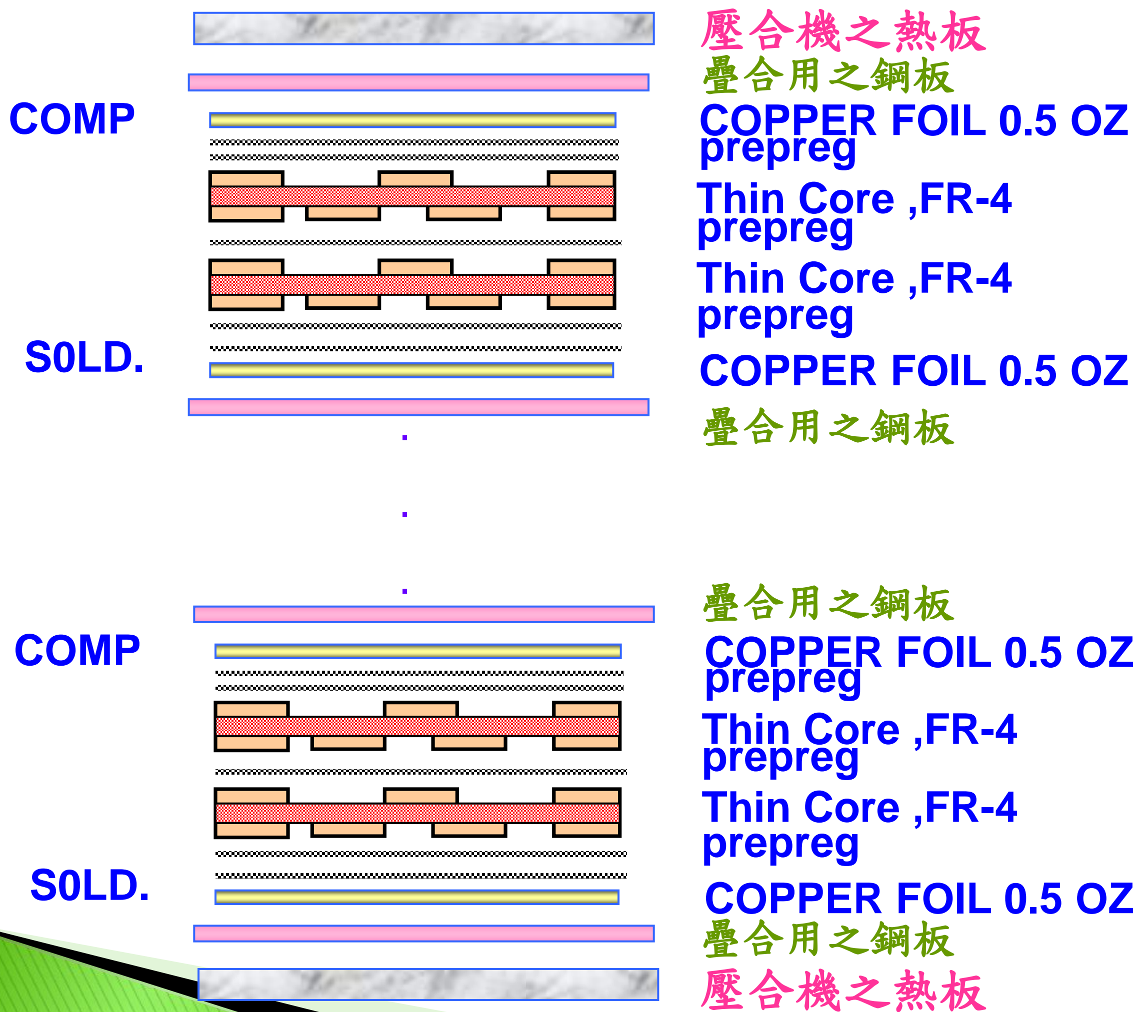


9. 壓合 (Lamination)





典型之多層板疊板及壓合結構



壓合機之熱板
疊合用之鋼板
COPPER FOIL 0.5 OZ
prepreg
Thin Core ,FR-4
prepreg
Thin Core ,FR-4
prepreg
COPPER FOIL 0.5 OZ
疊合用之鋼板

疊合用之鋼板
COPPER FOIL 0.5 OZ
prepreg
Thin Core ,FR-4
prepreg
Thin Core ,FR-4
prepreg
COPPER FOIL 0.5 OZ
疊合用之鋼板
壓合機之熱板

10-12層疊合

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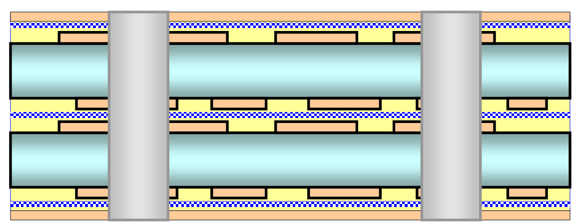
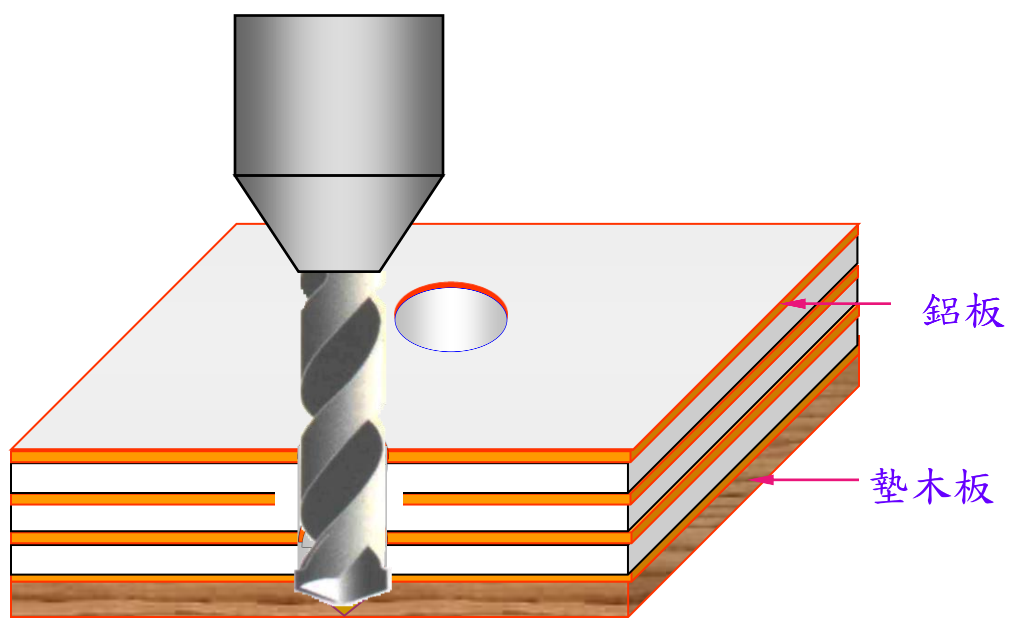
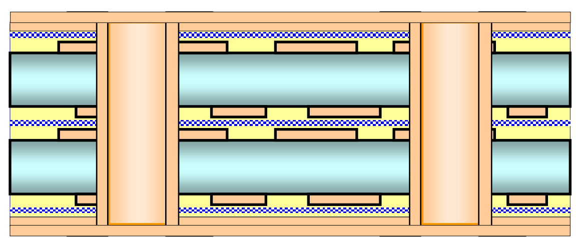
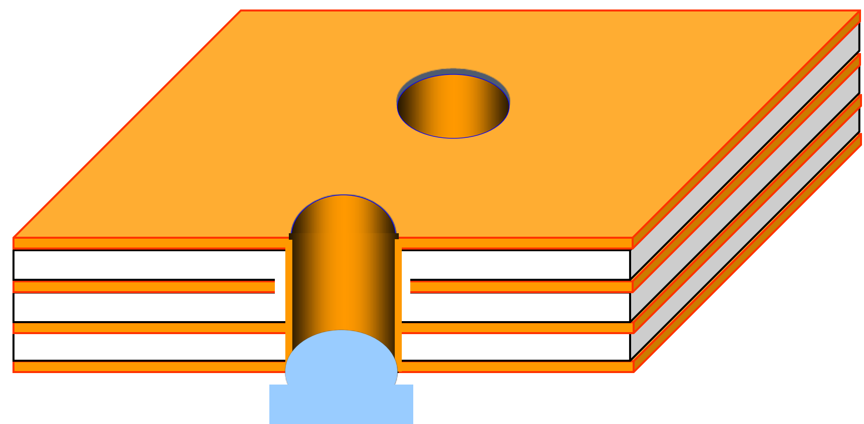
10. 鑽孔 (Drilling)





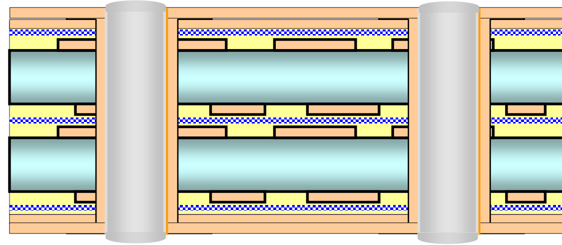
11. 電鍍Desmear & Copper Deposition



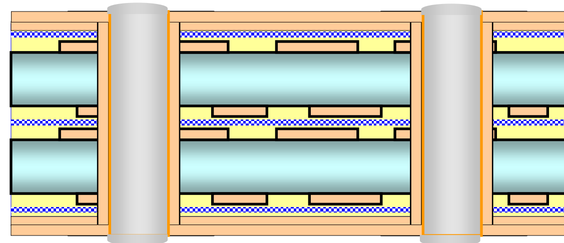


ROCKET PCB

12. 塞孔(Hole Plugging)

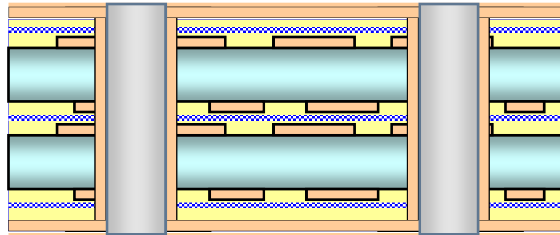


13. 去溢膠 (Belt Sanding)

