

COM update 4.2

Richard Mellitz, Samtec

Brandon Gore, Samtec

Adam Gregory, Samtec

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Highlights

❑ New Keywords:

- Time Axis
- Txpskew, Txnskew, Rxpskew, Pxnskew
- PKG_NAME, .START, .END

❑ New output

- SCMR_dB

❑ Rx FFE Bug fix

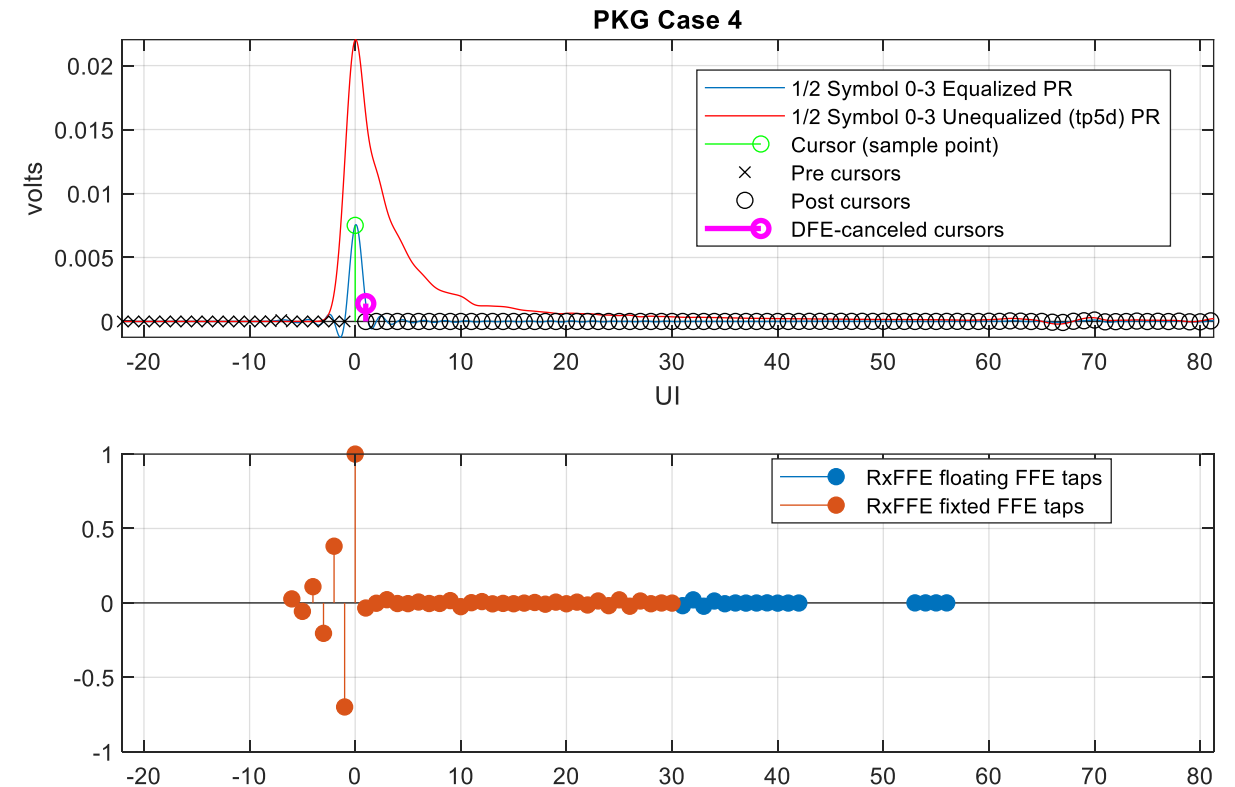
Equalization Display and RxFFE Floating taps

COM 4.2 UPDATES

Keywords:

□ Time Axis : UI or S

- X axis annotation.
- Updated figure display (on right)



Rx FFE Bug fix

COM 4.2 UPDATES

- ❑ Bug Fix: Problem resolved: RxFFE fails for channel with short delay or large RxFFE ranges and for COM using pulse response input
- ❑ The fix is just added some 0 voltage pre delay to the pulse response
- ❑ Applicable to most Rx FFE optimization methods implementations
- ❑ Used for
 - https://www.ieee802.org/3/dj/public/adhoc/electrical/23_1026/mellitz_3dj_elec_01_231026.pdf
 - and
 - https://www.ieee802.org/3/dj/public/adhoc/electrical/23_1026/mellitz_3dj_elec_02_231026.pdf

COM 4.2 updates



❑ Keywords: Txpskew, Txnskew, Rxpskew, Pxnskew

- Units are picoseconds (can be negative)

- Add port delay to tp0-tp5 channel

- See:

- https://www.ieee802.org/3/dj/public/adhoc/electrical/23_1207/mellitz_3dj_elec_01_231207.pdf

❑ Added output SCMR_dB as in mellitz_3dj_elec_01_231207

Package “A” and “B” support

COM 4.2 UPDATES

- ❑ Support for different Tx and Rx package types in the same config sheet
- ❑ New keywords and syntax

PKG_NAME	PKGA_2023 PKGM		TX RX
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- ❑ PKG_NAME corresponds to .START and .END package sections
 - Two names exact name required separated by white spec (no brackets)
- ❑ .START and .END must be
 - in column A and in rows after the main body
 - in upper case
- ❑ Original package sections are required but not used if PKG_NAME is used

