

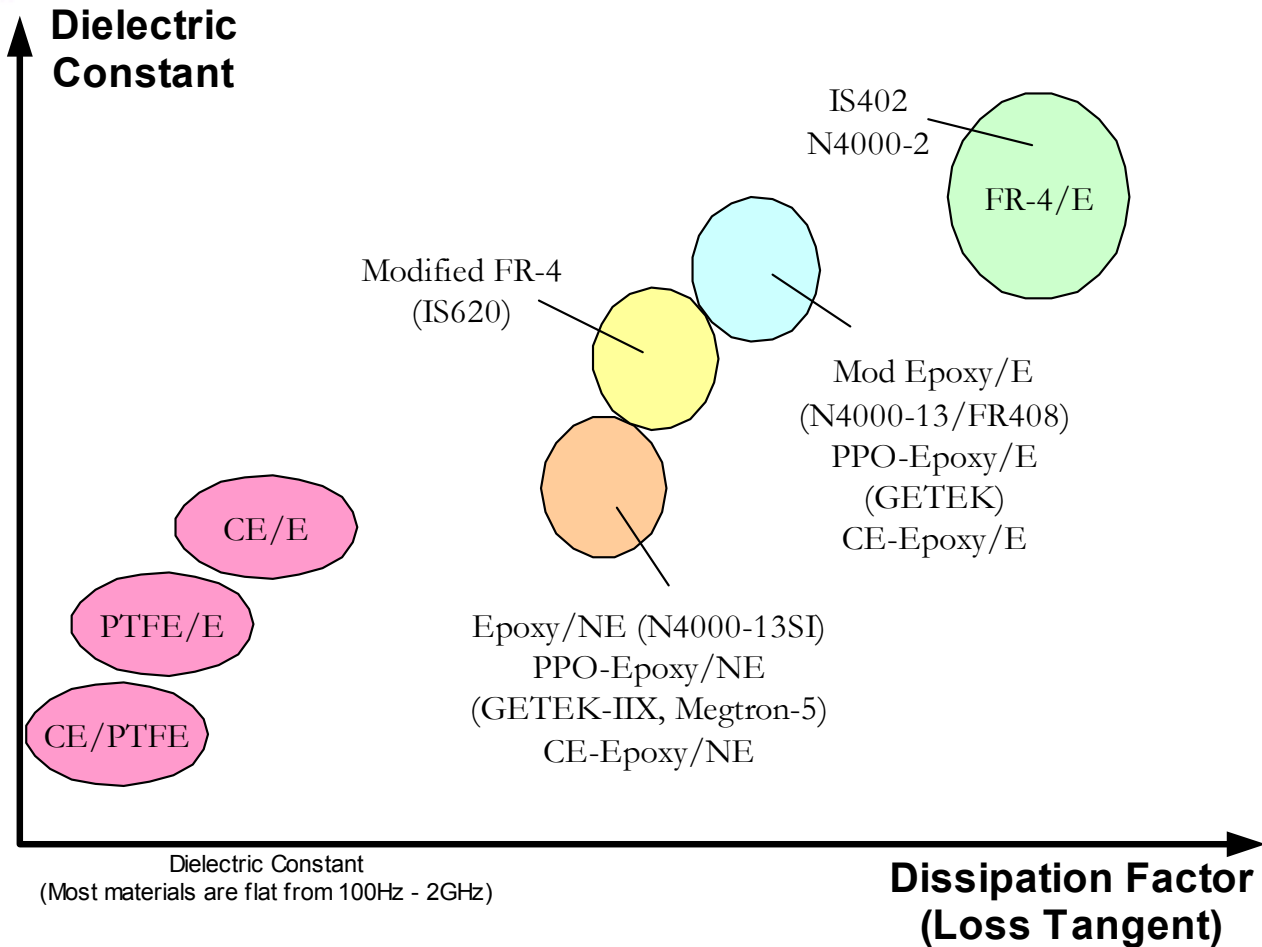
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Subject : IEEE 802.3ap Backplane Ethernet

Abstract : This presentation documents a connector-less test card that will validate the informative channel mask discussed in the IEEE May04 meeting. Data to be presented at the July04 IEEE Plenary Meeting.

- Discuss Materials
- Show the Dk/Df sheet that was agreed upon by straw poll at the May04 meeting.
- Show Changes to Dk/Df values.
- Outline Test Cards.
 - Review Stack Details.
 - Review Gerber Layers.



