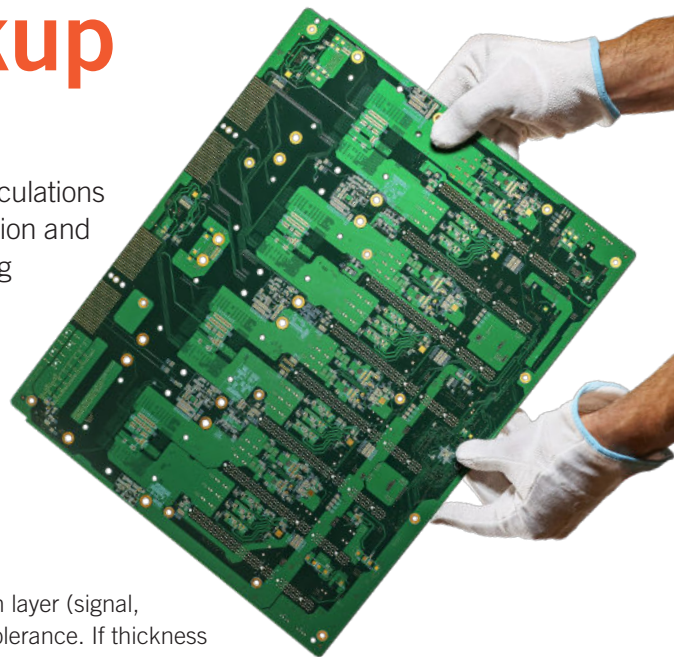


What we need to generate an accurate PCB stackup

NCAB offers PCB stackup modeling and controlled impedance calculations to help our customers develop designs that are optimal for application and manufacturing. Using tools from Polar Instruments, our engineering team can evaluate customer needs to develop a practical stackup for your design. To provide an accurate recommendation, we need complete and clearly defined information about the board construction, electrical requirements and any design constraints.



The information below outlines what should be provided when requesting stackup support.

- **Board construction:** Identify the layer count, layer order and function of each layer (signal, plane, mixed or shielding). Include the target finished board thickness and tolerance. If thickness is critical, identify whether copper surface finish, and solder mask are included in that value. Estimated copper distribution is beneficial if known at time of request.
- **Copper requirements:** Provide the starting copper weight or thickness for every copper layer and any minimum finished copper requirement. Clearly distinguish base copper from finished outer-layer copper. Identify any heavy copper, mixed copper weight or current-carrying requirement.
- **Material requirements:** State the required material family, IPC-4101 slash sheet, Tg, Td, CTI, halogen-free or lead-free assembly requirements. Please specify if a specific laminate brand and grade is mandatory. If equivalents are allowed, provide the properties that must be matched.
- **Electrical performance:** List every controlled impedance by layer, structure type, target value and tolerance. Include the reference plane(s), intended routing layer, differential pair spacing or any fixed trace-width/spacing constraints. For RF designs, provide the design frequency and the Dk/Df values or test method used.
- **Drill and via structure:** Supply finished hole sizes, pad sizes, plated or non-plated status and the via types used. For HDI, identify every laser drill span, buried via span, sequential lamination cycle, stacked or staggered condition and any via fill or cap requirement, including IPC-4761 type when specified.
- **Special construction details:** Identify rigid-flex or flex regions, stiffeners, coverlay, adhesiveless material, cavities, embedded components, edge plating, countersinks, copper coins, thermal vias or other features that affect material selection, lamination or finished thickness.
- **Fabrication data:** Provide the manufacturing drawing/notes and complete Gerber X2, ODB++ or IPC-2581 data set, plus NC drill files, as accurately as possible in this part of the design process. Built-in CAD cross-sections or constraint tables are also useful. Ensure that the drawing, data and impedance table match the layer count and layer name.

Note! A **preliminary stackup** is for design guidance. The **production stackup** must be reviewed and approved after the final fabrication data, selected factory and actual material availability are confirmed. Notify us which requirements are possible to change. If overall thickness, copper weight, material, trace width or impedance geometry has a priority, identify it. A stackup can often be optimized, but NCAB needs to know which requirements are fixed and which may be adjusted.

Download our PCB design guideline for Stackups and Impedances



The examples below show common transmission-line structures used when modeling controlled impedance. The correct model depends on where the trace is located, how it references adjacent copper and whether nearby ground copper is part of the structure. NCAB uses the final design geometry and selected material properties when completing calculations in Polar Instruments software.

10ML BOARD - 1,60MM	
Contents	Thickness (mm)
Solder mask	0,02
0,5oz + plating	0,035
PP	0,120
CCL 0,22 1oz/1oz	0,035
	0,150
	0,035
PP	0,120
CCL 0,22 1oz/1oz	0,035
	0,150
	0,035
PP	0,150
CCL 0,22 1oz/1oz	0,035
	0,150
	0,035
PP	0,120
CCL 0,22 1oz/1oz	0,035
	0,150
	0,035
PP	0,120
0,5oz + plating	0,035
Solder mask	0,02
Total	1,620

For more information, visit NCAB website: www.ncabgroup.com