



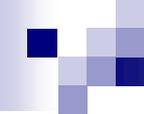
# PCB stackup

[Olney\_2010,

<https://jhdpcb.com/blog/ipc-class-standards/>,

<https://www.ourpcb.com/ipc-class.html>]



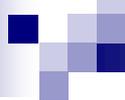
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- Most common dielectric material for PCB: FR4
  - two forms (often with copper foil on one or both sides):
    - core (cured fiberglass epoxy resin)
    - prepreg (fiberglass with uncured epoxy resin)
      - prepreg is then cured at high temperature and pressure
  - some typical PCB stackups are shown in the following
  
  - correct PCB stackup is fundamental for
    - reduced EMI radiation
    - reduced crosstalk
    - improved signal integrity





## IPC standards

- IPC is the global association that helps manufacturers and electronics industry suppliers to build better electronics
- IPC issues several standards, among which
  - IPC-2221: the most commonly used PCB process standard guide in the IPC 2220 design standard series
    - it covers topics such as design layout, parts list, materials, mechanical and physical properties, electrical properties, thermal management, and more
  - IPC-6012: establishes qualification and performance specifications for rigid printed boards
    - it provides requirements for rigid PCB processes in various materials in the areas of structural integrity, solderability, and conductor spacing



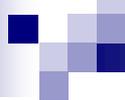
## Definitions of IPC Class 1, 2, or 3

In the production of electronic products, the IPC level of PCB is divided into three categories

- *CLASS 1 — General Electronics.* Boards with the lowest quality requirements, mostly found in products with an expected short life cycle
  - These products have simple functions and short lifespan
  - Day-to-day electronic products that we have at home and are easy to find: TV remote controls, LED lights, and children's toys

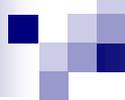
## Definitions of IPC Class 1, 2, or 3

- *CLASS 2 — Dedicated Service Electronic Products.* Electronics where continued performance and an extended life cycle is required — to a point
  - Uninterrupted service is desired, but not critical
  - extended lifespan, higher reliability
    - products go through stringent standards in their manufacturing
  - Boards are not highly critical
  - Devices such as tablets, communication equipment, laptops, and smartphones



## Definitions of IPC Class 1, 2, or 3

- *CLASS 3 — High Reliability Electronics.* Circuit boards subject to strict guidelines due to their importance in the field
  - High-reliability electronic components to ensure uninterrupted service
  - Class 3 products undergo a high level of inspection to ensure that they are reliable and dependable
  - Electronic manufacturing systems, support systems, and military devices



## Definitions of IPC Class 1, 2, or 3

- *IPC 6012 3 / A-Level - Advanced Electronic Products:* Military avionics and space equipment
  - A- Level is the highest Class of PCBs and undergoes a stringent manufacturing process
  - Much expensive to design and produce
  - Missile systems, military airborne systems, and aerospace applications