PCBWay PCB Capabilities

PCBWay has prototype PCB,PCB Production fabrication and pcb assembly capabilities.

Instant Quote & Order Online

PCB Capabilities

- PCB Capabilities
- Advanced PCB Capabilities
- Multi-layer laminated structure
- Quick turn PCB Fabrication
- PCB Prototyping
- Low-volume Production
- Production Process
- PCB Products
- FAQ of PCB

PCBA Capabilities

- PCB Assembly Capability
- Special Reminders
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We Offer a Wide Range of PCB Capabilities to Fit All of Your PCB needs

PCBWay is a professional quick-turn PCB prototyping, PCB Assembly and low-volume production manufacturer located in Shenzhen China. (3 major PCBs and 2 PCB Assembly production).

The information below details some of the key capabilities that PCBWay can offer and support today. You will find information here relating to the specific materials we can support, the PCB technologies or product types that we currently produce, as well as some of the tolerances which we can achieve.

The first category is what we call "Quick-turn" which means we can offer Small Quantity - Quick Turn PCBs, Custom Spec - Standard PCBs, and Quick-order PCBs (Gerber Viewer).

The second is our "Advanced" offering and this shows the very best that PCBWay can offer: Full Spec PCBs, Highly Specialized Precision PCBs, & Large Scale Production, but sometimes some plates and materials are temporarily out of stock.

Please send messages to your sales rep if your boards are beyond the capabilities listed below.

"Standard PCB" = Advanced + quick-order

PCB Capabilities - Quick-turn PCB

Items		Manufacturing Capabilities	Remarks
Number of Layers	-	1-10 layers	For orders above 10 layers,please view the below "Standard PCB" or contact our sales rep.
Material	-	FR-4,Aluminum	For Flex, Rigid-flex, Metal-based (Aluminum etc.,), HDI, Halogen-free, High Tg, etc.,please view the below "Standard PCB" or contact sales rep.
Maximum PCB Size(Dimension)	-	500*1100mm (min 5*6mm)	Any sizes beyond this dimension, please view the below "Standard PCB" or contact sales rep.
Board Size Tolerance(Outline)	-	±0.2mm/±0.5mm	±0.2mm for CNC routing, and ±0.5mm for V-scoring.
Board Thickness		0.2-2.4mm	0.2,0.4, 0.6, 0.8, 1.0, 1.2, 1.6, 2.0, 2.4mm. Please view the below "Standard PCB" or contact us if your board exceeds these.
Board Thickness Tolerance(t≥1.0mm)	-	±10%	Normally "+ Tolerance" will occur due to PCB processing steps such as electroless copper, solder mask and other types of finish on the surface.
Board Thickness Tolerance(t<1.0mm)	-	±0.1mm	
Min Trace		0.1mm/4mil	Min manufacturable trace is 4mil(0.1mm), strongly suggest to design trace above 6mil(0.15mm) to save cost.
Min Spacing			Min manufacturable spacing is 4mil(0.1mm), strongly suggest to design spacing above 6mil(0.15mm) to save cost.
Outer Layer Copper Thickness		1oz/2oz/3oz(35μm/70μm/105μm)	Also known as copper weight. 35μm=1oz, 70μm=2oz, 105μm=3oz. Please view the below "Standard PCB" or contact us if you need copper weight greater than 3oz.
Inner Layer Copper Thickness		1oz/1.5oz(35μm/50μm)	Inner copper weight as per customer's request for 4 and 6 layers(Multi-layer laminated structure). Please contact us if you need copper weight greater than 1.5oz.

