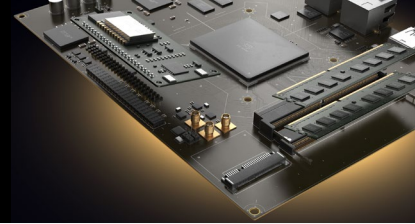




# AltiumLive 2018 University Day

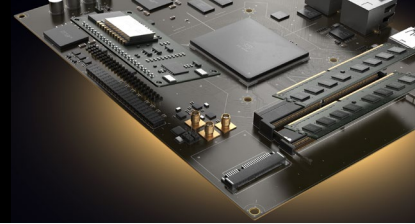
Instructor  
Charley Yap  
Field Application Engineer

**Altium**



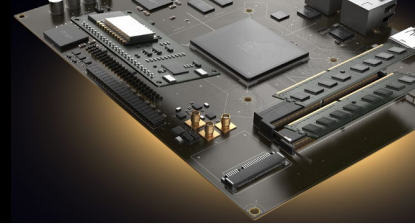
# Advance Layer Stack

Shows the various options and features possible with a multi-layer stack, including blind and buried vias.



## Agenda

- How to engineer a layer stack up
- Impedance Driven Width Routing
- Microvias
- Back drilling

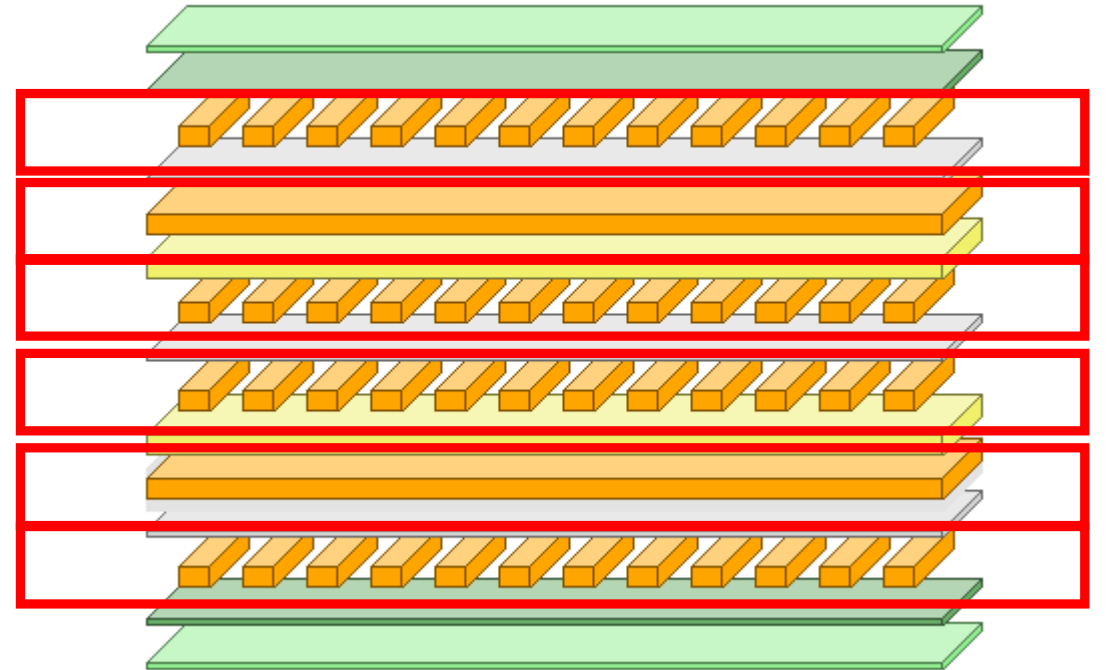


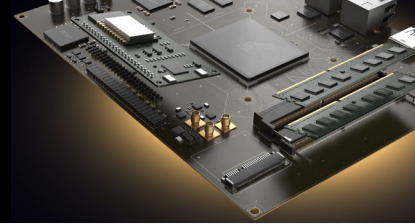
# How to Engineer a layer stack up

- Not a broad topic in layer stack up creation.
- Just a few feature in developing your stack up.

