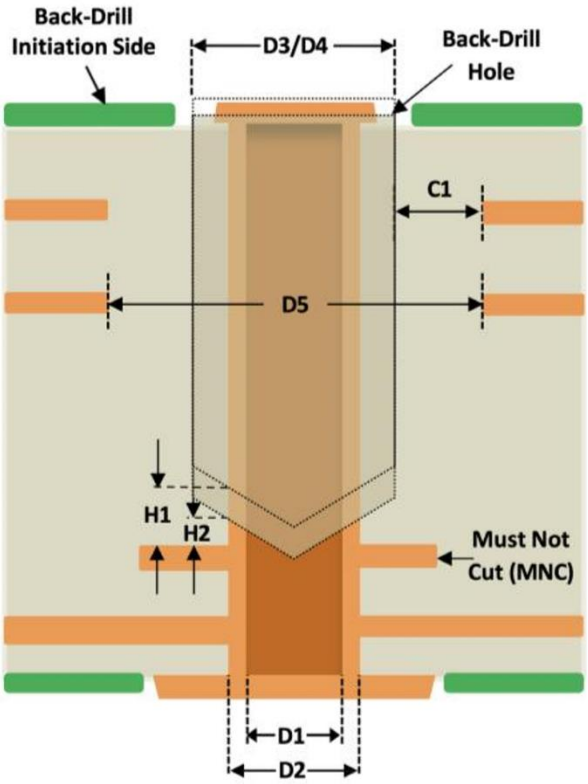
BACK DRILL DESIGN GUIDELINE

PURPOSE OF BACK DRILLING INTERCONNECTS

Removing the unused portion of copper plating from the barrel of plated through holes used to route high speed signals has been shown to improve signal quality by reducing attenuation. Back-drilling, as it is commonly known, is the process used to remove the unused portion of the copper plated barrel. Historically back-drilling has been used primarily on back panels, but ever increasing speeds and improved signal quality requirements have driven the need to utilize it on active PCBs as well.



Reference Back Drill Sizing Chart (in.)

PTH Finished Hole Size D1	PTH Primary Drill Bit D2 *	Back Drill Preferred Bit D3	Back Drill Minimum Bit D4
0.0060	0.0079	0.0157	0.0145
0.0080	0.0098	0.0177	0.0157
0.0080	0.0118	0.0197	0.0177
0.0100	0.0098	0.0177	0.0157
0.0100	0.0118	0.0197	0.0177
0.0110	0.0118	0.0197	0.0177
0.0120	0.0118	0.0197	0.0177
0.0140	0.0135	0.0217	0.0197
0.0160	0.0197	0.0276	0.0256
0.0170	0.0217	0.0292	0.0276
0.0180	0.0217	0.0292	0.0276
0.0190	0.0225	0.0310	0.0292
0.0200	0.0236	0.0330	0.0310
0.0210	0.0250	0.0330	0.0310
0.0220	0.0256	0.0350	0.0320
0.0230	0.0276	0.0360	0.0335

* Primary drill selection for vias is determined by via pad size, annular ring requirements, aspect ratio and drill to copper rather than the finished via hole size requirement

Capability Category		Capability
H1	Nominal Stub Length and Tolerance from MNC Layer *	0.007” +/- 0.005”
H2	Minimum Stub Length from MNC layer	0.002”
C1	Back Drill Clearance to Adjacent Copper Features	0.006”
D5	Back Drill Anti-Pad Diameter	Back Drill + 0.012”
	Back Drill Size Over Primary Drill (D2) see BD Sizing Chart)	Primary Drill + 0.008”
	Absolute Minimum Back Drill Bit Diameter	0.0157”

*Tighter tolerances for stub length are possible depending on design and stackup. If shorter maximum stub lengths are required, please contact a WELEXON Field Applications Engineer for review

BACK DRILL DESIGN EXAMPLE FAB DRAWING NOTES

Back Drill: Top to Must Not Cut L10_S_3V

Symbol	FHS	Tolerance	Plating	Quantity	BD Diamter	BD File Name
X	.010	+.0015" / -.010"	Plated	143	.017" +/-.002"	ncdrill_Top_L10S_3V.drl

Note: This PCB requires back drilling using the unique file(s) for X and Y locations in the tables listed.

Back Drill Callouts

- All back drills must provide a remaining barrel stub length of .002" minimum to .012" mils maximum from the MNC layer listed
- At no time shall the must not cut layers be contacted by the back drill
- Back drilled portion of barrel must be free of residual metal to assure proper electrical performance
- Holewall quality (burrs, gouges, etc.) to meet IPC 600 requirements
- Outer layer condition (scratches, burrs, etc.) to meet IPC 600 requirements

Back Drill Hole Size Guideline

- Back drills that are .006" vs .008" larger than the primary drill may require additional testing. Please work with your FAE or Account Manager for assistance
- Sizes are for reference in standard designs
- Press fit connectors will occasionally drive drill bit sizes other than is shown above, or may have a non-symmetrical tolerance. To determine back drill sizes in this case please contact your local sales manager or field application engineer