■ Graph provided by Zhi Wong zwong@altera.com

My Thoughts on 'Improved FR-4' in reference to IEEE802.3ap

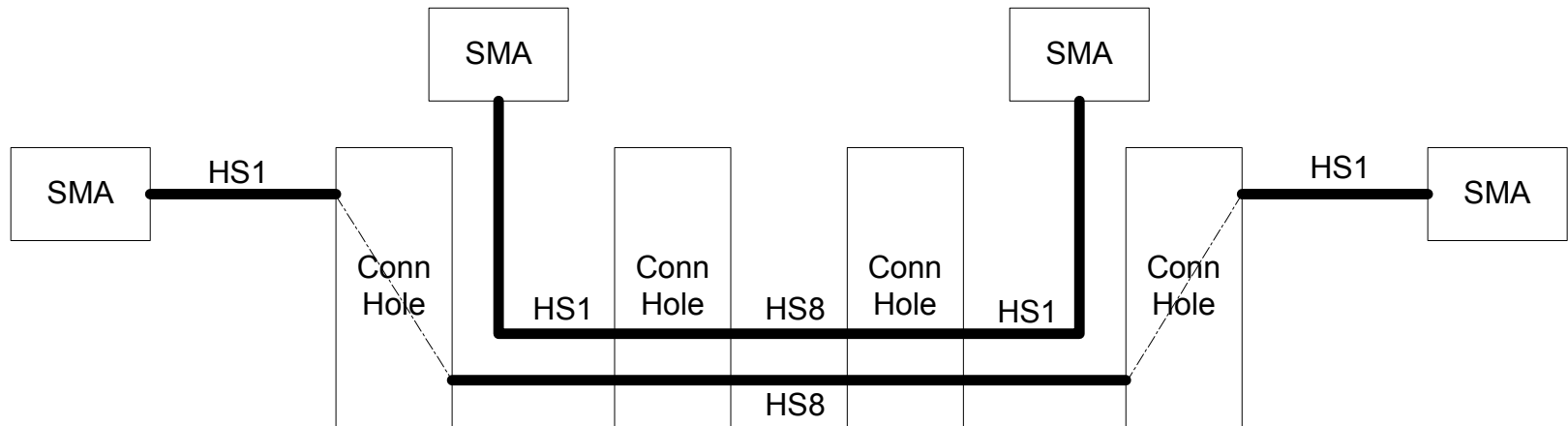
- Improved FR-4 (Mid Resolution Signal Integrity):
 - 100Mhz: $Dk \leq 3.60$; $Df \leq .0092$
 - 1Ghz: $Dk \leq 3.60$; $Df \leq .0092$
 - 2Ghz: $Dk \leq 3.50$; $Df \leq .0115$
 - 5Ghz: $Dk \leq 3.50$; $Df \leq .0115$
 - 10Ghz: $Dk \leq 3.40$; $Df \leq .0125$
 - 20Ghz: $Dk \leq 3.20$; $Df \leq .0140$
- Temperature and Humidity Tolerance (0-55degC, 10-90% non-condensing):
 - $Dk: +/- .04$
 - $Df: +/- .001$
- Resin Tolerance (standard +/-2%):
 - $Dk: +/- .02$
 - $Df: +/- .0005$

Changes to 'Improved FR-4' in reference to IEEE802.3ap

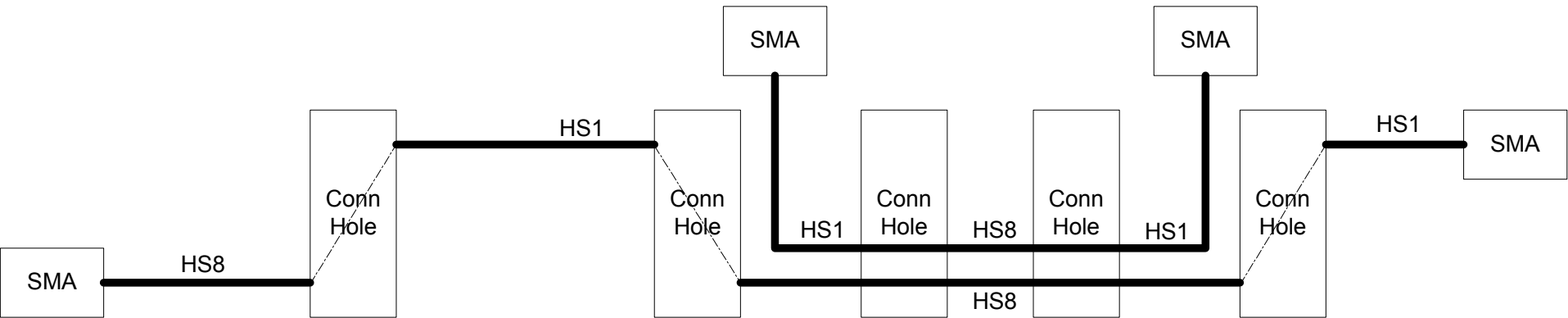
- Improved FR-4 (Mid Resolution Signal Integrity):
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 - 20Ghz: $Dk \leq 3.40$; $Df \leq .0140$
- Temperature and Humidity Tolerance (0-55degC, 10-90% non-condensing):
 - Dk : +/- .04
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- Resin Tolerance (standard +/-2%):
 - Dk : +/- .02
 - Df : +/- .0005

