

PCB Assembly Cost

How-to guide: what the workbook does, how to use it and what every number means.

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PCB Assembly Cost

Build the cost of every PCB assembly from bare board, BOM, SMT placements, through-hole joints, test, NRE and yield, and check each price against your target margin.

For: EMS and contract electronics estimators, OEM buyers checking EMS quotes, and electronics plant managers.

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Quick start

1. On Setup, type your currency, SMT line cost per hour and effective placements per hour, hand assembly and test rates, and your target margin.
2. On Assemblies, add one row per board: lot size, boards per panel, bare panel price, BOM cost and attrition.
3. Add SMT placements, through-hole joints, test seconds, setup and NRE per lot, final yield and the price.
4. Read the cost per good board, margin and status; the Check column names anything missing or impossible.
5. Open the Dashboard: margin against target, where each board's cost goes and what yield loss costs.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Currency, line, labour and test rates, and your target margin.
Assemblies	One row per board assembly: bare board, BOM, placements, joints, test, NRE, yield and price.
Dashboard	Margin against target, where each board's cost goes, and what yield loss costs.
Method	How every number is calculated, with assumptions, limits and sources.
Verify	Self-check: the workbook's formulas recomputed on fixed inputs against an independent reference.

What each number means

Quantity	How it is calculated	Units
Bare PCB	Panel price / boards per panel.	currency/board
Components	BOM cost x (1 + attrition).	currency/board
SMT	Placements / effective placements per hour x SMT line cost per hour.	currency/board
Through-hole	Joints x seconds per joint / 3600 x labour rate.	currency/board
Test	Test seconds / 3600 x test station cost per hour.	currency/board

Quantity	How it is calculated	Units
Setup per board	Setup and NRE per lot / lot size (good boards).	currency/board
Yield loss	(Bare PCB + components + SMT + through-hole + test) x (1 / final yield - 1).	currency/board
Cost per good board	Bare PCB + components + SMT + through-hole + test + yield loss + setup per board.	currency/board
Margin and status	(Price - cost per good board) / price. On target at or above target, Near target within 5% of it, else Below target.	%
Lot cost, value, margin	Cost per good board, price and price - cost, each x lot size.	currency/lot
Weighted margin	Sum of lot margin / sum of lot value over priced lots (not an average of percentages).	%
Material share	Sum of (bare PCB + components) x lot size / sum of lot cost.	%
Yield loss (tile)	Sum of yield loss x lot size.	currency

Assumptions, limitations, sources and the self-check (the Verify sheet, which recomputes the workbook's formulas on fixed test inputs) are in the workbook. The last page shows the Dashboard with the example data for Kestrel EMS, a fictional business.

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Engineering estimates for planning and improvement work. Verify the results against your own process, data and standards before you rely on them.

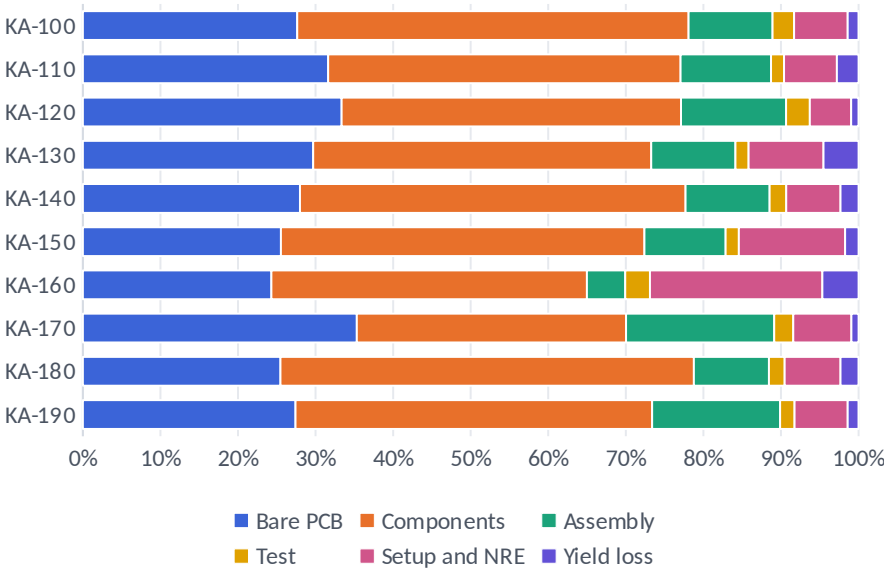
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Margin against target, where each board's cost goes, and what yield loss costs.

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WEIGHTED MARGIN ON PRICE	ASSEMBLIES BELOW TARGET MARGIN	MATERIAL SHARE OF COST	YIELD LOSS (USD, EST.)
14.3%	2	74.7%	4,024
Target 15.0%	Margin status on Assemblies	Bare PCB + components, all lots	Boards built but not shipped, all lots
Near target			

Where the cost of each board goes



Margin on price by assembly