Items		Manufacturing Capabilities	Remarks
Drill Sizes (CNC)		0.2-6.3mm	Min drill size is 0.2mm, max drill is 6.3mm. Any holes greater than 6.3mm or smaller than 0.3mm will be subject to extra charges.
Min Width of Annular Ring		0.15mm(6mil)	For pads with vias in the middle, Min width for Annular Ring is 0.15mm(6mil).
Finished Hole Diameter (CNC)		0.2mm-6.2mm	The finished hole diameter will be smaller than size of drill bits because of copper plating in the hole barrels
Finished Hole Size Tolerance(CNC)	-	±0.08mm	For example, if the drill size is 0.6mm, the finished hole diameter ranges from 0.52mm to 0.68mm will be considered acceptable.
Solder Mask		LPI	Liquid Photo-Imageable is the mostly adopted. Thermosetting Ink is used in the inexpensive paper-based boards.
Minimum Character Width(Legend)		0.15mm	Characters of less than 0.15mm wide will be too narrow to be identifiable.
Minimum Character Height (Legend)	-	0.8mm	Characters of less than 0.8mm high will be too small to be recognizable.
Character Width to Height Ratio (Legend)	-	1:5	In PCB silkscreen legends processing, 1:5 is the most suitable ratio
Minimum Diameter of Plated Half Holes	-	0.6mm	Design Half-Holes greater than 0.6mm to ensure better connection between boards.
Surface Finishing		HASL with lead HASL lead free Immersion gold,OSP	The most popular three types of PCB surface finish. Please view the below "Standard PCB" or contact us for other finishes.
Solder Mask		Green ,Red, Yellow, Blue, White ,Black	No extra charge (Green, Red, Yellow, Blue)
Silkscreen		White, Black, None	No extra charge.
Panelization		V-scoring, Tab-routing, Tab-routing with Perforation (Stamp Holes)	Leave min clearance of 1.6mm between boards for break-routing. For V-score panelization, set the space between boards to be zero.
Others	-	Fly Probe Testing (Free) and A.O.I. testing(free), ISO 9001:2008 ,UL Certificate	No extra charge.

Advanced PCB Capabilities - Advanced PCB

Categories	No.	Items	PCB process parameters				Remarks
			Normal process	Medium difficulty	High difficulty		
					Non-standard review	Unable to make	
product type	1	Multilayer PCB Layers	3L≤Layers≤16L	18L≤Layers≤24L	≥24L		
	2	Blind and Buried Vias	HDI(1+1+....+N+.....+1+1)	Anylayer HDI	HDI(2+...+N...+2)		If meet the requirements of 2, 6, and 21 at the same time, it is classified as a high requirement product (thickness to diameter ratio, copper thickness of hole)
	3	Surface Coating	HASL(+gold finger),immersion gold, Immersion Gold +gold fingers with hard gold,OSP (+gold finger with hard gold), Immersion Tin (+gold finger with hard gold) (Not two different surface finish),Immersion Tin	Local immersion gold (long or short gold fingers, segmented gold finger craft)	Exceed this range require unconventional production processes		Partial immersion gold, thickness of gold or nickel reference to the thickness of the coating
	4	Board Material	FR-4;aluminum,Rogers4 series + FR-4 mixed(The Prepreg is ShengYi brand and ROGERS4403 series);CEM-3、LianMao IT158/IT180A	Pure ROGERS4 series multi-layer board (Prepreg is 4450F),PTFE、aluminum+FR4、PTFE+FR4	Exceed this range require unconventional production processes	Pure PTFE multi-layer board	Pure PTFE can't be made because the lamination temperature isn't up to standard,Can't laminate Rogers copper foil directly