- Adjust the 10Ghz Dk value to 3.5. This opens the door for more of the lower cost, improved fr-4 materials.
- Adjust the 20Ghz Dk value to 3.4. This opens the door for more of the lower cost, improved fr-4 materials.
- Df values are good.

Test Card Outline – 2 connectors



Test Card Outline – 3 connectors



Channel Lengths

#		LYR							
Conn		HS8		HS1		HS8		HS1	Total
2	CH1			4		3		4	11
2	CH2			7		3		7	17
2	CH3			10		3		10	23
3	CH4	3		3		3		7	16
3	CH5	5		5		3		10	23
2	CH6			4		10		4	18
2	CH7			7		10		7	24
2	CH8			10		10		10	30
3	CH9	3		3		10		7	23
3	CH10	5		5		10		10	30
2	CH11			4		15		4	23
2	CH12			7		15		7	29
2	CH13			10		15		10	35
3	CH14	3		3		15		7	28
3	CH15	5		5		15		10	35
2	CH16			4		20		4	28
2	CH17			7		20		7	34
2	CH18			10		20		10	40
3	CH19	3		3		20		7	33
3	CH20	5		5		20		10	40

IS620 Stack Detail

Layers	Specified Thickness	Cross Section Diagram	Layer Name Definition	Layer Type	Resin Content	Material Type	Impedance	Geometry	Impedance	Geometry
L01	0.7	(((		Mask						
	2.0	(((	Foil & Plating	Plating						
	1.3	(((	Pads Only				Pads Only			
L02	6.3	(((		2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu			98ohm+4	10on10	56ohm+5	10on10
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
L03	1.3	(((	HS1	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
L04	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	HS2	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
L05	1.3	(((	GND	1 oz. Cu						
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	HS3	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
L06	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
L07	1.3	(((	HS4	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
L08	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	HS4	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
L09	1.3	(((	GND	1 oz. Cu						
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	Plane	1 oz. Cu						
L10	10.5	(((		1x1080H/2x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	Plane	1 oz. Cu						
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
L11	1.3	(((	Plane	1 oz. Cu						
	10.5	(((		1x1080H/2x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	Plane	1 oz. Cu						
L12	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
L13	1.3	(((	HS5	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
L14	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	HS6	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
L15	1.3	(((	GND	1 oz. Cu						
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	HS7	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
L16	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
L17	1.3	(((	HS8	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
L18	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	HS7	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
L19	1.3	(((	GND	1 oz. Cu						
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
	1.3	(((	HS8	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
L20	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
	7.0	(((		1x1080H/1x106H/1x1080H	rc: 63.4%/70.2%/63.4%	IS620				
L21	1.3	(((	HS8	1 oz. Cu			100ohm+3	6on14	51ohm+3	6on14
	6.0	(((		core 2x1080H	rc: 63.4%	IS620				
	1.3	(((	GND	1 oz. Cu						
L22	6.3	(((		2x1080H	rc: 63.4%	IS620				
	1.3	(((	Pads Only	1 oz. Cu			98ohm+4	10on10	56ohm+5	10on10
	2.0	(((	Foil & Plating	Plating						
L24	0.7	(((		Mask						

CH4_OUT_7_8_2_3
CH4_OUT_10_3_10
CH2_OUT_7_3_7
CH1_OUT_4_3_4
CH6_OUT_10_3_5_5
CH6_OUT_10_2_8_5
CH3_OUT_10_3_5_3
CH6_OUT_10_2_5_5

CH5_OUT_10_3_5_5