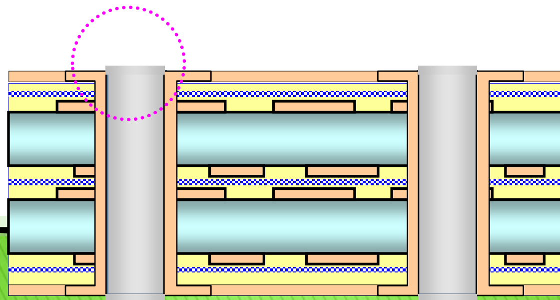


ROCKET PCB

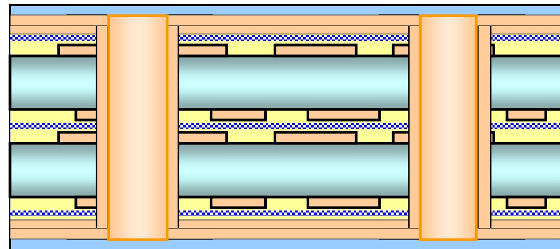
14. 減銅 (Copper Reduction) → Option

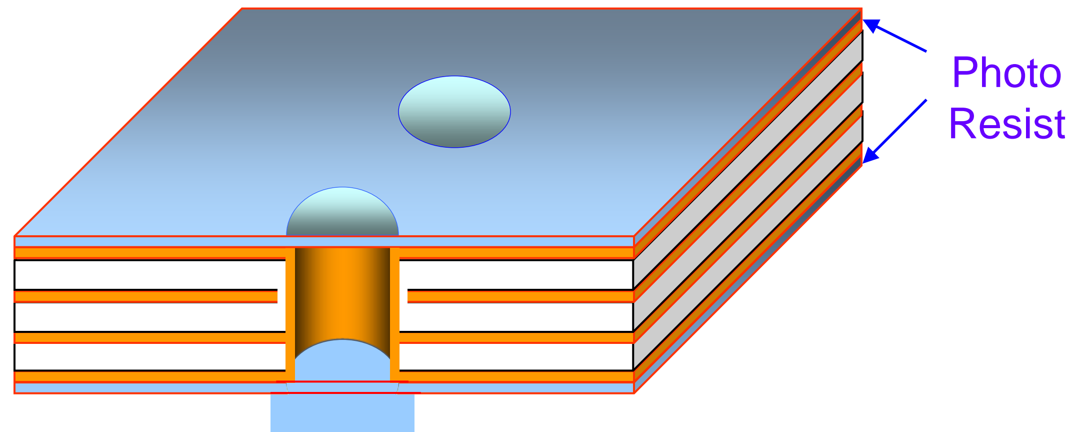


15. 去溢膠 (Belt Sanding) → Option

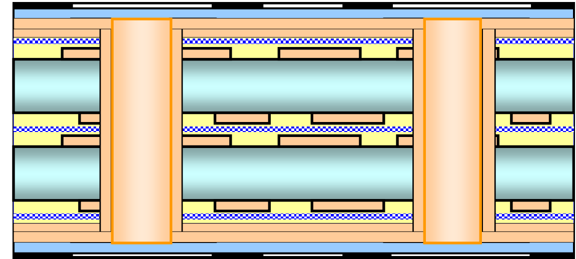


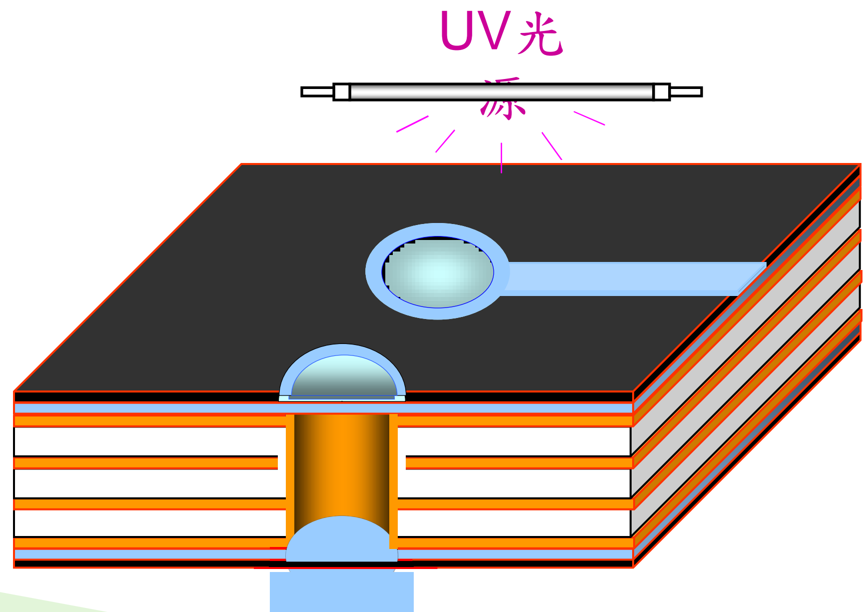
16. 外層壓膜 Dry Film Lamination (Outer layer)



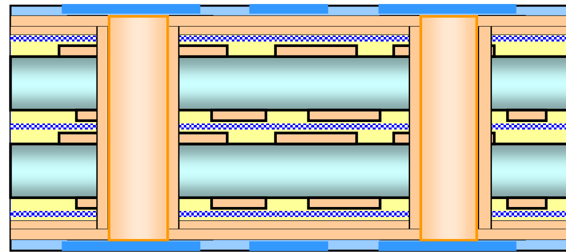


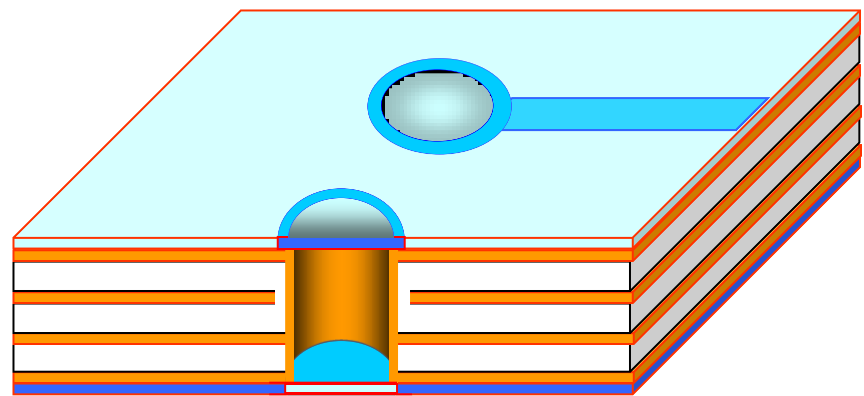
17. 外層曝光 Expose



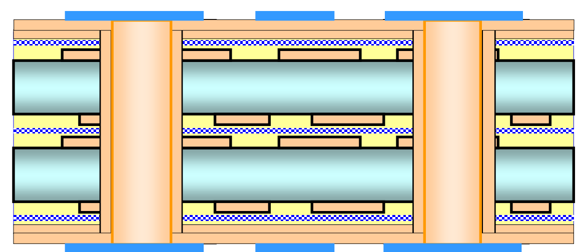


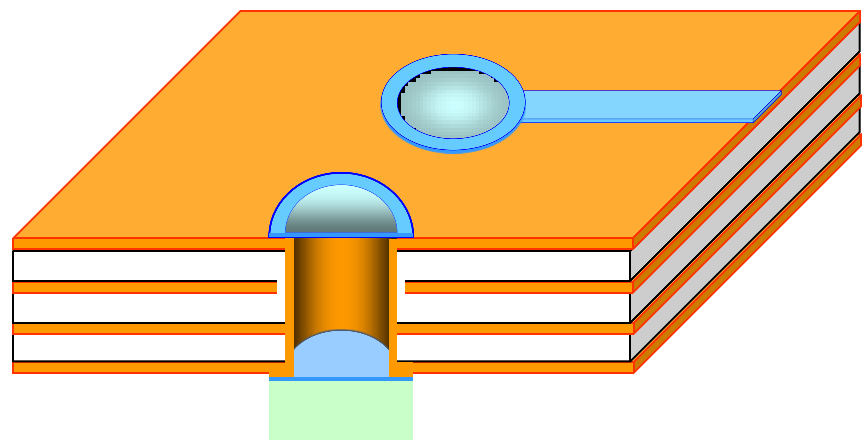
18. After Exposed





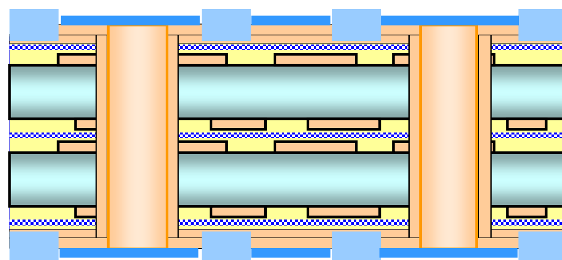
19. 外層顯影 Develop

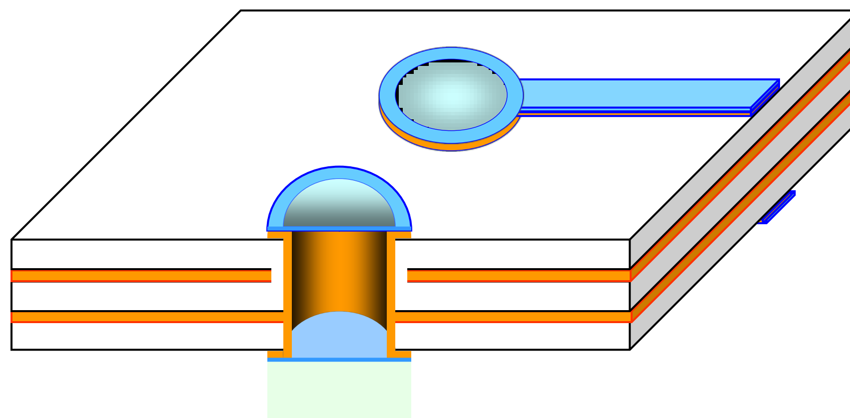




ROCKET PCB

20. 蝕刻 Etch





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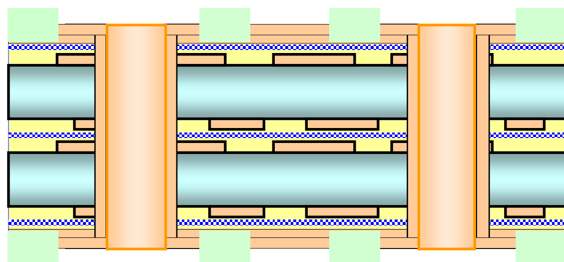
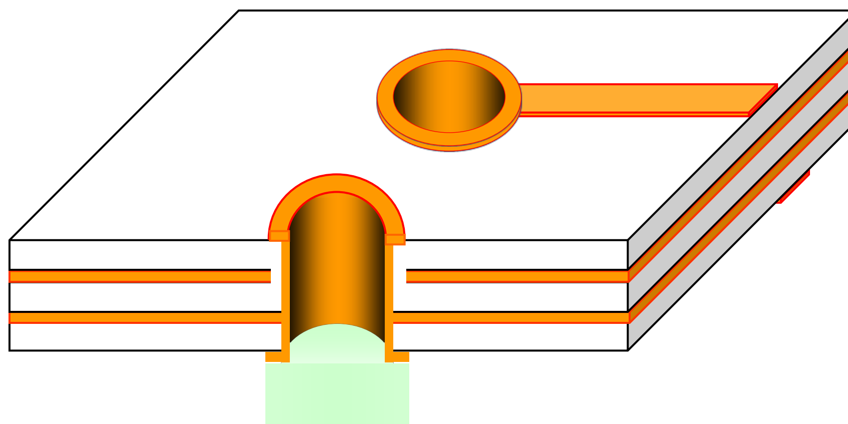
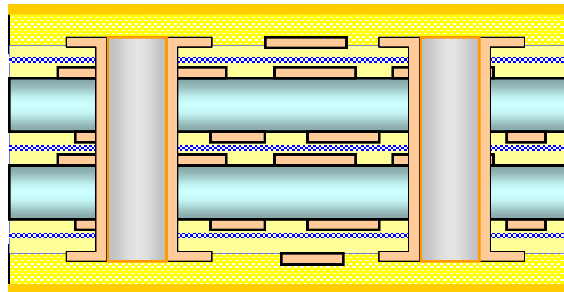
20. 去乾膜 Strip Resist





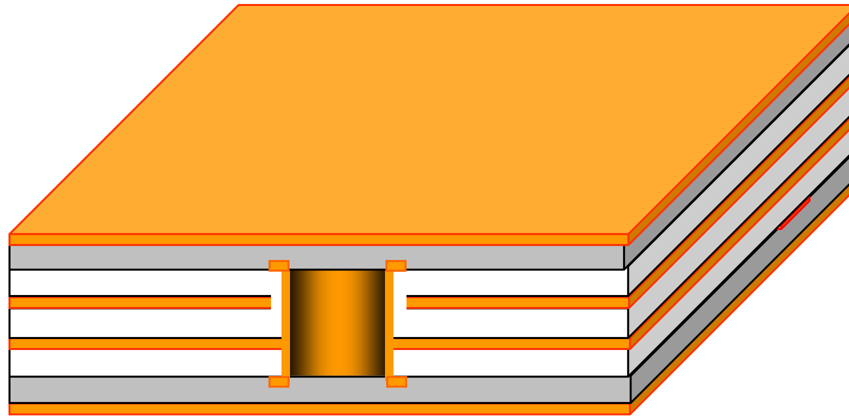
ROCKET PCB

21.壓合 (Build-up Layer Lamination)

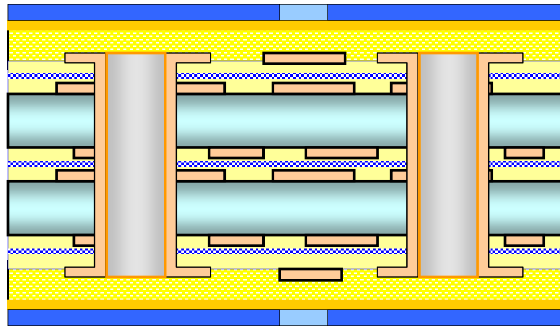


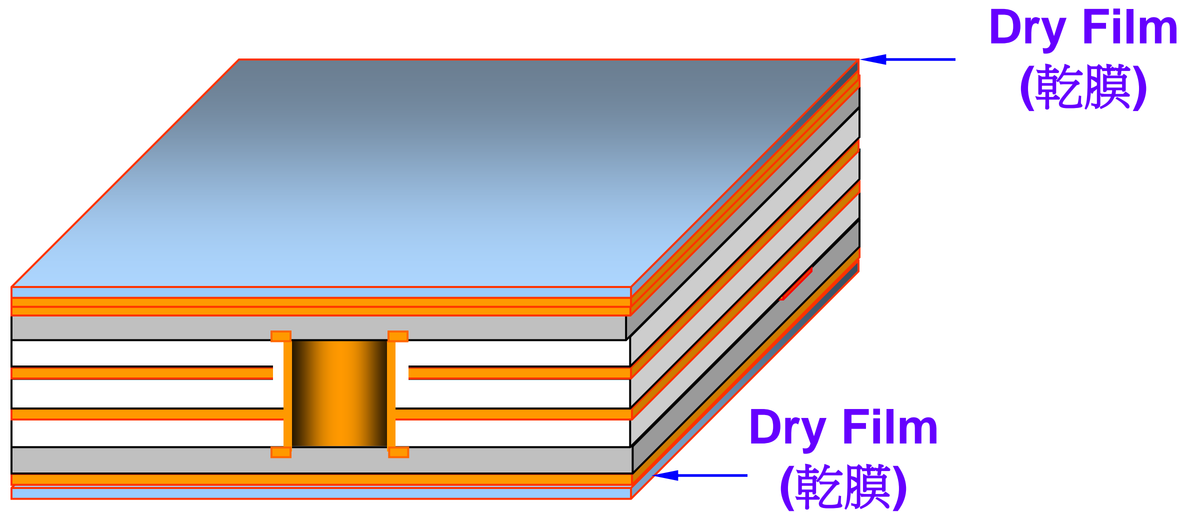
RCC

(Resin Coated Copper foil)