Categories	No.	Items		PCB process parameters				Remarks
				Normal process	Medium difficulty	High difficulty		
						Non-standard review	Unable to make	
Drills	5	Drill diameter	Nc drill	0.20mm≤Drill diameter≤6.5mm More than 6.0mm using CNC milling hole diameter 0.2mm: maximum board thickness 1.6mm hole diameter diameter 0.25mm:maximum board thickness 2.0mm, hole diameter 0.3mm≤Φ≤0.35mm, maximum board thickness 3.2 mm, hole diameter 0.4mm≤Φ≤0.55mm, maximum board thickness 4.8 mm, hole diameter>0.55mm maximum board thickness 6.4 mm	6.5mm or more ±0.1mm ≤ hole diameter tolerance (using CNC milling for 6.5mm or more)	The drill diameter more than 6.0mm, the hole diameter tolerance less than ±0.1mm. If exceed this range require unconventional production processes		Drill diameter below 0.2mm, and the aspect ratio≥10, which is medium difficulty
	6	Thickness to diameter ratio		Thickness to diameter ratio≤8	8	10	Thickness to diameter ratio greater than 12 when the aperture cannot be compensated	If need to meet the requirement of 2, 6, and 21, it will be treat as high requirement product.
	7	countersink	hole diameter	3.0mm≤hole diameter≤6.5mm		Unconventional production beyond this range		Countersink depth tolerance is controlled 0.15mm
			Angle	90°		Unconventional production beyond this range		
	8	Hole position tolerances		±0.075mm		±0.05mm	<+/-0.05mm	
	9	hole diameter tolerance	PTH	±0.075mm or no customer requirements	±0.05≤ hole diameter tolerance <±0.75mm	<±0.05mm	<+/-0.05mm	Metallized hole diameter tolerance of 6.0mm or more refers to the requirement of serial number 5
			NPTH	≥±0.075mm		<±0.05mm	<+/-0.025mm	
			Special hole: pressfit	≤±0.05	\	\		
			Special hole: non-plated Countersink/Counterbore holes(NPTH)	hole diameter <10mm:tolerance ±0.15mm,hole diameter ≥10mm:tolerance ± 0.20mm	\	\		
			Special hole: non-plated Countersink/Counterbore holes（NPTH）	hole diameter <10mm:tolerance ±0.2mm hole diameter ≥10mm:tolerance+0.3mm	\	\		
	10	Hole to hole spacing	component hole	≥16MIL	14≤Hole to hole spacing≤16	13≤Hole to hole spacing≤14	<13mil	
			via （≤0.45mm）	≥11MIL				
	11	Slot (Cut-out)	Slot width	Plated slot ≥0.5mm Non-plated slot ≥0.8mm	\	\		More than 1.0mm, can be slot by machine
			Length to width ratio of slot	Length to width≥2	Length to width<2			
	12	Castellated Holes	Castellated Holes diameter	≥0.5mm	0.5mm>diameter≥0.4mm	\		
			Castellated Holes spacing (edge to edge)	≥0.3mm	0.3mm>diameters≥0.2mm	\		
	13	Minimum isolation ring of Inner layer, The distance between minimum hole in Inner layer and circuit (before compensation)	4L	≥7MIL	6MIL≤isolation ring, distance<7MIL	5MIL≤isolation ring, distance<6MIL		If the size of one side is greater than 600MM, the inner hole to line and the hole to copper spacing must be greater than or equal to 15mil. If less than 15mil, it must be treated as unconventional review. The conventional process of 10 layers or more
			6L	≥8MIL	6.5MIL≤isolation ring, distance<8MIL	6MIL≤isolation ring, distance<6.5MIL		
			8L	≥9MIL	7MIL≤isolation ring, distance<9MIL	6MIL≤isolation ring, distance<7MIL		

