

# PCB Fabrication Requirements for Multi Layer Boards Containing Blind, Buried and Micro Vias

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Today PCB produces two cnc reports. The first is for un-plated holes the second is for plated vias and pins.

The rules for buried, blind and micro vias are:

Don't mix the layers. If there is a buried via connecting layers 2, 3, and 4, there can not have a buried via connecting layers 3, 4 and 5. This is because the fab shop will build up the layers 2, 3, and 4. Drill and plate the holes for these layers. Add the other layers to make the complete board. Finally drill and plate all the normal vias.

The way to present this information is with separate CNC files for each group of layers. It is also a good idea to provide the FAB shop with an fab drawing which shows the various groups of vias.

Rules:

1) Any group of layers that have blind or buried layers can not be intermingled with another group of layers that have blind or buried via. There must be a separation dielectric layer between the groups

Example: 8 Layer Board

Group 1) Blind via connecting Layers 1, 2, 3 and 4. Buried Via connecting Layers 2, 3 and 4. This is legal. The fabrication process would be to align, press and drill Layers 2,3 and 4 then align, press and drill layer 1 with the previous set of layers. The drill bit can pass through all four layers.

Adding a second Group

Group 2) Buried Via connecting Layers 3, 4 and 5. Combined with the first group this is not allowed.

Replacing Group 2 with Group 3

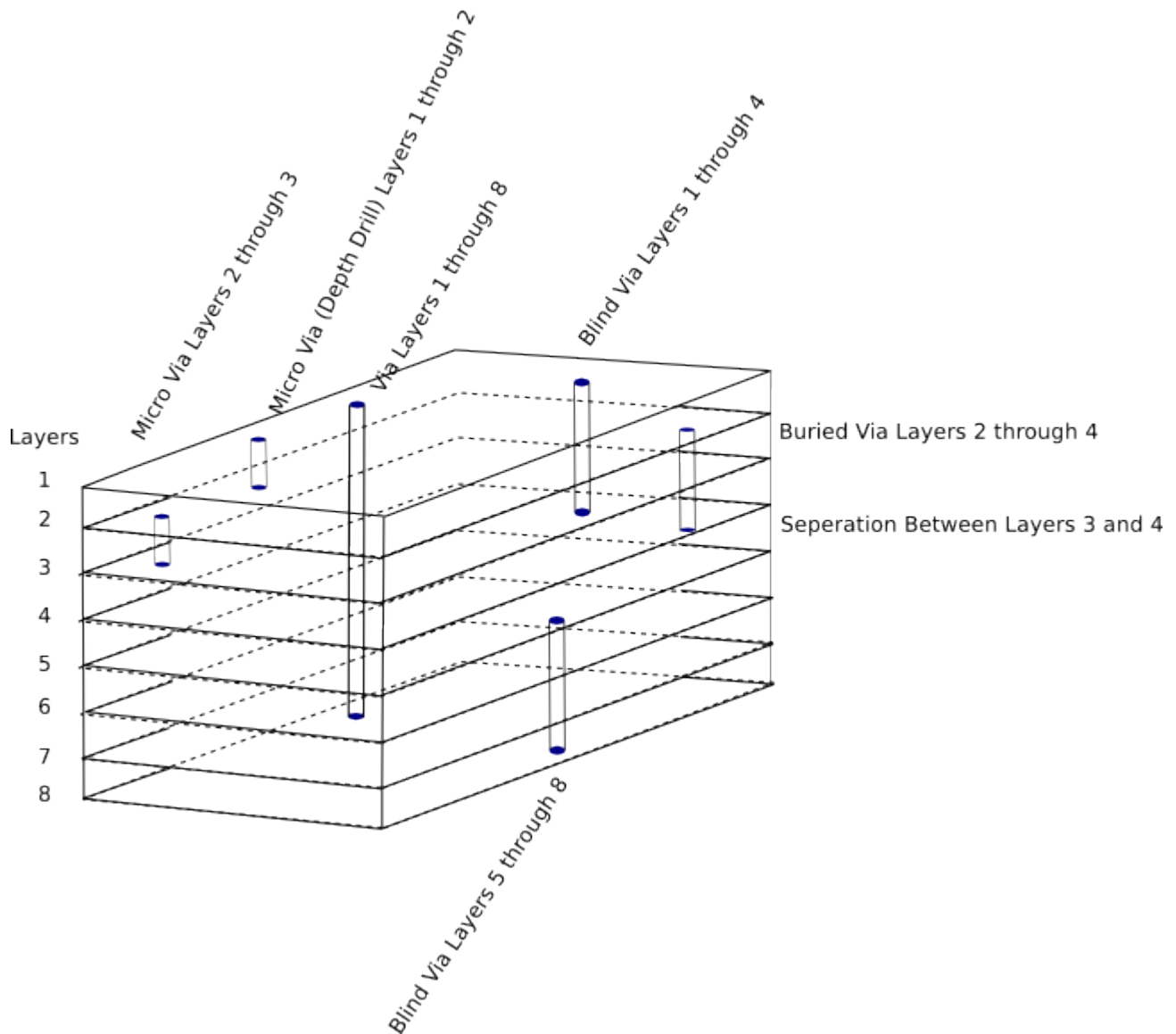
Group 3) Buried via connecting Layers 5, 6, 7 is legal since the two groups do not overlap and there is a separation layer of dielectric between them.

2) Depth Drilling from final board outer layers into inner layers is allowed to violate rule number 1 as long as the diameter of the hole is equal or greater than the required drill depth. The number of layers that Depth drilling can penetrate is a function of width to depth. Normally this limits the depths to be drilled to 1 or 2 layers.

Example: 8 Layer Board

Group 1) Buried Via connecting Layers 5, 6 and 7. Depth Drill from outer layer connecting layers 6, 7 and 8.

Complete Example of an Eight Layer Board containing a via, blind vias, buried vias and depth drilled micro blind via.



Required Files:

CNC file for layers 2 and 3 (drill\_2\_3.cnc)  
CNC file for layers 2, 3 and 4 (drill\_2\_4.cnc)  
CNC file for layers 1, 2, 3 and 4 (drill\_1\_4.cnc)  
CNC file for layers 5, 6, 7 and 8 (drill\_5\_8.cnc)  
CNC file for depth drilled from the top Layer (drill\_1\_2.cnc) (drill\_1\_3.cnc)  
CNC file for depth drilled from the bottom Layer  
CNC file for layers 1, 2, 3, 4, 5, 6, 7, 8 (drill\_1\_8.cnc)  
un-plated CNC file for layers 1, 2, 3, 4, 5, 6, 7, 8 (drill\_unplated\_1\_8.cnc)

The drawing used in the above example might be a useful tool for working the technical issues out with the fab shops. If anyone is looking for an interesting project, automatically generating such a drawing from the pcb files might be useful.

History: This document is based upon conversations between the author and Pat Stroman of Hunter Technology and questions raised by D.J. Delorie.