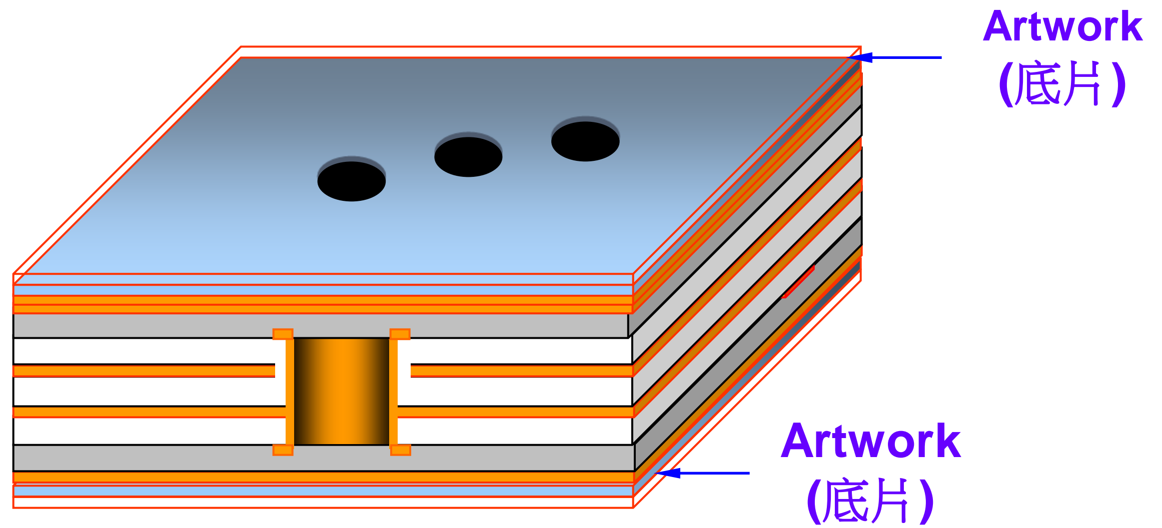
21. 護形層製作 (壓膜)(Conformal Mask)



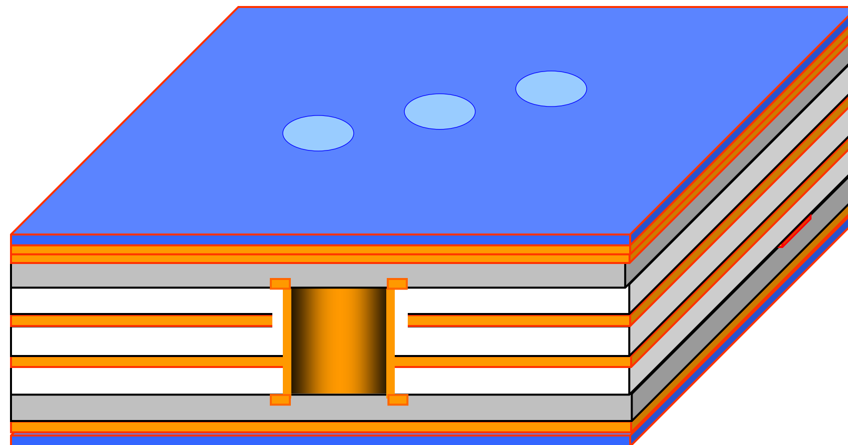


22. 護形層製作 (曝光)(Conformal Mask)

Before Exposure



After Exposure



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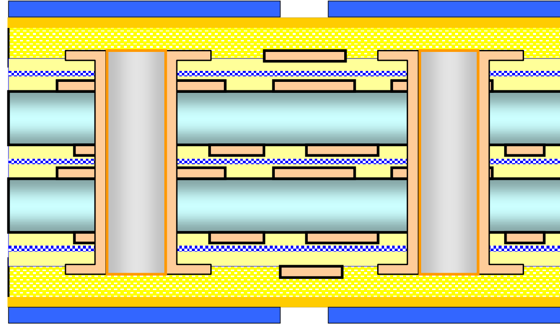
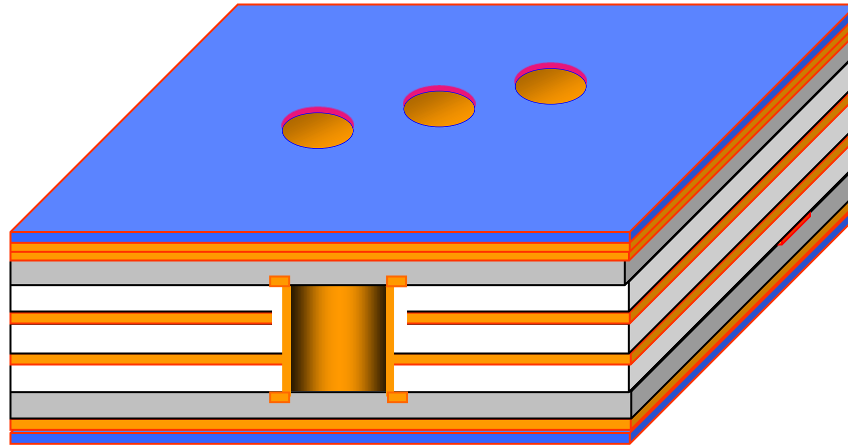
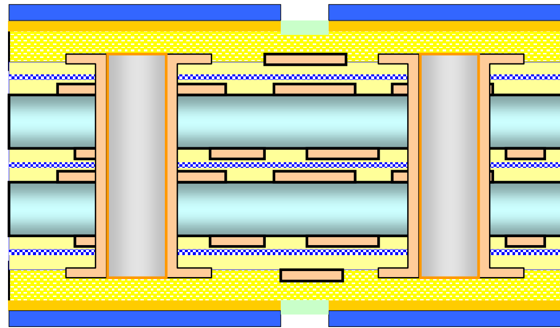
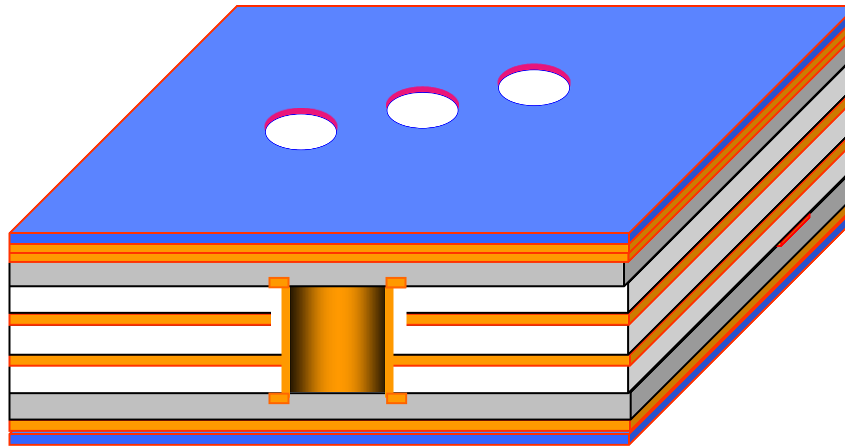
23.護形層製作 (顯像)(Conformal Mask)



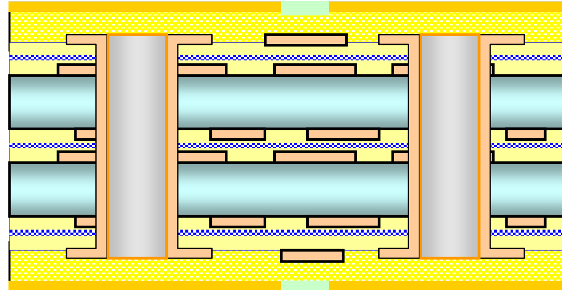


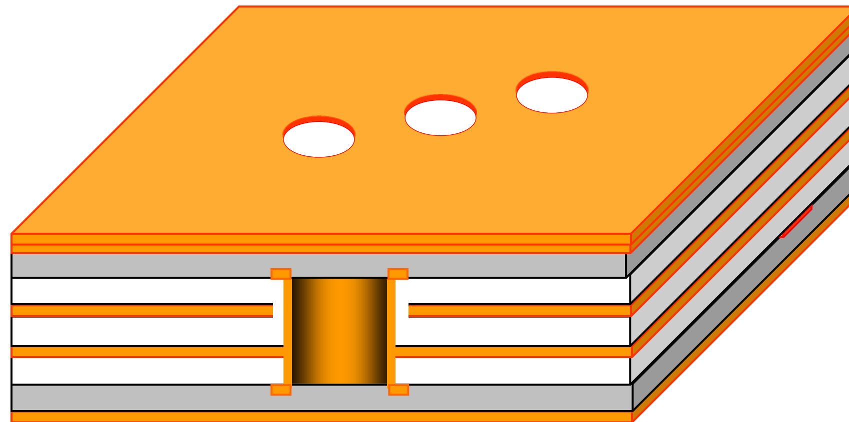
24. 護形層製作 (蝕銅) (Conformal Mask)



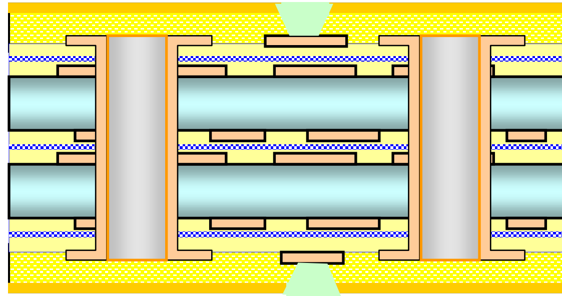


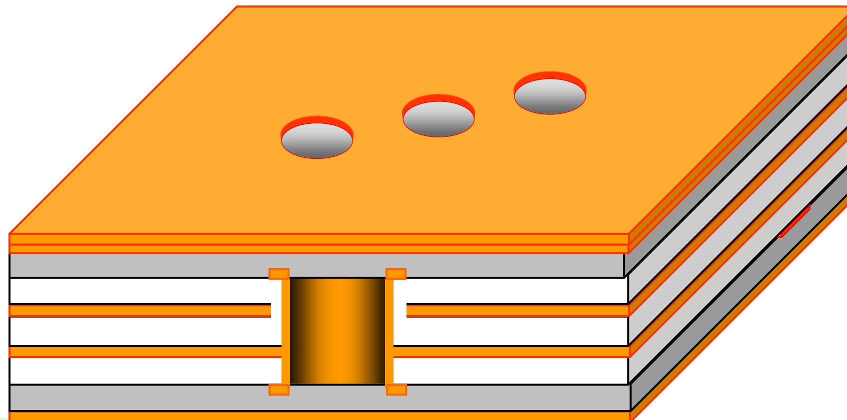
25.護形層製作(去膜) (Conformal Mask)