Categories	No.	Items		PCB process parameters				Remarks
				Normal process	Medium difficulty	High difficulty		need to be incremented by 1 mil for each additional 2 layers. Change the isolation ring to 12mil or more as much as possible
						Non-standard review	Unable to make	
		≥10L		≥10MIL	8MIL≤isolation ring, distance<10MIL<9MIL	7MIL≤isolation ring, distance<8MIL		
image transfer	14	The min width/spacing of inner layer (before compensation)	cooper thickness 18um	≥4/4 mil	≥4/3.5 mil		<3.5/3 mil	width/spacing
			cooper thickness 35um	≥4/5 mil	≥4/4 mil		<3.5/4 mil	width/spacing
			cooper thickness 70um	≥6/8mil	≥6/7mil		<5/6 mil	width/spacing
			cooper thickness 105um	≥8/11 mil	≥8/10 mil		<6/9 mil	width/spacing
	15	The min width/spacing of outer layer (before compensation)	cooper thickness 18um	≥4/5 mil	≥4/4 mil or parts 3.5/3.5mil		<3.5/3.5 mil	Local 3.5/3.5mil, only the distance from the GBA chip area line to the PAD
			cooper thickness 35um	≥5/6 mil	≥5/5 mil		<4/4 mil	
			cooper thickness 70um	≥7/8mil	≥6/7mil		<5/6 mil	
			cooper thickness 105um	≥10/12 mil	≥8/10 mil		<6/9 mil	
	16	grid trace width/spacing	cooper thickness 18um	≥7/9 mil	≥6/8 mil		<6/7 mil	
			cooper thickness 35um	≥9/11 mil	≥8/10 mil		<8/9 mil	
			cooper thickness 70um	≥11/13mil	≥10/12mil		<10/11 mil	
			cooper thickness 105um	≥13/15 mil	≥12/14 mil		<12/13 mil	
	17	Minimum weld ring (outer layer)	cooper thickness 18um	via hole	≥5mil	≥4mil	<3 mil		
				component hole	≥8mil	≥6mil	<6 mil		
			cooper thickness 35um	via hole	≥5mil	≥4mil	<3 mil		
				component hole	≥10mil	≥8mil	<8 mil		
			cooper thickness 70um	via hole	≥7mil	≥6mil	<5 mil		
				component hole	≥12mil	≥10mil	<10 mil		
			cooper thickness 105um	via hole	≥8mil	≥6mil	<6 mil		
				component hole	≥14mil	≥12mil	<12 mil		
	18	width tolerance			width tolerance:≥±20%	±10%≤ width tolerance:<±20%	<±10%		spacing must meet the requirements of 11 and 12, If width is greater than 15mil, controlled by ±2.5mil
		BGA pad diameter	hot air leveling (original)		≥12MIL	≥10MIL		<8mil	
			immersion gold (original)		diameter≥11mil	8.0mil≤diameter<11.0mil		<6mil	
	19	Line to board edge distance	CNC milling		0.25mm	0.20mm	<0.20mm		
		SMT width			≥12mil	≥9mil	<9mil以下		<7mil,except the binding board
Metal plating	20	Plating Thickness(μin)	Electroless Nickel-Immersion Gold,ENIG	Nickel thickness	100-150 μin	200 μin			
				gold thickness	1-8 μin			>8 μin	
			Full board gold plating	Nickel thickness	100-150 μin		200-500 μin		Order center check the final price
				gold thickness	1-10 μin	10-50 μin		>50 μin	
			gold finger	Nickel thickness	120-150 μin		200-400 μin		
				gold thickness	1-30 μin	30-50 μin		>50 μin	
	21	Hole copper thickness (μm)	Through hole		18-25 μm	30-50 μm	>50 μm		If 2,6,19 is required to exist at the same time, it will be treated as high
			Blind hole (mechanical hole)		18-25 μm	30-50 μm	>50 μm		