**4 Signal Layer**

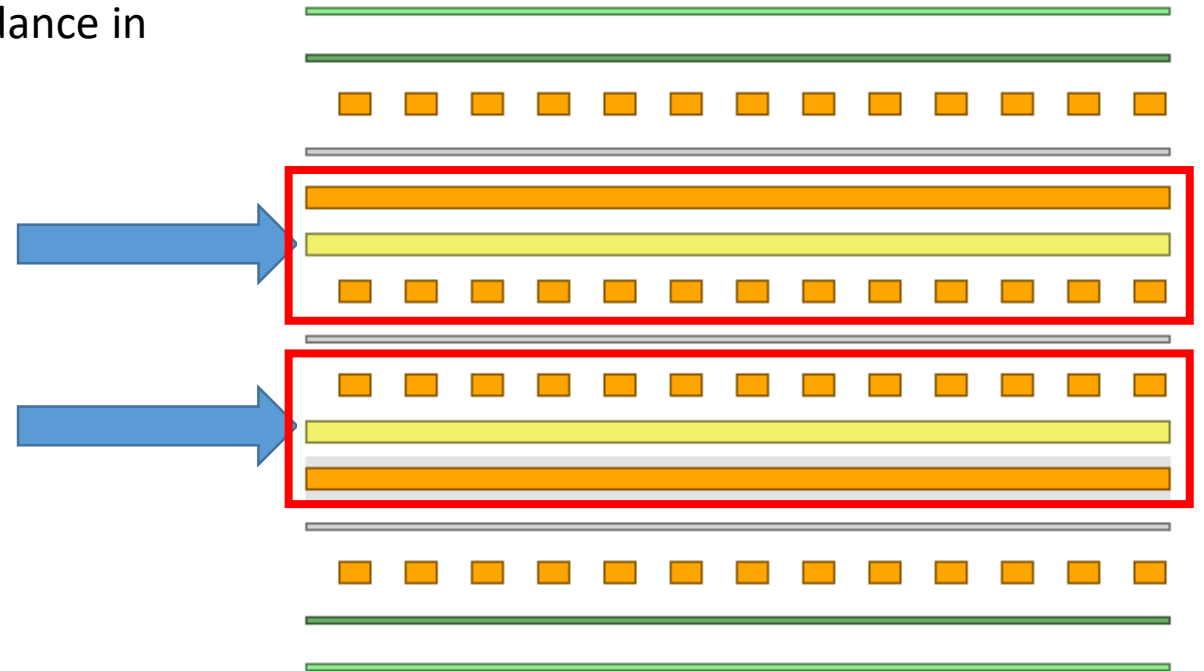
**2 Power Plane Layer**

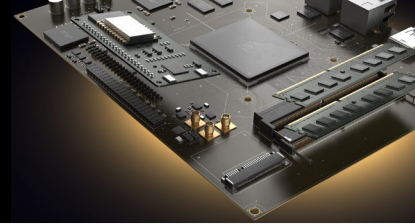




# High-Speed Design Application

- For high-speed design, signal layers should be tightly coupled with its plane layer.
- Having a thin core can provide consistent impedance in impedance driven width routing.





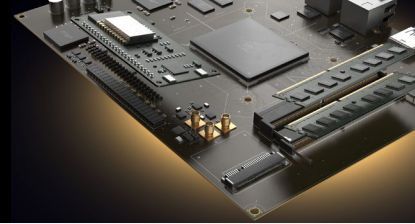
## Microvias

- What are Microvias?
- How it Works?
- Advantages of Microvias



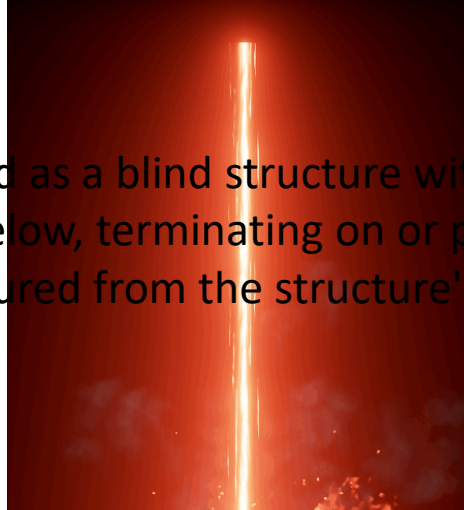
**What  
Is It?**





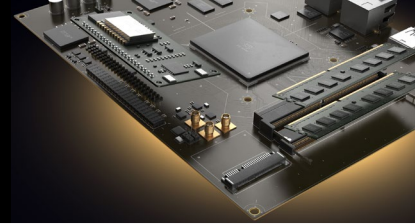
## Definition of a Microvia

IPC-2226A - Microvia: (build-up via) defined as a blind structure with a maximum aspect ratio of 1:1 when measured in accordance with the image below, terminating on or penetrating a target land, with a total depth (X) of no more than 0.25 mm [9.84 mil], measured from the structure's capture land foil to the target land.