26. 雷射鑽孔 (Laser Ablation)及機械鑽孔





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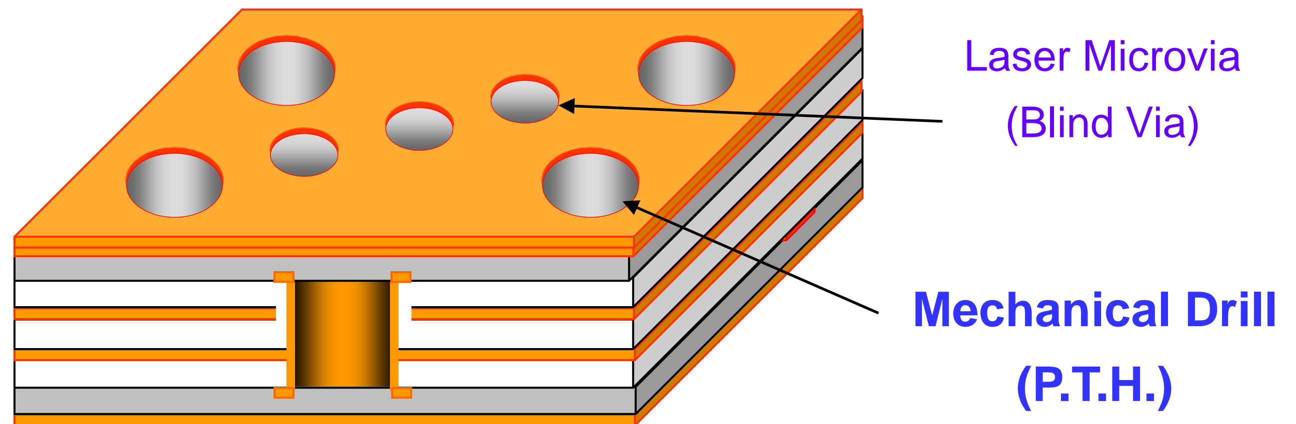
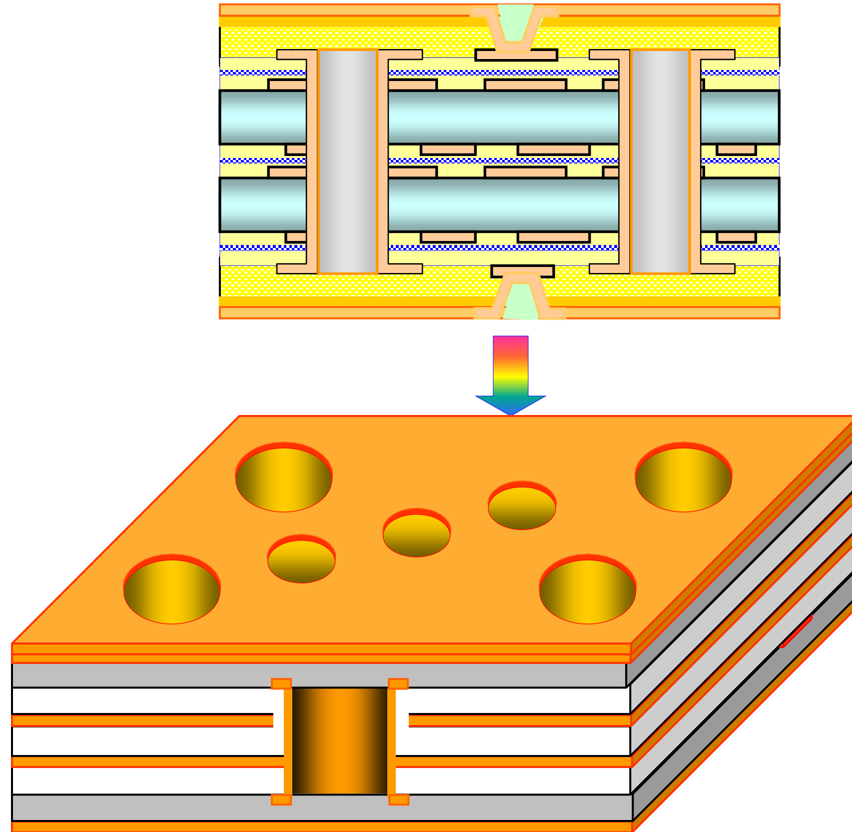
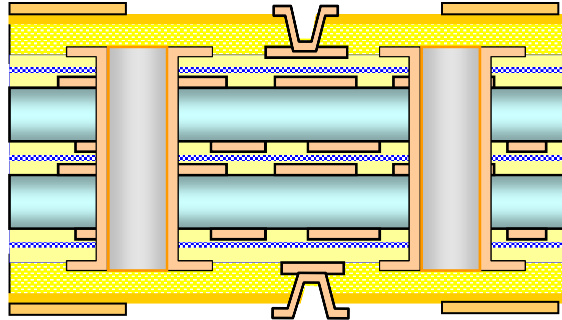
27. 機械鑽孔 (Mechanical Drill)



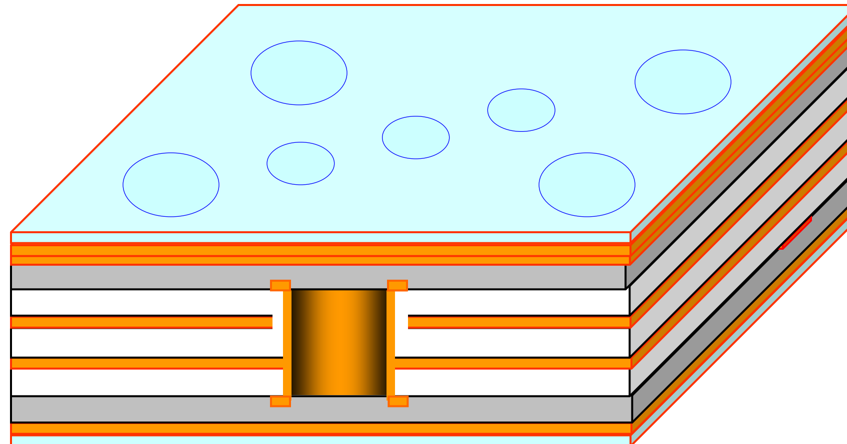
28. 電鍍(Desmear & Copper Deposition)



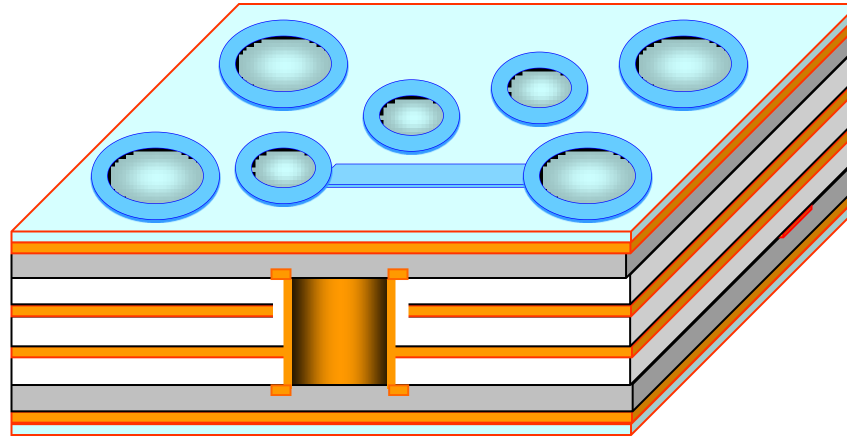
29. 外層線路製作 (Pattern imaging)



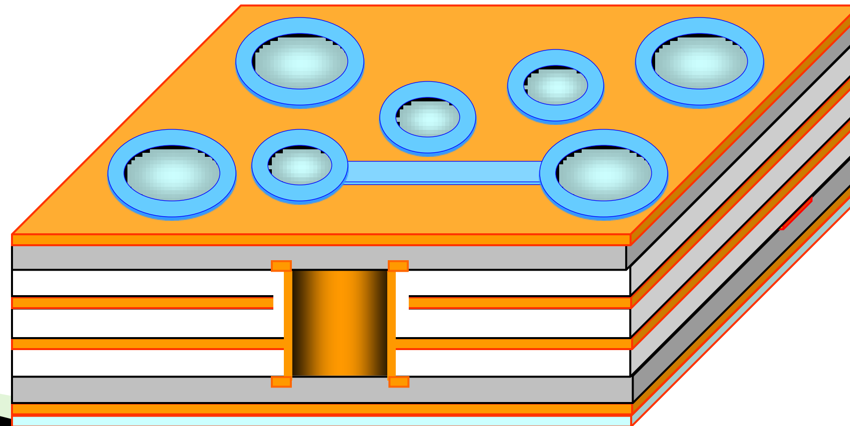
壓膜(D/F Lamination)



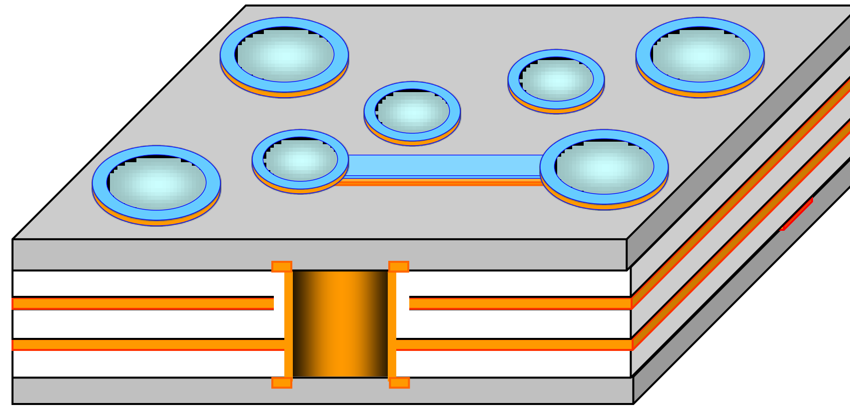
曝光(Exposure)



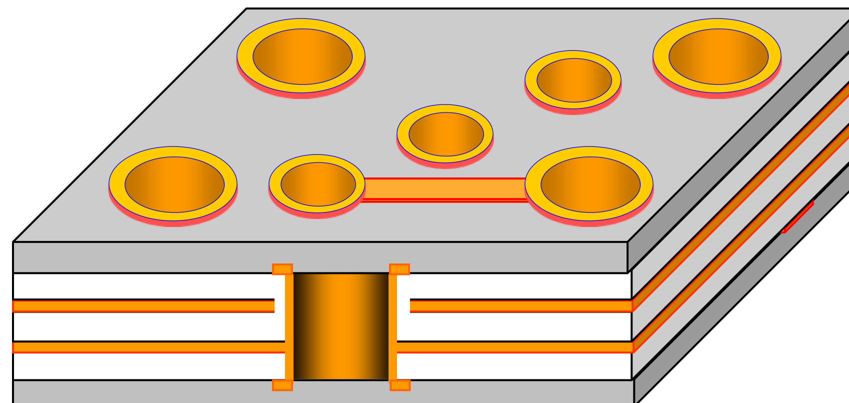
顯像(D/F Developing)



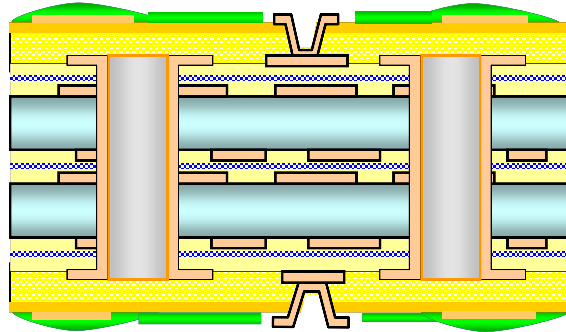
蝕銅 (Etching)

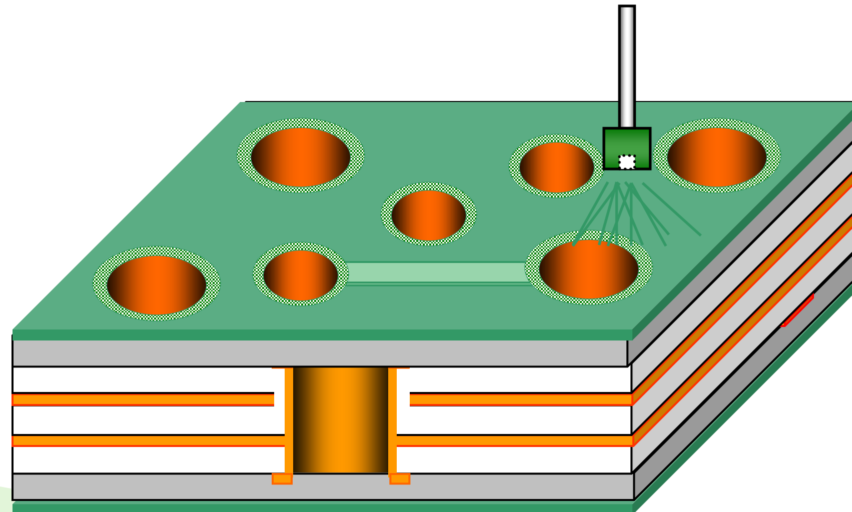


去膜(D/F Stripping)

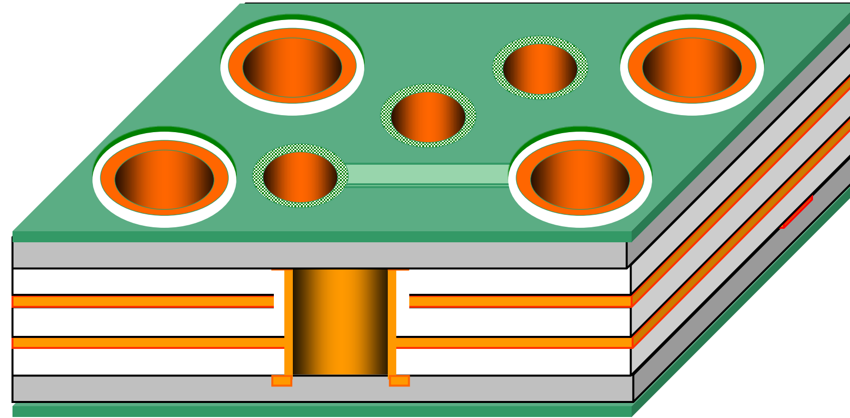


30. 防焊(綠漆)製作 (Solder Mask)