Categories	No.	Items		PCB process parameters				Remarks
				Normal process	Medium difficulty	High difficulty	Unable to make	
						Non-standard review		
		Buried hole		15-25 μm	30-50 μm	>50 μm		requirement. The thickness of the copper is 25-50UM, and the thickness of the copper is required to be 2-3OZ generally.
	22	Bottom copper thickness	Inner and outer copper thickness (OZ)	0.5-4	4-6		>6	
solder mask	23	solder mask	green solder mask opening（mil）	≥2mil	1.5	1		1mil is only concentrated in the BGA area. If the window can be enlarged, increase it as much as possible, but the maximum is 3mil
			green solder mask Bridge（mil） cooper thicknesss<2OZ	4（spacing between ICs is 8 mil, green oil），variegated or black oil≥4.5mil	3-4（spacing between ICs is 7-8 mil, green oil），variegated or black oil≥4mil			
			green solder mask Bridge（mil） cooper thicknesss≥2OZ	5	4			
			Plug Hole diameter	0.20mm≤hole diameter≤0.40mm，plug hole fullness 70%	0.4mm< hole diameter ≤0.70mm	fullness 100%		
			Plug Hole board thickness	0.40mm≤board thickness≤2.4mm	>2.4MM			
	24	solder mask	solder mask color	Green, matt green, blue, red, black, matte black, white, yellow	\	\		Special colors need to be purchased or deployed in advance
silkscreen	25	Etched silkscreen (finished copper thickness)	Copper thickness 18um word width/word height	8MIL/40MIL	7MIL/35MIL			
			Copper thickness 35um word width/word height	9MIL/40MIL	8MIL/35MIL			
			Copper thickness 75um word width/word height	12MIL/60MIL	10MIL/50MIL			
			Copper thickness 105um word width/word height	16MIL/60MIL	14MIL/50MIL			
outline	26	Maximum board thickness	Double PCB	3.2MM	4.5MM	>4.5MM		calculated by 4 layers if the thickness more than 3mm
			Multilayer layer board	3.2MM	4.5MM	>4.5MM		
	27	Minimum board thickness (single and double panel refers to substrate thickness)	Single or Double side PCB (pcb prototype)	≥0.3mm	0.25mm			
			4L	≥0.60mm	0.40mm	<0.40mm		
			6L	≥0.9mm	0.70mm	<0.70mm		
			8L	≥1.20mm	1.00mm	<1.00mm		
			10L	≥1.40mm	1.20mm	<1.20mm		
			12L	≥1.70mm	1.50mm	<1.50mm		
			14L	≥2.00mm	1.80mm	<1.80mm		
	28	thickness (T) tolerance MM (multilayer layer pcb)	T≤1.0	±0.10		Need to review if less than the tolerance		If the tolerance is unilateral tolerance, the tolerance shall be double tolerance value, such as: 1.8mm requires positive tolerance, the tolerance shall be 0-0.36mm
			1.0	±0.13				
			1.6	±0.18				
			2.5	±0.23				
			T≥3.2	±8%				

Categories	No.	Items		PCB process parameters				Remarks
				Normal process	Medium difficulty	High difficulty		
						Non-standard review	Unable to make	
	29	Maximum finished board size	Single and double side PCB	508×610mm	Beyond this range needs to be reviewed			
			Multilayer Layer PCB	508×600mm				
	30	Minimum finished pcb size		≥20mm	10mm≤Size<20mm	<10mm		
	31	Beveling for gold finger	Bevel angle	20°30°45°60°		<20°Or>60°		
			Bevel angle tolerance	>±5°	±5°	<±5°		
			Bevel depth tolerance	tolerance≥±0.15mm	±0.15mm< Tolerance ≤ ±0.1mm	tolerance<±0.10mm		
	32	Shape tolerance		tolerance≥±0.15mm	±0.10mm≤tolerance<±0.15mm		Tolerance<±0.10mm or more than two form tolerance control	
	33	V-CUT	Angle	20°30°45°60°				
			The Maximum number of V-CUT	In 20 times	In 30 times	In 40 times		
			Width of the shape	80MM< width <560MM	60MM< width <80MM	width <60MM		
			board thickness	0.6MM≦thickness≦2.4MM	0.5MM≦thickness<0.6MM	thickness<0.5MM or thickness>2.4MM		below 0.5mm is single-sided V-CUT
			Remaining thickness	≥0.25MM			<0.25MM	
			V-CUT	Conventional V-CUTT、V-CUT: Skip V-CUT	\	\		
others	34	panel size	The minimum panel size	≥100*120mm	\	<100*120mm		The thickness of the finished board is less than 0.4MM, the panel size can't exceed 14inch, and the maximum size of the HASL PCB can't exceed 24inch
			the Maximum panel size	≤20*24 inch	\	Need to review if beyond range		
	35	impedance control	Impedance control tolerance	±10%，50Ω and below：±5Ω	\	<±10%，50Ω and below <±5Ω		
		bow and twist	bow and twist tolerance	bow and twist≤0.75%	0.75%≤bow and twist≤0.5%	bow and twist<0.5%		asymmetry boards bow and twist tolerance 1.2%
	36	HASL processing capacity	component hole diameter	hole diameter>0.5mm	0.4mm≤hole diameter≤0.5mm			
			board thickness	0.5mm≤board thickness≤3.5mm	0.4mm≤board thickness<0.5mm			
			thickness	2um≤thickness of Tin≤30um	\	\		
	37	Acceptance Criteria	IPC standard	IPC2 level standard	IPC Level 3 standard			