## Laser Drilling



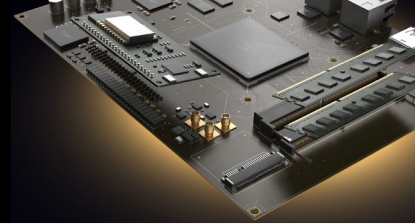


## Advantages of Microvias

- Unlikely to yield manufacturing defects compared to normal vias
  - No material behind drilled out holes.
  - Same risk as normal vias when it comes to plating and solder reflow.

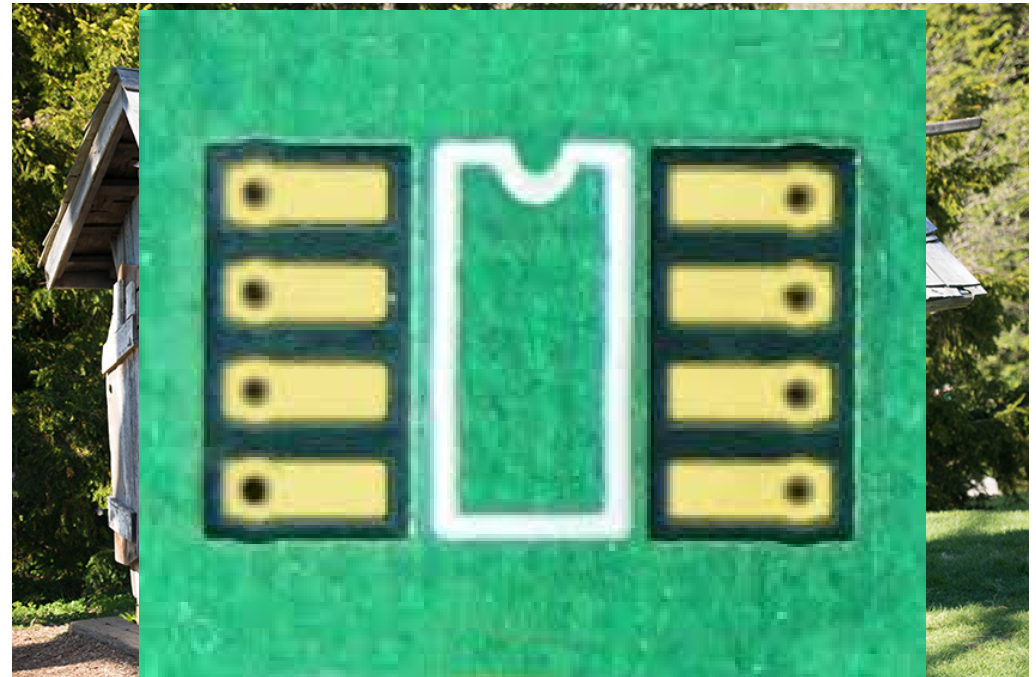


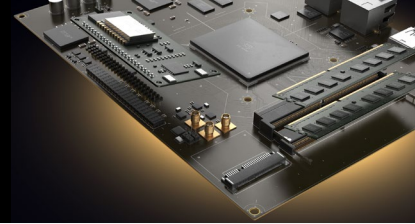




## Advantages of Microvias

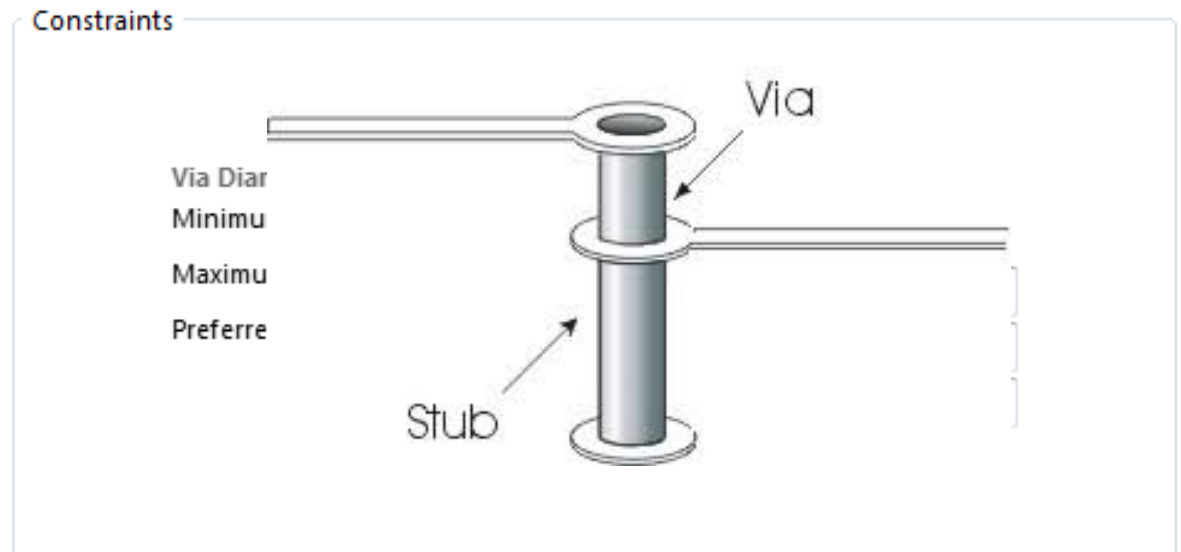
- Board Real estate
  - Board space is expensive.
  - Microvias can help you lower your cost.
- Via in Pad (VIP)
  - Normal vias are too large to fit inside pads for SMTs.
  - Pretty useful for fine pitch ball grid arrays (BGA)
  - Can fit within the pad without causing risk of fabrication issues.