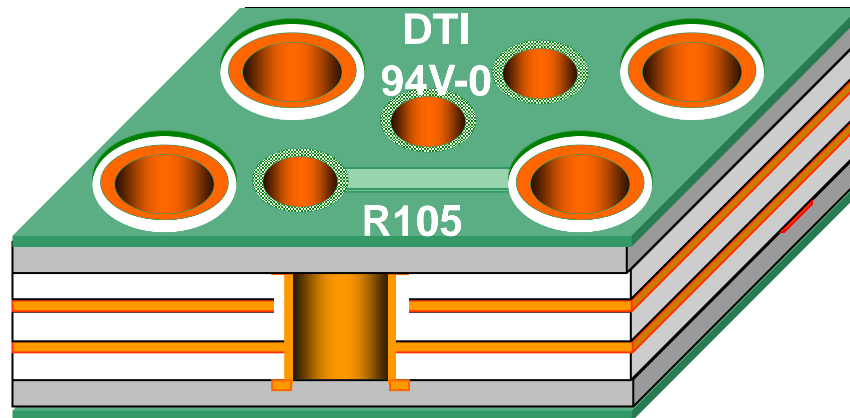




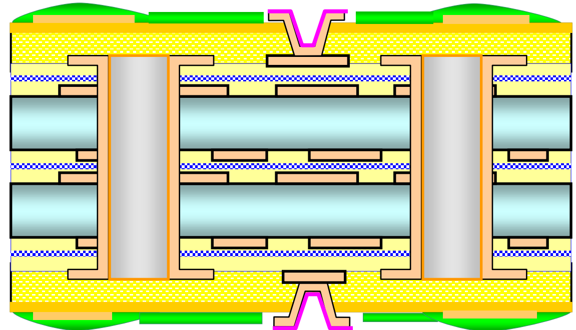
31. S/M 顯像 (S/M Developing)

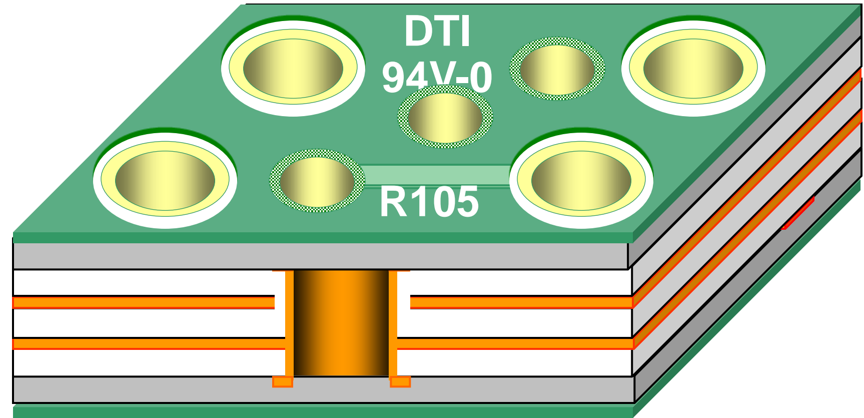


32. 印文字 (Legend Printing)

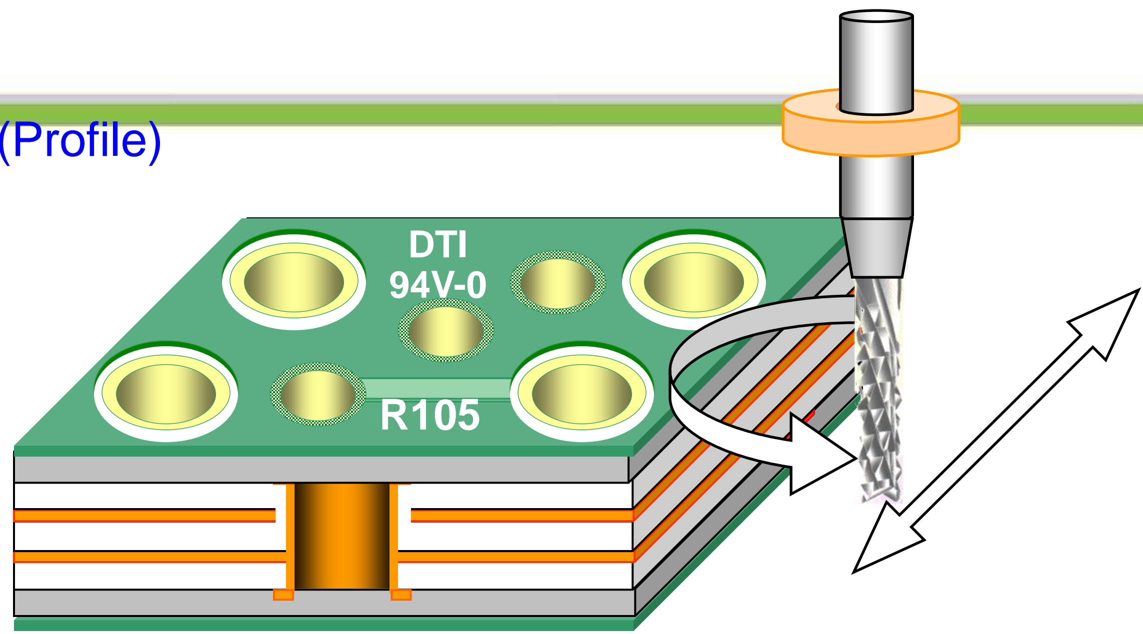


33. 浸金(噴錫……)製作(Electroless Ni/Au , HAL……)



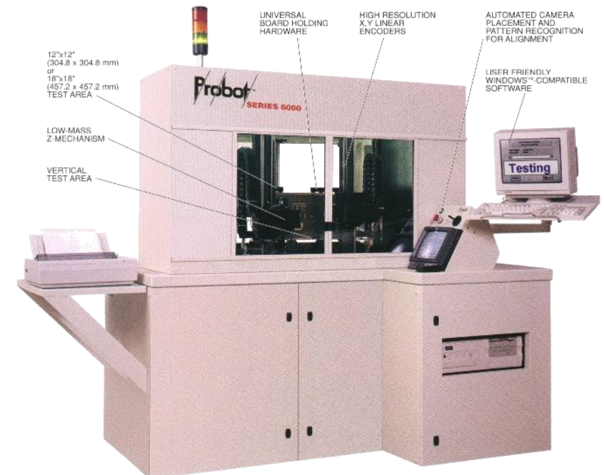


34. 成型 (Profile)



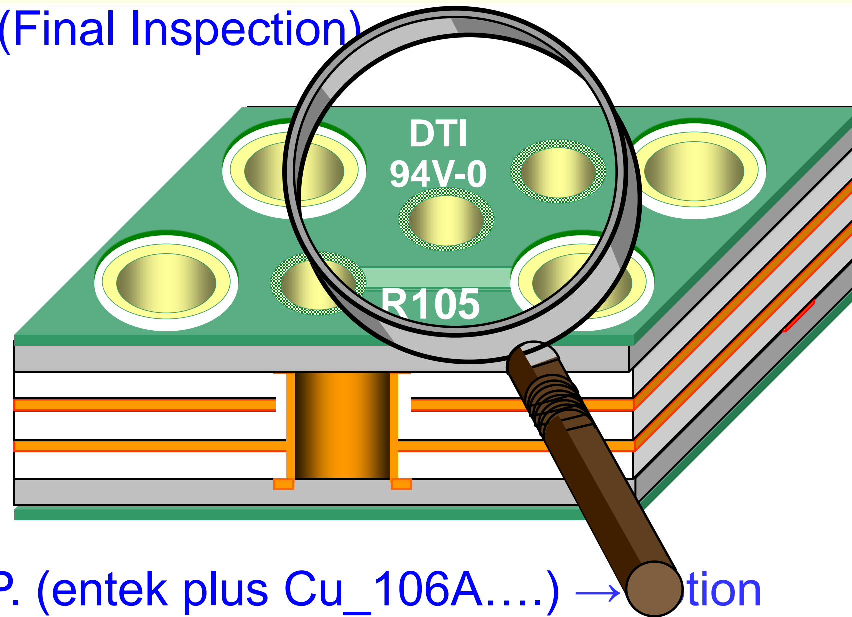
35. 測試 (Electrical Testing)

Dedicate or universal Tester

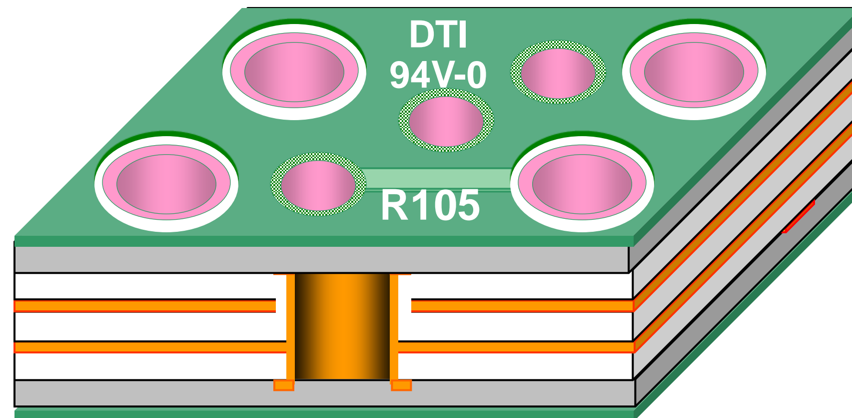


Flying Probe Tester

36. 終檢 (Final Inspection)



37. O.S.P. (entek plus Cu_106A….) → tion



ROCKET PCB

*E*quipment *P*hoto

BACK

Equipment Photo

Exposure

A O I

ROCKET PCB

Equipment Photo

Laser Drilling

M/Drilling

Equipment Photo

X-Ray Drilling

Cu Platting

ROCKET PCB

Equipment Photo

CNC Routing

SEC/EDS

ROCKET PCB

Equipment Photo

IR

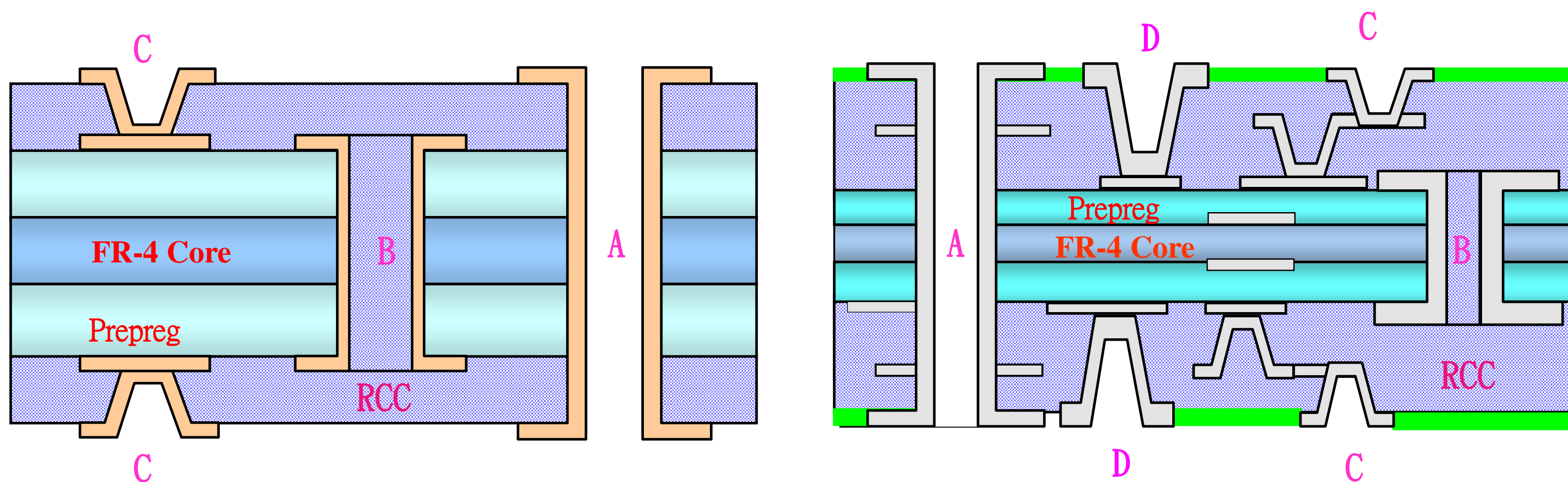
Thermal Shock

*HDI P*roducts

BACK

Buried Via and Laser Blind Via

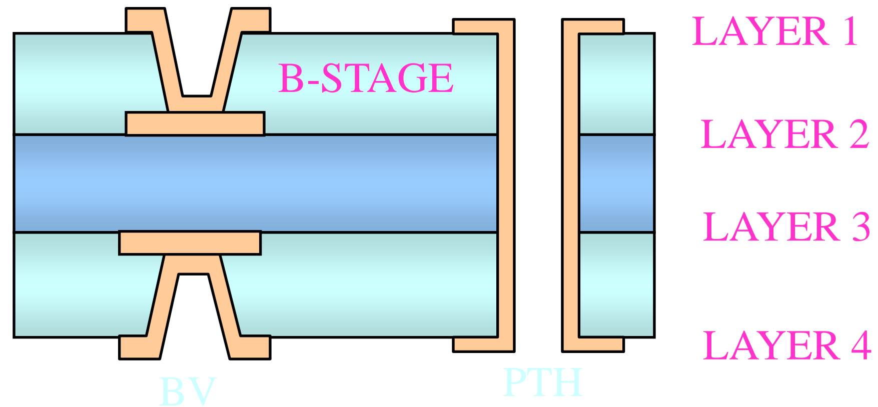
A = THROUGH Via Hole (導通孔)
B = BURIED Via Hole (埋孔)
C = STAGGER Blind Via （雷射盲孔）
D = TWO LEVEL Laser Via (雷射盲孔）

