

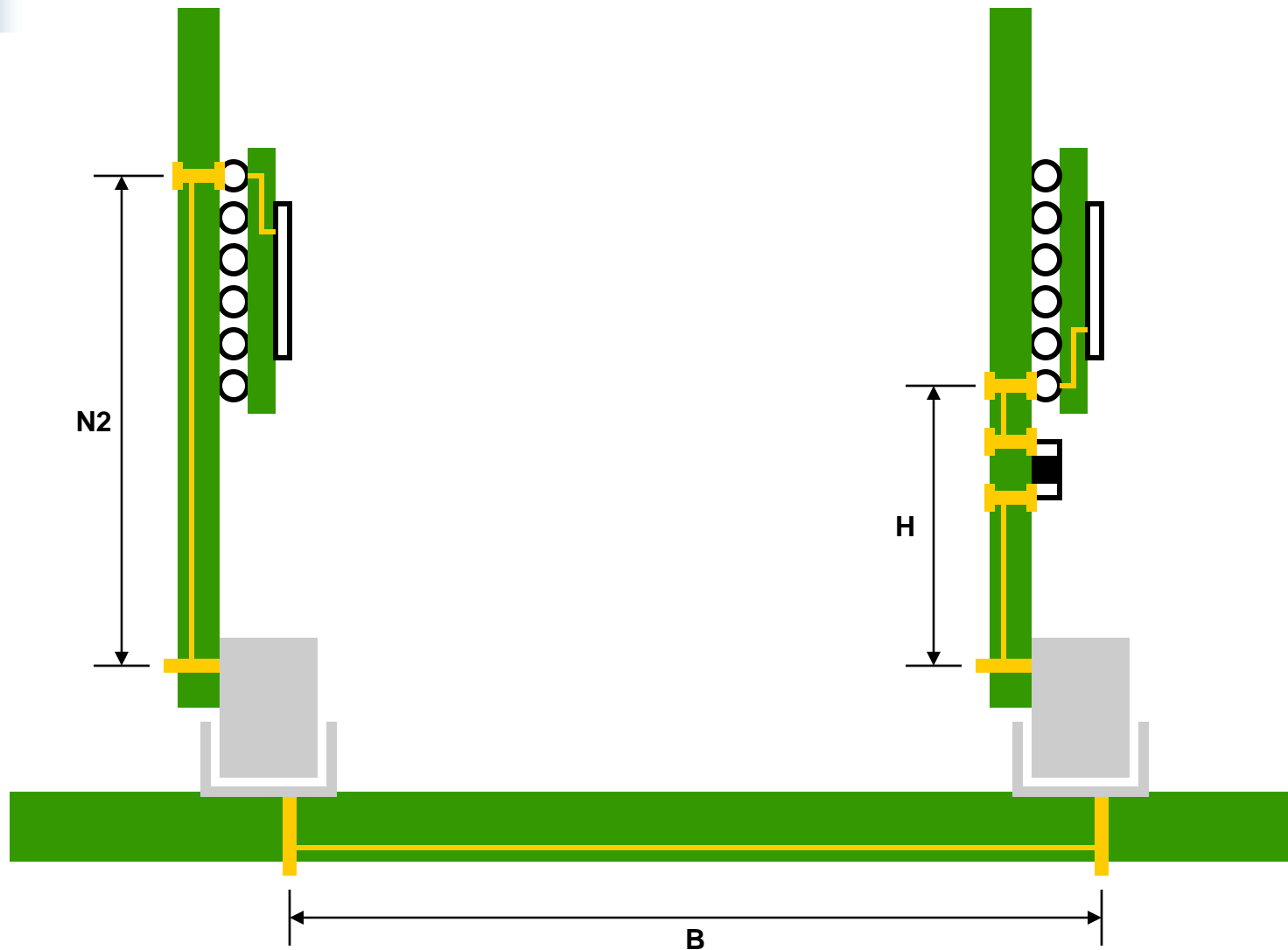


Channels for Consideration by the Signaling Ad Hoc

