IEEE 802.3ap

Enterprise Midplane Channel Topology Definition

IEEE 802.3ap Task Force
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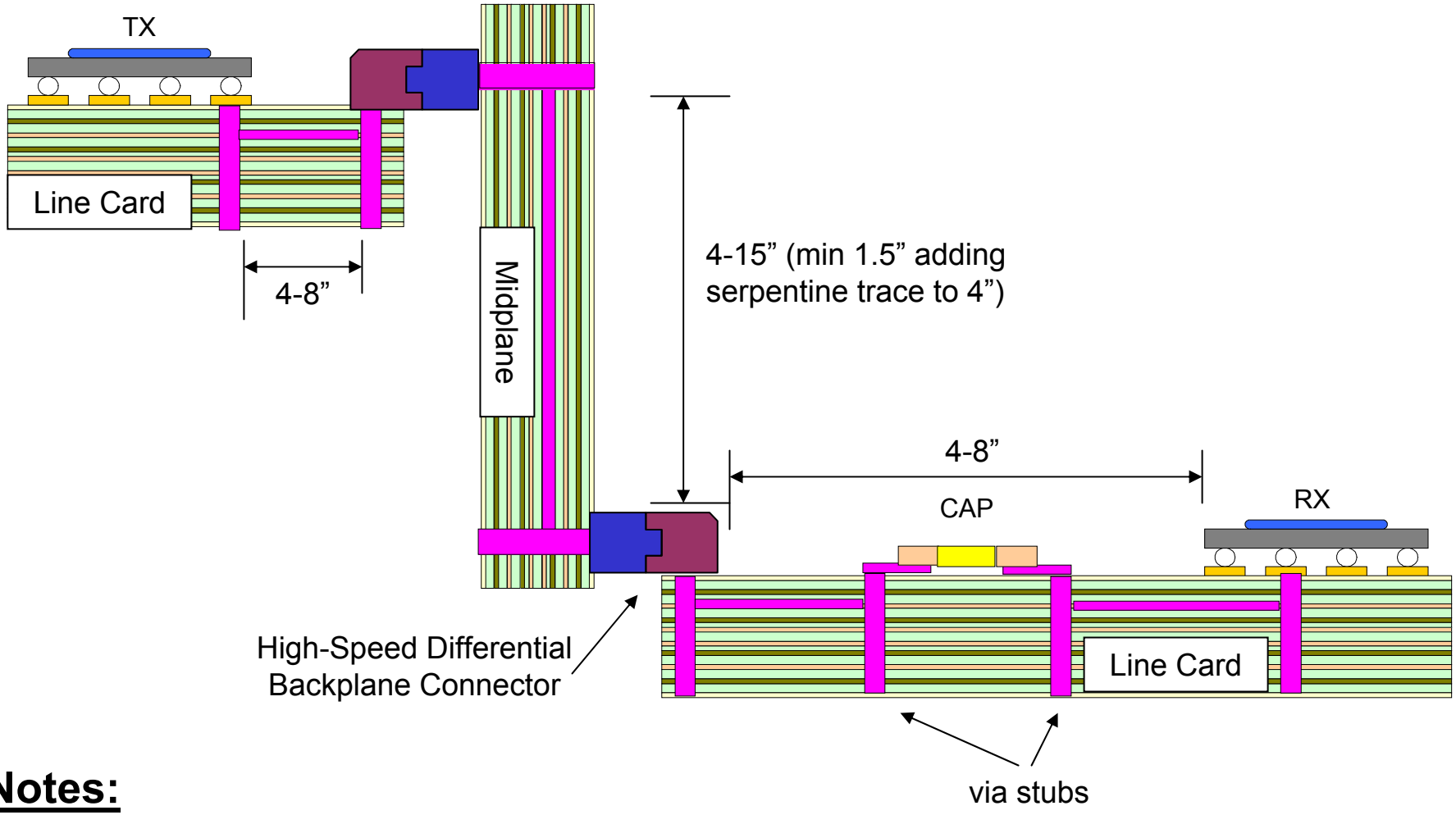
- **Back-Drill Restriction**
  - Back-drilling the midplane is not currently an option. Double-sided back-drilling is not cost-effective.
  - This problem is not specific to our mid-plane and connectors, but to any midplane.
- **Comments**
  - Specific design steps based off of existing ATCA learnings:
    - Reduced backplane thickness
    - Internal layer routing only (4 inner-most layers)
    - Minimum backplane length set above 4”
    - Minimized stub length is critical to performance
  - Material preference is FR-4

Line Card (estimates)

- Max thickness: 0.092”
- Max via stub: 0.092”
- **Using all signal layers for routing**
- FR-4
- 6-12 layers
- 100 Ohm
  - Width: 5-8 mil (internal), 5 mil min (Ext.)

Midplane (estimates)

- Max thickness: 0.165”
- Max via stub: 0.124”
- **Only inner 4 signal layer routing**
- FR-4
- 14-18 layers
- 100 Ohm
  - Width: 5-8 mil (internal)



Notes:

- Connectors are TBD
- Cap represents situation where AC coupling needs extra vias
  - Contingent upon signaling scheme
- Silicon residing on same side as connector is TBD.

- Feedback welcomed
- Backup page…

Backup Info:

Midplane	1	Inner 4-signal Thickness	~85mil		**Example 18 Layer Board**							
	2	Stackup (with 4 middle signal layers)										
	3	Trace Width Inner Layers	4-7mils									
		Pair separation	6-10mil							Layer Thickness(mils)		
		signal-to-signal spacing	18-30mil		Signal 1	SIGNAL				2.0		
Linecard	4	Overall Thickness	~165mil			dielectric				8.0		
	5	Max via stub	~124mil		Plane 2	REF				1.3		
						dielectric				8.0		
					Signal 3	SIGNAL				1.3		Min via stub
						dielectric				8.0		63.8
					Plane 4	REF				1.3		
General	6	Interleaved routing?	Y/N			dielectric				10.0		
					Signal 5	SIGNAL				1.3		
						dielectric				10.0		
					Plane 6	REF				1.3		
						dielectric				10.0		
					Signal 7	SIGNAL				1.3		
						dielectric				10.0		
					Plane 8	REF				1.3		
						dielectric				4.0		
					Plane 9	REF				1.3		
		Inner 4-signal Thickness		85.0		**center dielectric**				4.0		
					Plane 10	REF				1.3		
						dielectric				4.0		
					Plane 11	REF				1.3		Max via stub
						dielectric				10.0		123.6
					Signal 12	SIGNAL				1.3		
						dielectric				10.0		
					Plane 13	REF				1.3		
Notes:						dielectric				10.0		
	No crossing split planes				Signal 14	SIGNAL				1.3		
	No vias to change layers					dielectric				10.0		
	No high speed signals in outside layers				Plane 15	REF				1.3		
	Center power layers 9/10 may move to outside					dielectric				8.0		
					Signal 16	SIGNAL				1.3		
						dielectric				8.0		
					Plane 17	REF				1.3		
						dielectric				8.0		
					Signal 18	SIGNAL				2.0		
									Overall Thickness	164.8		