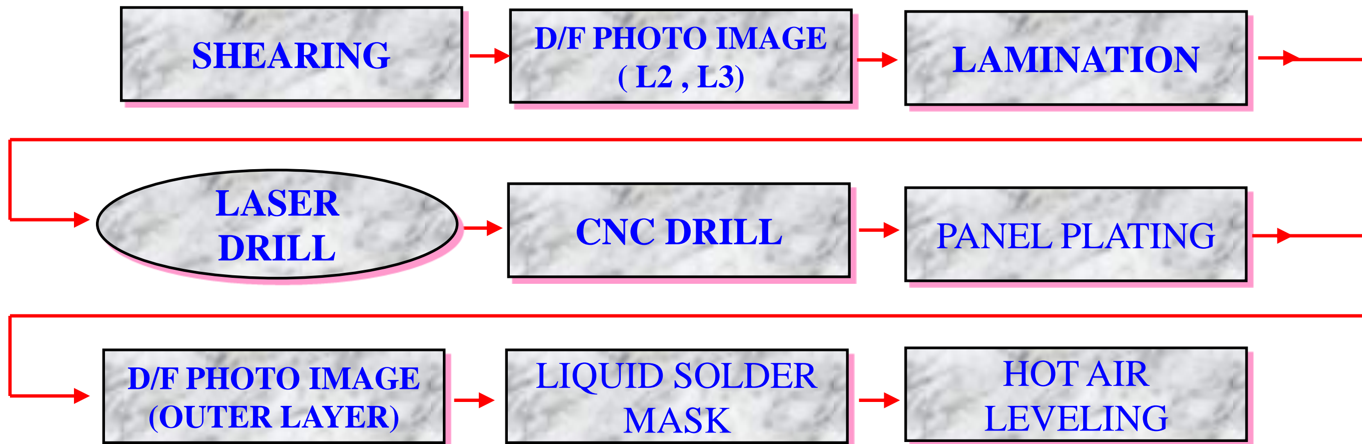


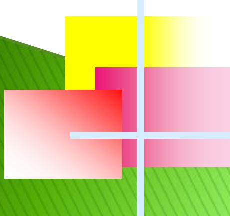
LASER BLIND & BURIED VIA LAY-UP

ROCKET PCB

4Ls MLB with Blind Via Process







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8Ls MLB with Blind Via Process

LAYER 1
LAYER 2
LAYER 3
LAYER 4
LAYER 5
LAYER 6
LAYER 7
LAYER 8

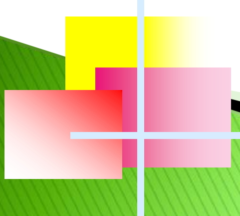
PTH BV

L1-L2: DRILLING → PTH → INNER LAYER IMAGE (L2)

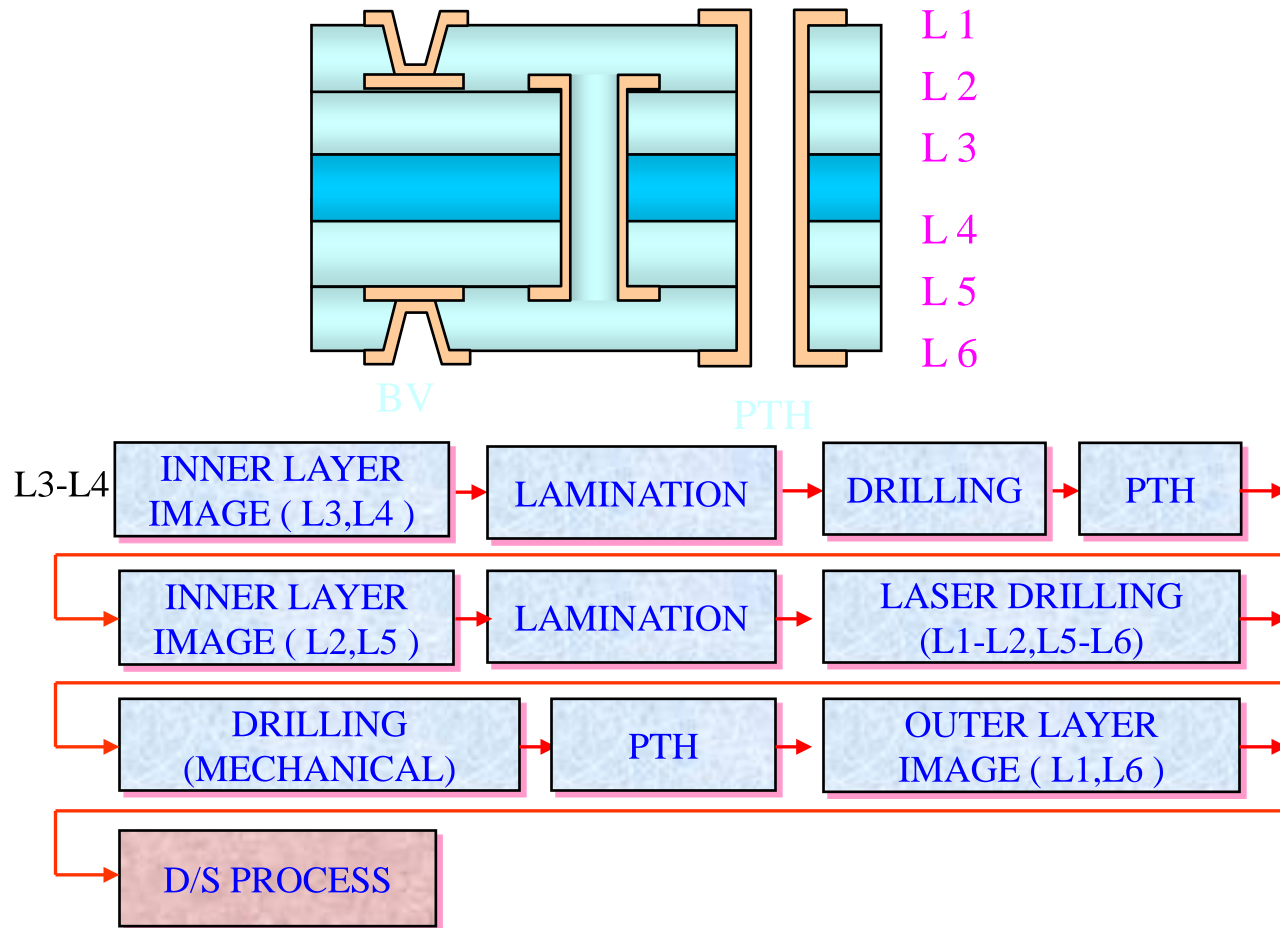
L7-L8: DRILLING → PTH → INNER LAYER IMAGE (L7)

