Manufacturing
How Boards Get Made

PCB Mills

Printing and chemically etching

Fab House

So cheap and fast you may as well

Can assemble as well
Cost

Number of layers

Size of board

Extent of testing

Assembly

   # of sides, # of components

Level of detail (min trace width, hole size)

Shipping

Number of holes (different sized holes)
In House Testing

Flying probe - test for unwanted shorts, ensure proper connections

Can create custom testing for large-scale production

BON (Bed of Nails) - pins connected to designated test points to test connectedness, program

AOI - automated optical inspection
In House Assembly

Thru hole vs smt - SMT easier

- Small scale thru hole done by hand sometimes, costly

Cheaper for one side

Pick & place machines - put components in correct spot on PCB from spools

Always need to send them extra for attrition
Process

Usually chemical etching used to define copper regions (traces, pads, planes, etc)

Holes drilled with CNC, through holes plated

Solder mask applied to non-copper areas

Copper areas tinned if assembly to occur

Silk screen applied
Mass Manufacturing

Very different design considerations

Cheaper per board

May want more thorough testing

Going to modify prototype to make smaller, cheaper

Source components directly from suppliers
BOM: Bill of Materials

When done with board, collect list of components

Associates designators with ordering components

Ensure it is complete enough for a stranger (manufacturer, future user) to order and place every component