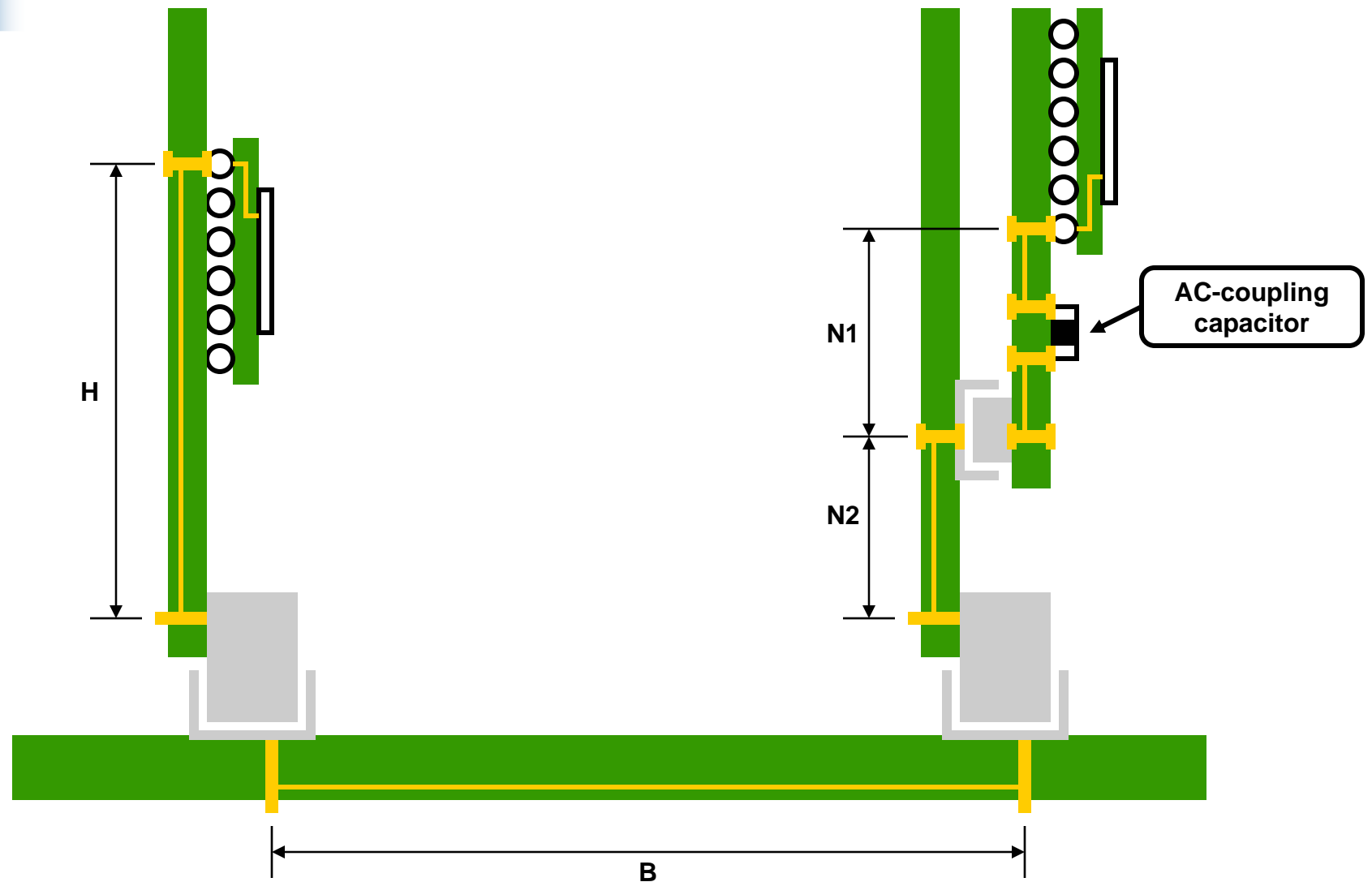
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Two-Connector Topology