L3-L4, L5-L6: INNER LAYER IMAGE

→ LAMINATION → D/S PROCESS

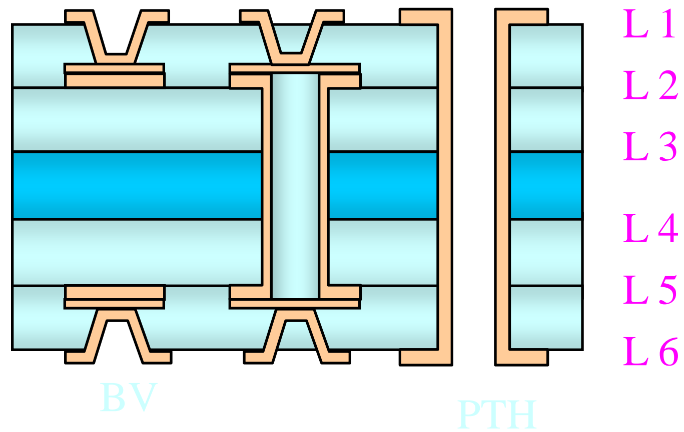


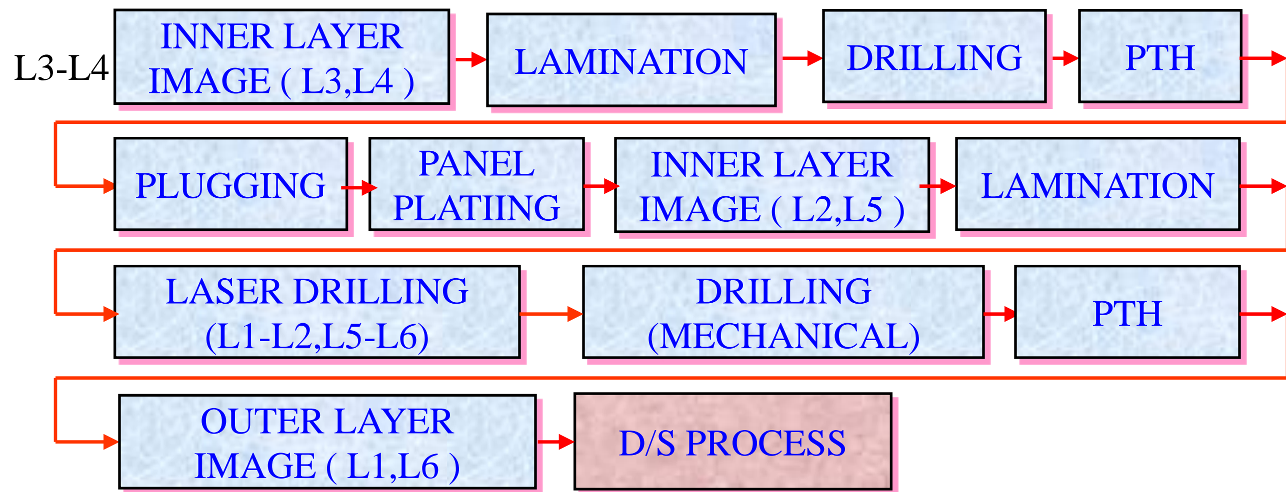
6Ls MLB with Blind & Buried Via Process

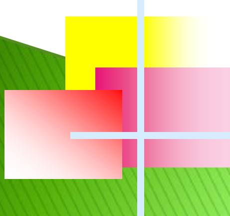


ROCKET PCB

6Ls MLB with Blind & Buried Via Process

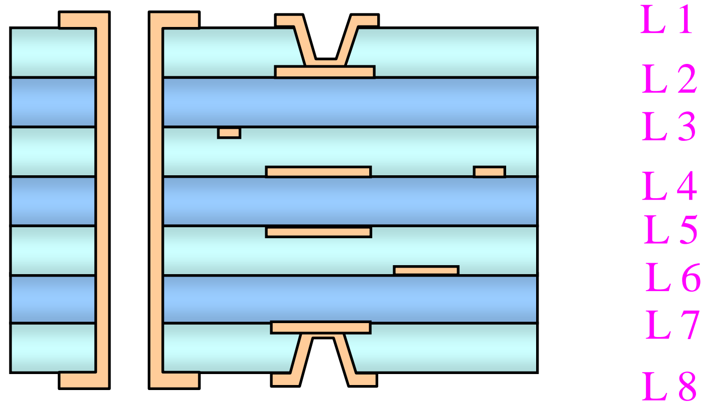






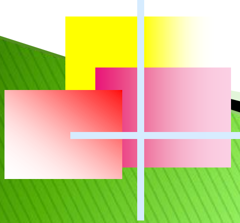
ROCKET PCB

8Ls MLB with Laser Blind Via Process



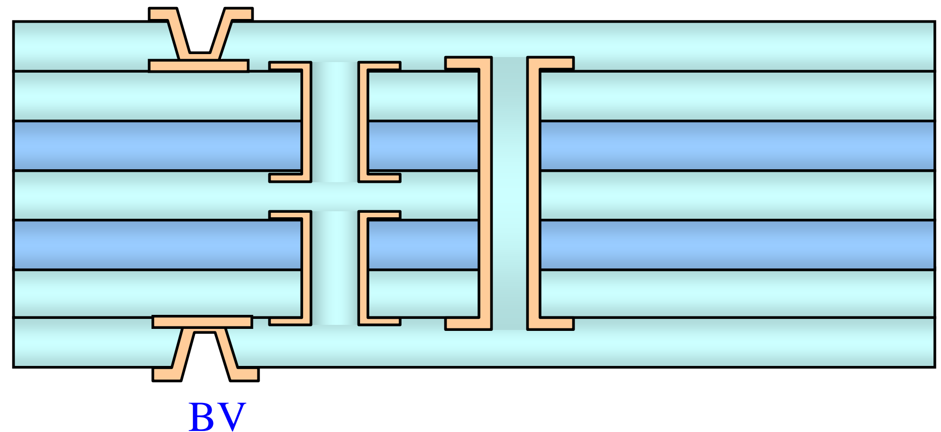
L2-L3
L4-L5
L6-L7

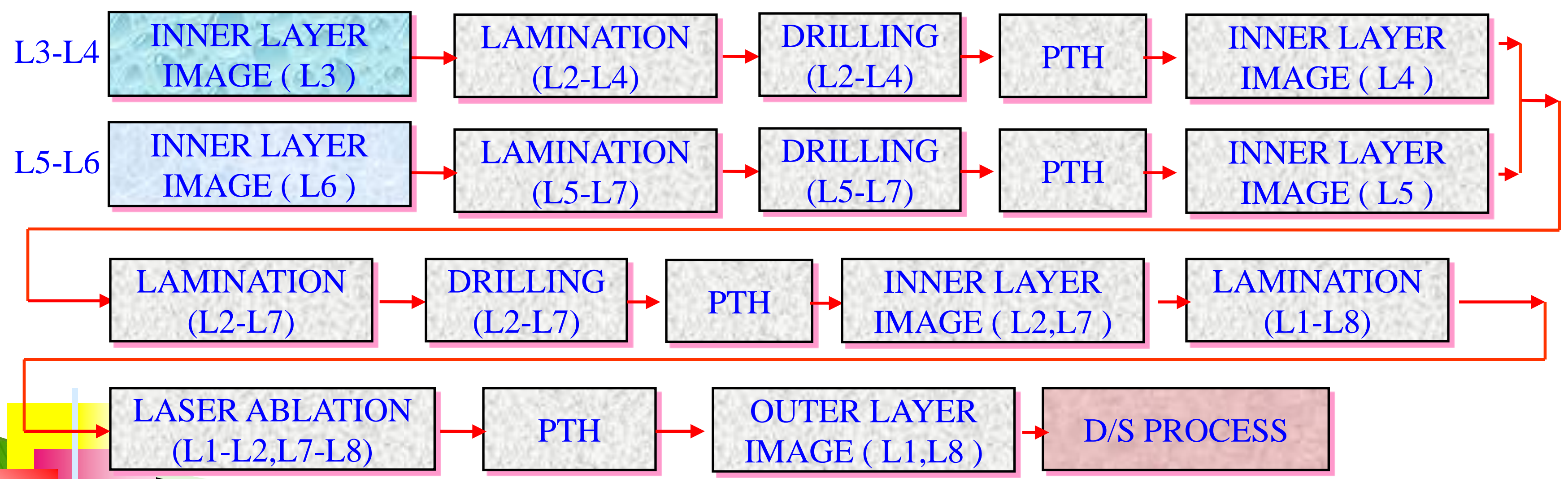
INNER LAYER IMAGE(L2-L7) → LAMINATION (L1-l8) → LASER DRILLING (L1-L2,L7-L8) → DRILLING (L1-L8) (MECHANICAL DRILL) → PTH → OUTER LAYER IMAGE (L1,L8) → AOI Inspection → Double Side PROCESS