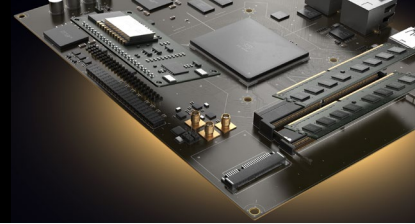




# Advantages of Microvias

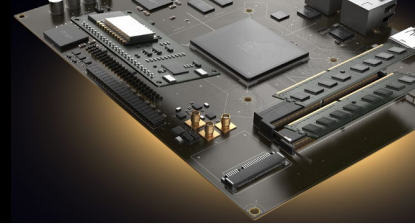
- EMI Advantages
  - Reduce crosstalk
  - Microvias application are excellent for EMI prone circuits, like high-speed and high-frequency applications.
- Radiating antennas
  - Microvias diameter can reduce the power of radiating antennas.
  - A good solution for eliminating via stubs.





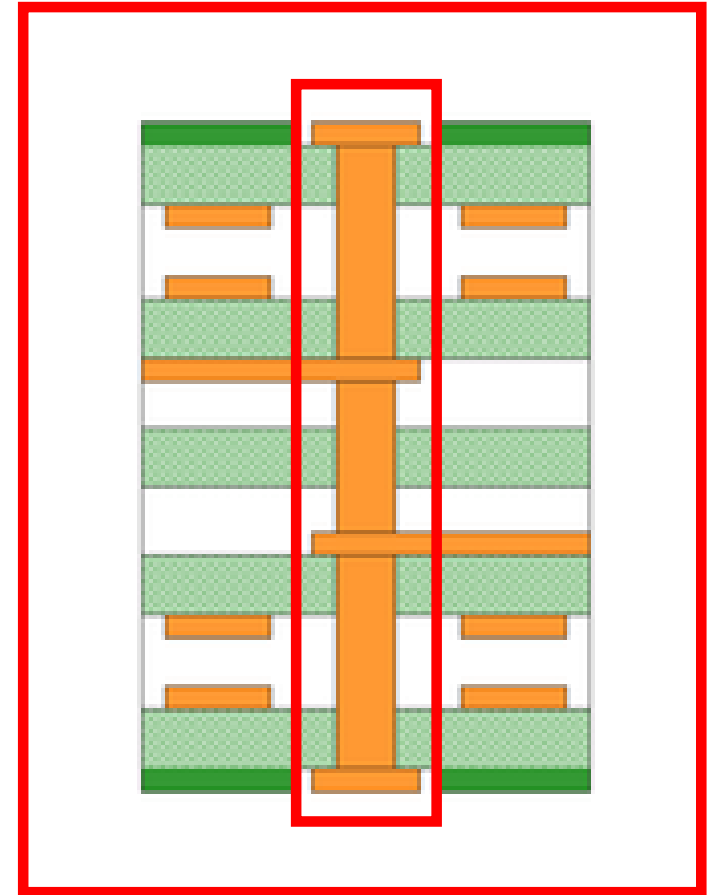
# BackDrilling

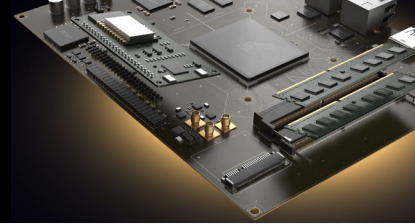
- Revisiting a via stub
- What is BackDrilling?
- Application