Three-Connector Topology



Topology Data

Description	N1	N2	B	H	Total	No. Connectors	AC / DC Coupling	Source
	(mm)	(mm)	(mm)	(mm)	(mm)			
Blade Server								
Proposed Worst-Case	76	102	533	127	838	3	AC	<i>koenen_01_0504.pdf</i>
ATCA								
Full Mesh (max)	0	127	533	127	787	2	AC	<i>(note 1)</i>
Switch / Router								
2 to 3 chassis/rack (min)	0	152	51	305	508	2	AC	<i>goergen_01_0304.pdf</i> <i>(note 2)</i>
2 to 3 chassis/rack (max)	0	152	559	305	1016			
5 to 8 chassis/rack (min)	0	127	51	229	406			
5 to 8 chassis/rack (max)	0	127	432	229	787			
					700	2	AC or DC	<i>mandich_01_0704.pdf</i>
					1000		AC	
ATCA Example (Star)								
min(B)	0	102	28	102	231	2	AC	<i>peters_01_0504.pdf</i>
max(B)	0	102	244	102	447			
<p>Note 1: From PICMG 3.0 R1.0 AdvancedTCA Specification, December 30, 2002 (8.4.2.1 and 8.2.4.3).</p> <p>Note 2: Based on LC-2/SF-2. For minimum values, fabric position is assumed to be in the middle of the line cards. For maximum values, fabric position is assumed to be at the top of the line cards.</p>								



Topology Observations

- Worst-case backplane trace length (B) is about 21" (533mm).
 - Applies to full-mesh and star applications where the hub cards are positioned at the top or bottom of the node cards.
 - This distance may be reduced by centering the hub cards.
 - Example: Tyco Electronics Dual-Star ATCA Backplane, B(max) = 9.8" (248mm).
- Wide range of variability in the expected trace length on node and hub cards.
 - N2 = 3" (76mm) to 6" (152mm)
 - H = 3" to 12" (305mm)
 - Median trace length is 6" (152mm).
 - Additional mezzanine connector and N1 = 3" for blade servers.
- AC-coupling is required by multiple applications.



Recommended Channels of Interest

- Objective: 1m of “improved FR-4”
 - 10” Line Card > 20” Backplane > 10” Line Card
- ATCA Full Mesh
 - 6” Line Card > 20” Backplane > 6” Line Card
- ATCA Dual-Star
 - 6” Line Card > 10” Backplane (with and without stub) > 6” Line Card
- Adjacent Slots
 - 6” Line Card > 1” Backplane (with stub) > 6” Line Card
- Variations of above scenarios based on different grades of “improved FR-4”

Summary of Proposed Test Cases

Test Case	Line Card		Backplane			Total Length	Comments
	Length	Material	Length	Material	Stub		
1	10" (254mm)	Nelco 4000 13SI	20" (508mm)	Nelco 4000 13SI	Bottom (or counter-boring)	40" (1016mm)	Channel Model <i>Tyco - Data to be available within 2 to 3 weeks</i>
2	10" (254mm)	Nelco 4000 13	20" (508mm)	Nelco 4000 13SI	Bottom (or counter-boring)	40" (1016mm)	Margin Test Case <i>Tyco - Data is available.</i>
3	10" (254mm)	Nelco 4000 6	20" (508mm)	Nelco 4000 13SI	Bottom (or counter-boring)	40" (1016mm)	Margin Test Case <i>Tyco - Data is available.</i>
4	6" (152mm)	Nelco 4000 13	20" (508mm)	Nelco 4000 13SI	Bottom (or counter-boring)	32" (812mm)	ATCA Full Mesh <i>Tyco - Data is available.</i>
5	6" (152mm)	Nelco 4000 13	10" (254mm)	Nelco 4000 13	Bottom (or counter-boring)	22" (558mm)	ATCA Dual Star <i>Tyco - Data is available.</i>
6	6" (152mm)	Nelco 4000 13	10" (254mm)	Nelco 4000 13	Top Layer (with stub)	22" (558mm)	ATCA Dual Star <i>Tyco - Data is available.</i>
7	6" (152mm)	Nelco 4000 13SI	1" (25mm)	Nelco 4000 13SI	Near Top-Layer (with stub)	13" (330mm)	Adjacent Slot <i>Tyco - Data is available.</i>

NOTE: Data for all test cases includes dominant, adjacent NEXT and FEXT aggressors.



Additional Considerations

- Stub Effects
 - Include even if they violate the channel model?
- Crosstalk
 - Different pin-outs.
- Return Loss
 - Good launch required to see difference.
 - Driven by line card layer connection with further peaking caused by backplane layer connection.
- Manufacturing and environmental variance