ROCKET PCB

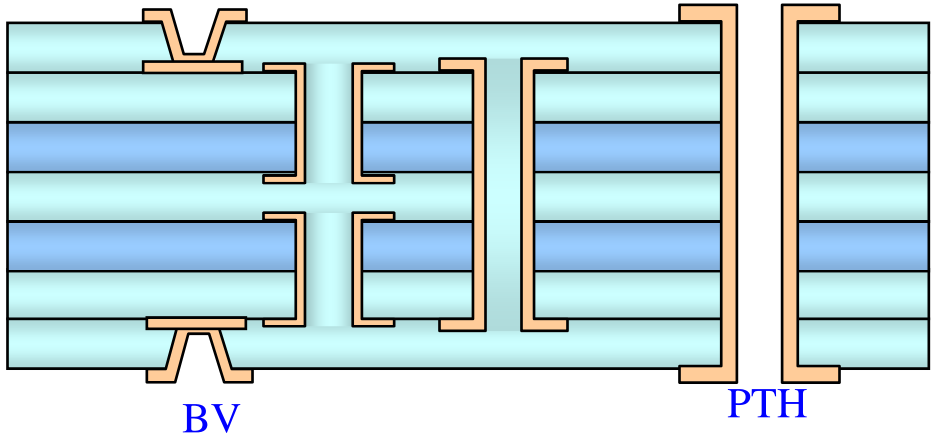
8Ls MLB with Laser Blind Via Process

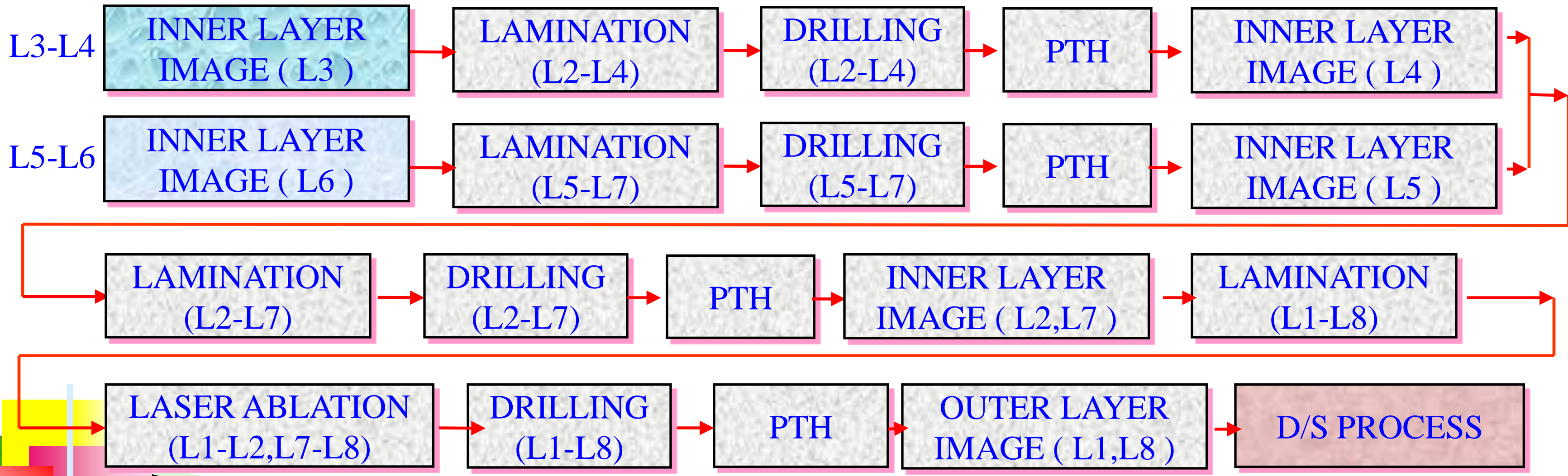




ROCKET PCB

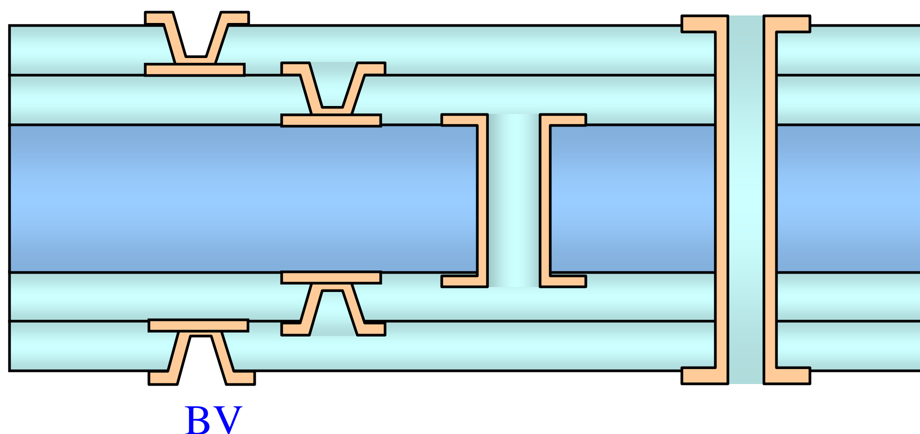
8Ls MLB with Laser Blind Via Process

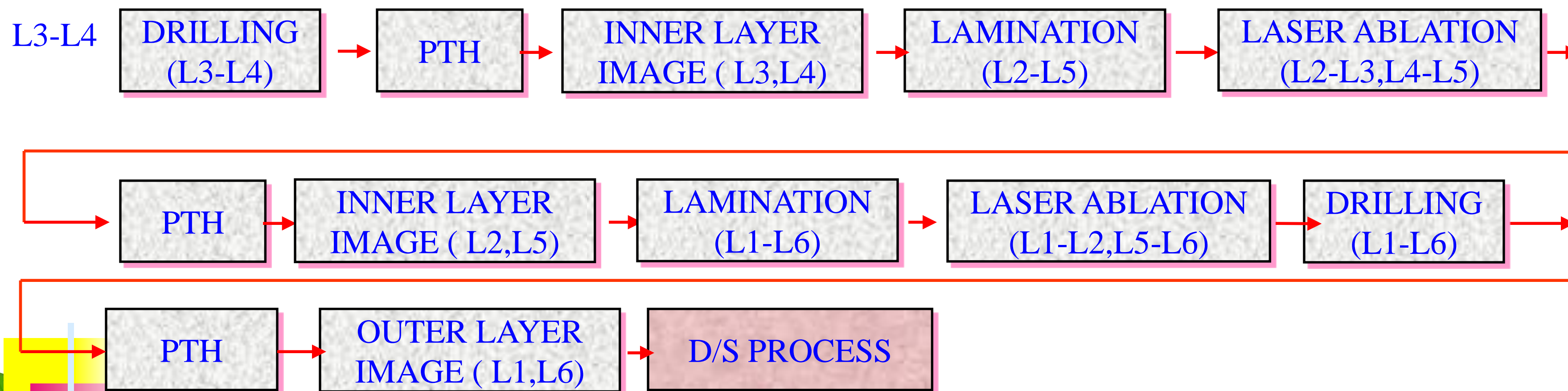




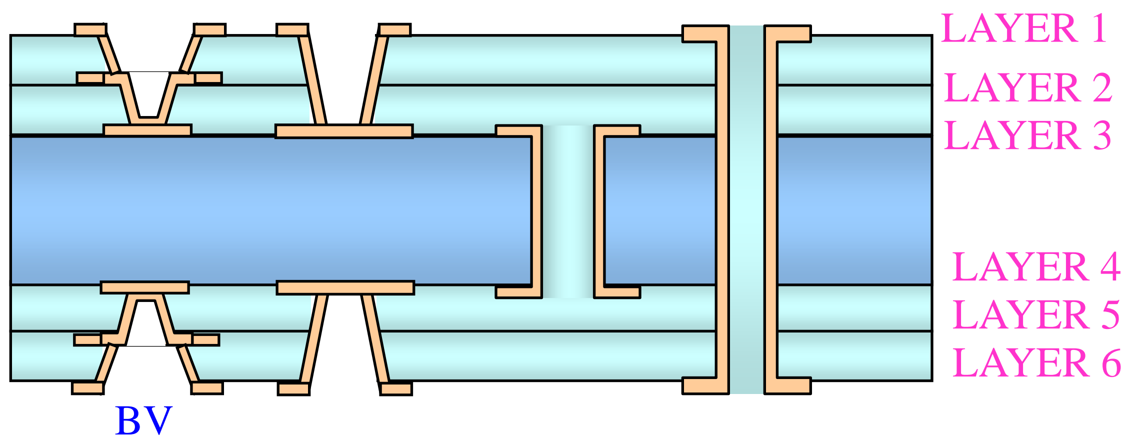
ROCKET PCB

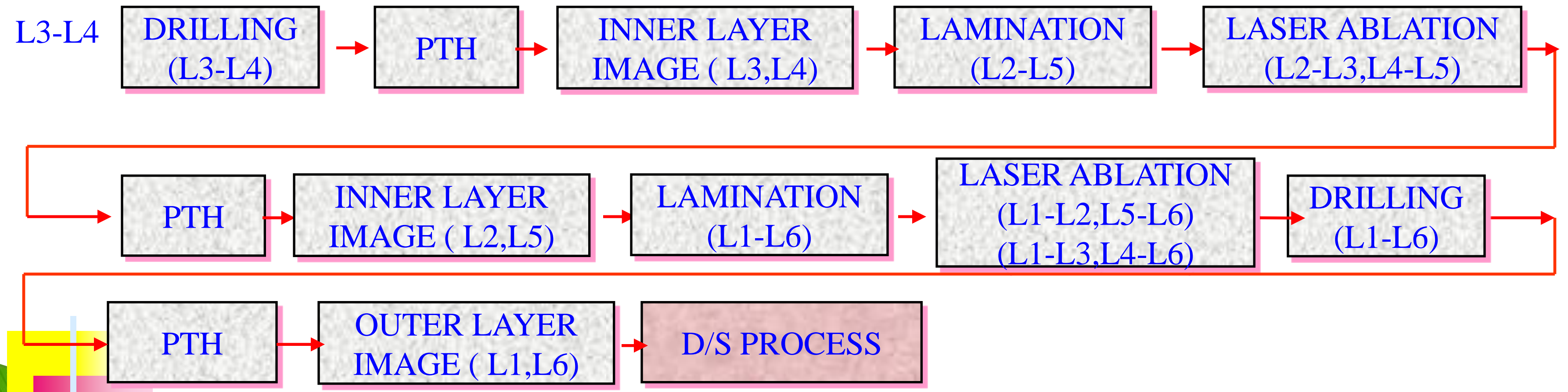
6Ls MLB with Laser Blind Via Process



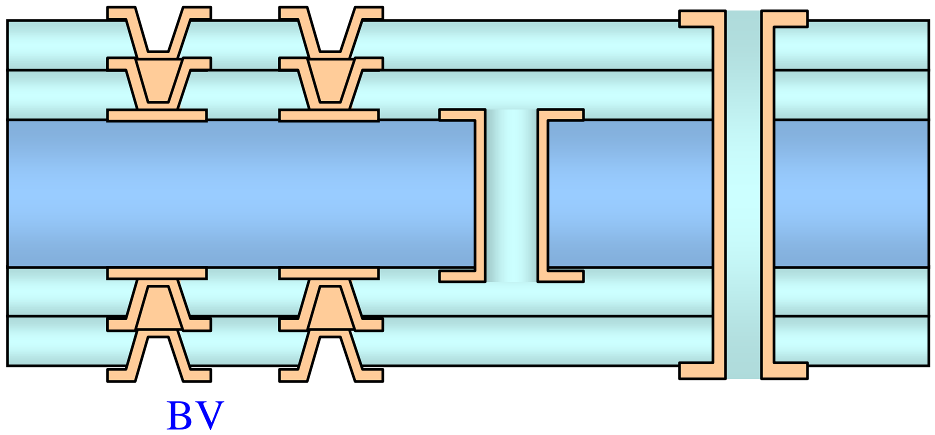


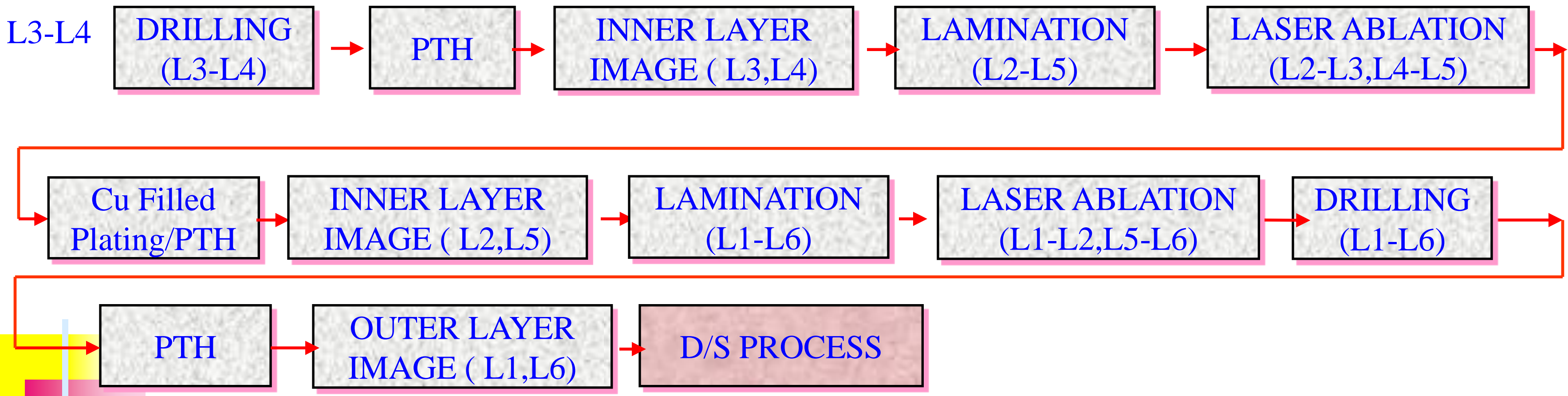
6Ls MLB with Laser Blind Via Process





6Ls MLB with Laser Blind Via Process





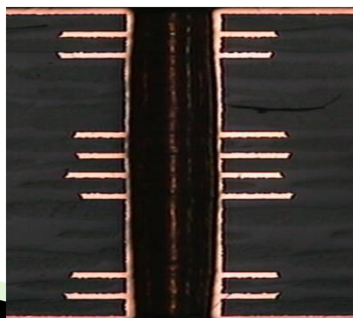
ROCKET PCB

Technology Roadmap

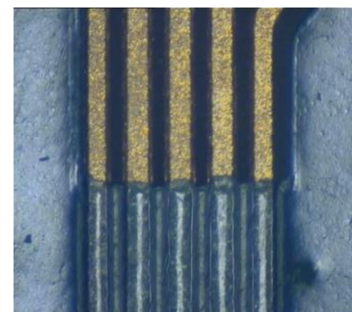
Technology Roadmap

	2005	2006	2007	2008
PCMCIA, 14 Layers	Blind Via	HDI		Buried C. R.
Line/Space	4 / 4 mil, 3.5 / 3.5 mil	3/3mil	3/3 mil	2.5/2.5 mil
Micro Via(D)	5 mil	4 mil	3 mil	2.5 mil
Surface Finish	Immersion Ni / Au, Entek, Gold Plating, Selective Ni / Au, Immersion Silver&Tin, HASL			
Green Material	Halogen Free, Lead Free			
Layer Reg.	4 mil	3.5 mil	3 mil	2.5 mil

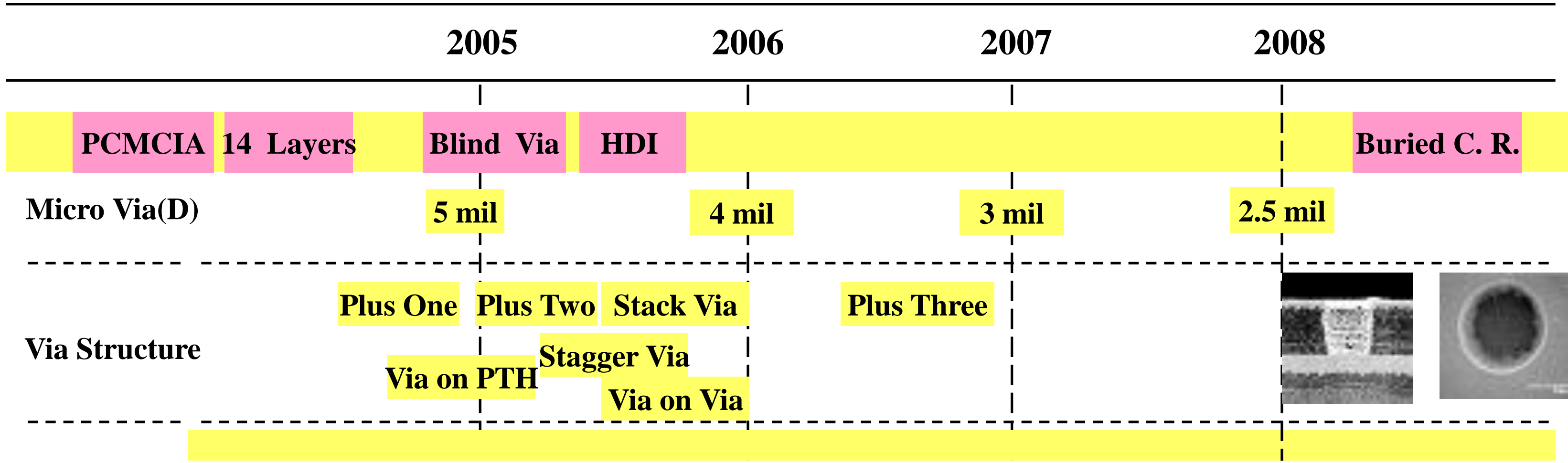
Layer Reg.

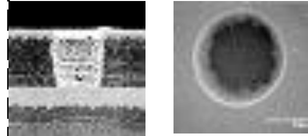


Line/ Spacing.

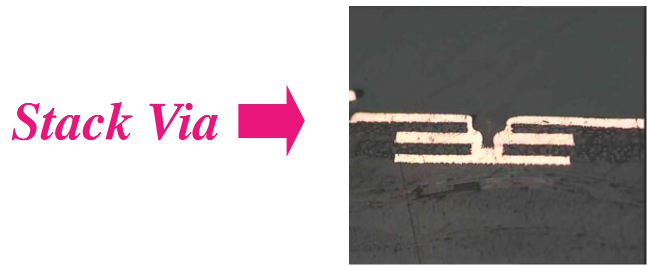


Technology Roadmap

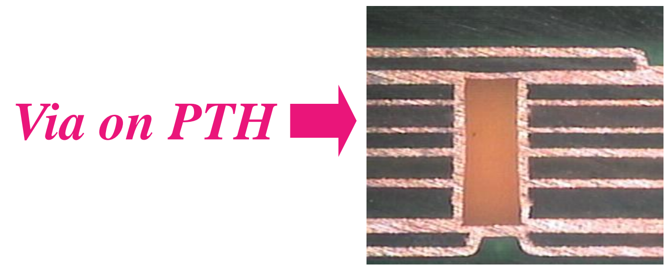




Stack Via →

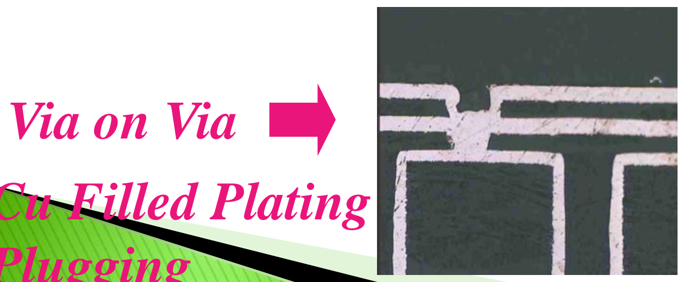


Via on PTH →

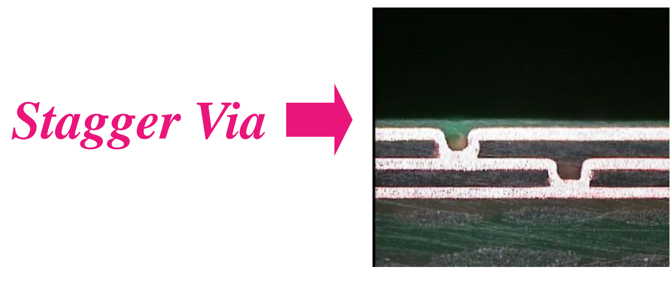


Via on Via →

- *Cu Filled Plating*
- *Plugging*



Stagger Via →



ROCKET PCB

Capability (HDI)

		2006	2007	2008	2009
Max. build-up layer count per side	layers	2	2	3	3
Min. build-up dielectric thickness	mil	2.6	2.6	2.0	2.0
Min. micro via diameter (Unfinished)	mil	5	4	4	3
	mil	12	12	10	10
Max. micro via aspect ratio		0.8:1	0.8:1	0.9:1	1:1
Line / Space	mil	3/3	3/3	2.5/2.5	2/2
Layer to layer Reg. Tolerance	mil	3.5	3	2.5	2
Solder Mask Reg. Tolerance	mil	1.5	1.5	1. 25	1
Impedance control	%	±10	±10	±7	±7
Via on PTH	Yes/No	Yes	Yes	Yes	Yes
Via on Via	Yes/No	Yes	Yes	Yes	Yes
Plugged Plating	Yes/No	Yes	Yes	Yes	Yes

ROCKET PCB

Capability (PWB)

		2006	2007	2008	2009
PTH Hole Size (Finished)	mil	6	5	4	4
Max. PTH aspect ratio		7:1	8:1	9:1	10:1
Line / Space	mil	3/3	3/3	2.5/2.5	2/2
Min. SMT pitch	mil	8	7	7	6
Layer to layer Reg. Tolerance	mil	3.5	3	2.5	2
Solder Mask Reg. Tolerance	mil	1.5	1.5	1.25	1
Impedance control	%	±10	±10	±7	±7
Board flatness tolerance	%	0.7	0.7	0.5	0.5
Min. board thickness of 4 layers	mil	14	12	12	10
Min. board thickness of 8 layers	mil	27	25	22	20
Min. board thickness of 12 layers	mil	41	37	34	32
Max. board thickness	mil	100	100	100	120

ROCKET PCB

Thank you !