## Via Process

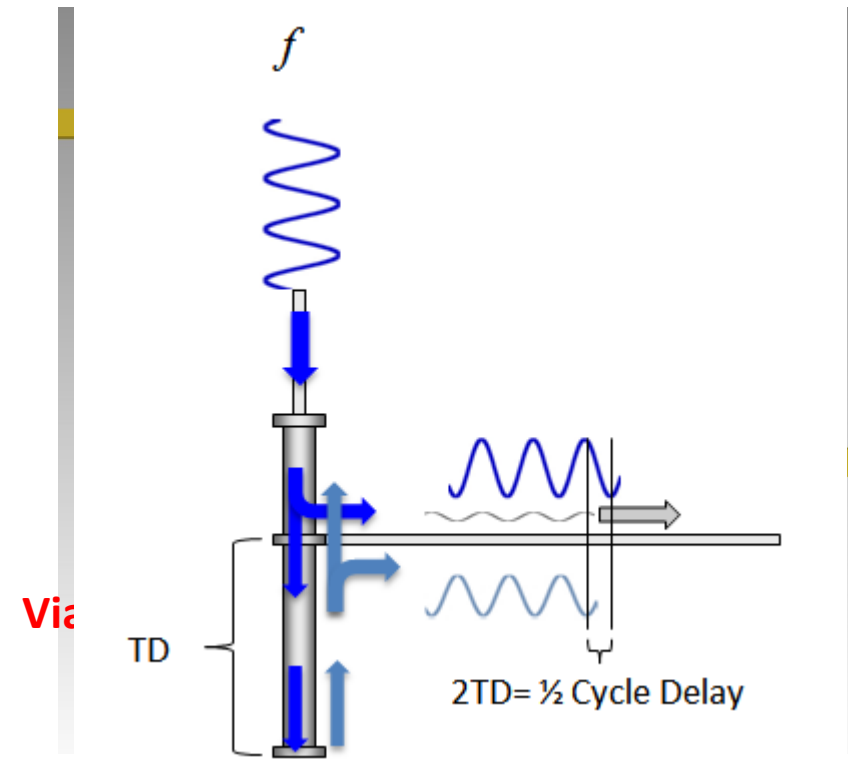
- Lamination
- Drilling
- Plating

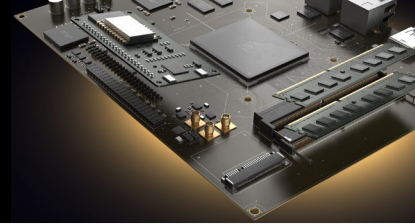




## Revisiting Via Stub

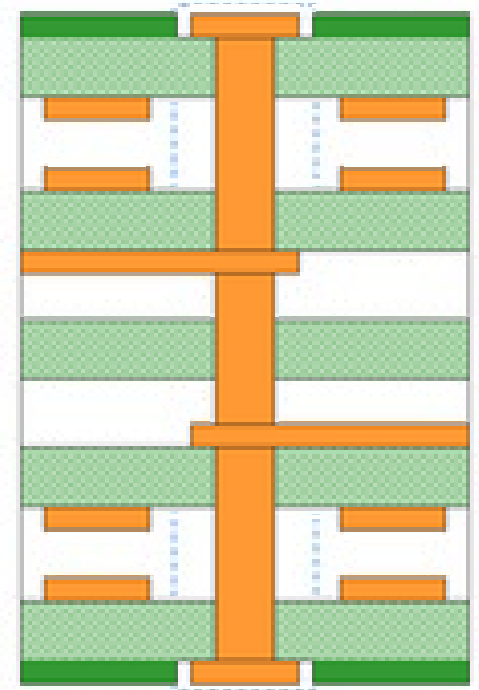
- Commonly created when you use through-hole vias
  - Unused portion of a plated through hole.
- Parasitic Capacitance
  - Parasitic Capacitance of via can increase signal rise time, making the signal speed slower.

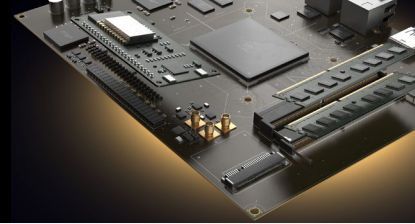




## What is BackDrilling?

- a manufacturing technique used on high speed multi-layered boards to reduce the amount of parasitic generated by plated through holes.
  - Eliminates capacitive coupling.
  - Eliminates antenna radiation.





# AltiumLive 2018 Questions?