Upload PCB files(gerber file, .pcb, .pcbdoc or .cam file format)

Thanks for reviewing our PCB capabilities. Please upload your PCB files in the format of gerber file, .pcb, .pcbdoc or .cam file when you go through our online purchase procedures. Please try best to offer gerber file. But if you only have DXP file with (.pcb/.pcbdoc) format, we will use ALtium Designer10.0 software to transfer to gerber.So please avoid higher version than AD10.0 .You can also send your Gerber to your sales rep, but we strongly suggest you order online on the webpages.

Making a PCB - PCB Manufacture step by step

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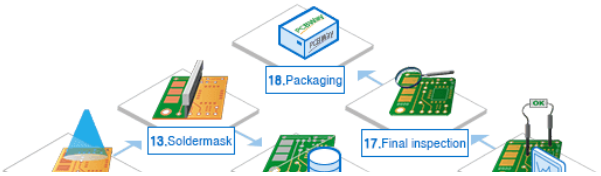

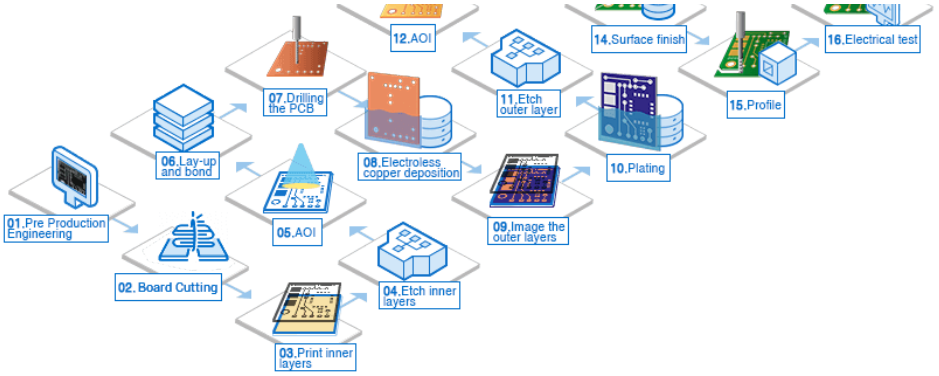

Our Customers

Smart Devices: We have large customer base in these industries. Customers choose us to make their PCBs in the prototype and production stage.

Medicine: Medicine and biomedical clients occupy a large part of our customers. We have strict quality standard and short lead time and our price is competitive, our customer base in this area is still on the rise.

Commercial, industrial and automotive: Most of our customers are in these industries. Fast response, short delivery time, professional engineering support continuously affordable price help retain and expand customer scale in these industries.

University, school and amateur: Students are our future scientists, we support them! Students and amateurs are price sensitive customers, our price guarantees they will rely on us for their PCB needs in terms of price and quality! At the same time, our educational sponsorship program provides free PCBs to university students, please send us the details of your project or competition at service@pcbway.com.