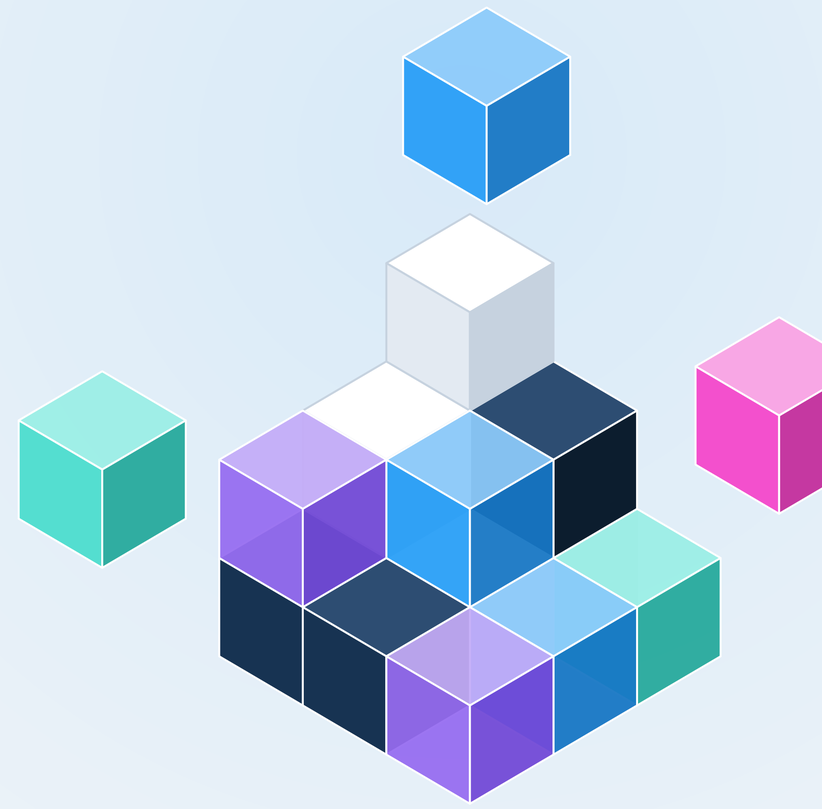
PRODUCTION & MANUFACTURING

Design for Assembly



Design for assembly (DFA) simplifies a product so it is easy to put together: fewer parts, easy handling, one-way orientation and simple fastening.

01 THE CORE MODEL

FOUR LEVERS · SIMPLER PRODUCT, FASTER ASSEMBLY

01 LEVER 1

Part count

Question each part: must it move, be a different material or come apart for service? If not, combine it.

02 LEVER 2

Handling

Avoid parts that tangle, nest, are fragile or are too small to grip easily.

03 LEVER 3

Orientation

Make parts symmetric, or clearly asymmetric, so they can only fit one way.

04 LEVER 4

Fastening

Replace screws with snap fits, press fits or built-in features where loads allow.

Theoretical minimum

Parts that must stay separate for motion, material or service reasons.

Assembly direction

Top-down, single-axis assembly avoids turning and re-gripping.

DFA review

A structured check of every part by design and manufacturing together.

02 DESIGN DECIDES COST

Much of assembly cost is fixed in design, long before production starts.

FIX IN PRODUCTION — FIX IN DESIGN

LATE CHANGES

- Workarounds and special fixtures
- Training to cover tricky steps
- Errors from parts that fit two ways

DFA IN DESIGN

+ Fewer parts to buy, stock and handle
+ Faster, error-proof assembly
+ Lower cost before tooling is built

03 WORKED EXAMPLE

SENSOR HOUSING REDESIGN · ILLUSTRATIVE

BEFORE
9 parts
including 4 screws

→

QUESTION
Must it be separate?
motion, material, service

→

AFTER
3 parts
base, cover, seal

→

EFFECT
No screwdriver
snap-fit assembly

04 MANAGEMENT TAKEAWAYS

01

Review designs with assemblers

People on the line spot handling and orientation problems at first sight.

02

Challenge every fastener

Each screw is a part, a step and a chance to cross-thread.

03

Do it before tooling

Changes are cheap on screen and expensive once molds are cut.

05 COMMON MISTAKE

LIMITATION

Integrating parts too far

Merging everything into one complex part can raise tooling cost and hurt serviceability. Balance part count against part cost.