Parameter	Setting	Units	Information
.START	PKG_HiR_CLASSB	[2.8 5.6 6.7 9.4]	dB
Table 93A-3 parameters			
package_tl_gamma0_a1_a2	[0.0005 0.00065 0.000293]		
package_tl_tau	0.006141	ns/mm	
package_Z_c	[87.5 87.5 ; 95 95 ; 100 100; 78 78]	Ohm	
R_d	[50 50]	Ohm	[TX RX]
z_p (TX)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
z_p (NEXT)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
z_p (FEXT)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
z_p (RX)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
C_p	[0.4e-4 0.4e-4]	nF	[TX RX]
A_v	[0.4049 0.4114 0.4132 0.4173]	V	Vf=0.400
A_fe	[0.4049 0.4114 0.4132 0.4173]	V	Vf=0.399
A_ne	[0.600 0.600 0.600 0.600]	V	Vf=0.400
.END			

Main body for configurable packages

CONFIGURATION SHEET

Table 93A-1 parameters			
Parameter	Setting	Units	Information
f_b	106.25	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[0.4e-4 0.9e-4 1.1e-4 ; 0.4e-4 0.9e-4 1.1e-4]	nF	[TX RX]
L_s	[0.13 0.15 0.14; 0.13 0.15 0.14]	nH	[TX RX]
C_b	[0.3e-4 0.3e-4]	nF	[TX RX]
R_d	[50 50]	Ohm	[TX RX]
R_0	50	Ohm	
PKG_NAME	PKG_HIR_CLASSB_PKG_Module		TX RX
A_v	0.413	V	rqd syntx
A_fe	0.413	V	rqd syntx
A_ne	0.608	V	rqd syntx
L	4		
M	32		
filter and Eq			
f_r	0.55	*fb	
c(0)	0.55		min
c(-1)	[-0.4:0.02:0]		[min:step:max]
c(-2)	[0:.02:0.1]		[min:step:max]
c(-3)	0		[min:step:max]
c(-4)	0		[min:step:max]
c(1)	0		[min:step:max]
N_b	1	UI	
b_max(1)	0.75		As/dffe1
b_max(2..N_b)	1		As/dfe2..N_b
b_min(1)	0		As/dffe1
b_min(2..N_b)	-0.15	S	As/dfe2..N_b
g_DC	[-15:1:0]	dB	[min:step:max]
f_z	59.03	GHz	
f_p1	59.03	GHz	
f_p2	106.25	GHz	
g_DC_HP	[-5:1:0]		[min:step:max]
f_HP_PZ	1.328125	GHz	
Butterworth	1	logical	include in fr
Local Search	2		
sample_adjustment	[-24 24]		[mn max]
ts_anchor	1		

I/O control			
DIAGNOSTICS	1		logical
DISPLAY_WINDOW	1		logical
CSV_REPORT	0		logical
RESULT_DIR	.\results\C2M_{date}\		
SAVE_FIGURES	0		logical
Port Order	[1 3 2 4]		
RUNTAG	COM_model		
COM_CONTRIBUTION	0		logical
Operational			
ERL Pass threshold	10		dB
COM Pass threshold	3		db
DER_0	2.00E-05		
T_r	4.00E-03		ns
FORCE_TR	1		logical
Min_VEO_Test	0		mV
PMD_type	C2C		
T_0	50		mUI
samples_for_C2M	100		amples/UI
EW	0		
MLSE	0		
Noise, jitter			
sigma_RJ	0.01		UI
A_DD	0.02		V^2/GHz
eta_0	1.25E-08		dB
SNR_TX	33		
R_LM	0.95		
minutes_3cwfdfj_2309_unapproved			
benartsi_3dj_01_2311			
mli_3df_02_220316			

Table 93A-3 parameters			
Parameter	Setting	Units	Information
package_tl_gamma0_a1_a2	[5e-4 0.00065 0.0003]		rqd syntx
package_tl_tau	0.006141	ns/mm	rqd syntx
package_Z_c	[92 92 ; 70 70; 80 80; 100 100]	Ohm	rqd syntx
z_p select	[3]		rqd syntx
z_p (TX)	[8 24 30 45 ; 1 1 1 1 ; 1 1 1 1 ; 0.5 0.5 0.5 0.5]	mm	rqd syntx
z_p (NEXT)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	rqd syntx
z_p (FEXT)	[8 24 30 45 ; 1 1 1 1 ; 1 1 1 1 ; 0.5 0.5 0.5 0.5]	mm	rqd syntx
z_p (RX)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	rqd syntx
C_p	[0.4e-4 0.4e-4]	nF	rqd syntx
Floating Tap Control			
N_bg	0		0 1 2 or 3 groups
N_bf	4		taps per group
N_f	120		UI span for floating taps
bmaxg	0.2		max DFE value for floating taps
B_float_RSS_MAX	0.1		rss tail tap limit
N_tail_start	25		(UI) start of tail taps limit
Filter: Rx FFE			
ffe_pre_tap_len	8		UI
ffe_post_tap_len	24		UI
ffe_tap_step_size	0		
ffe_main_cursor_min	1		
ffe_pre_tap1_max	1		
ffe_post_tap1_max	1		
ffe_tapn_max	1		
ffe_backoff	0		
TDR and ERL options			
TDR	1		logical
ERL	1		logical
ERL_ONLY	0		ns
TR_TDR	0.01		
N	1000		logical
TDR_Butterworth	1		
beta_x	0		
rho_x	0.618		
TDR_W_TXPKG	0		UI
N_bx	20		
fixture delay time	[0 0]		
Tukey_Window	1		

Package spec is below the main body

CONFIGURATION SHEET

.START	PKG_LowR_CLASSA	[2.44 5.7] dB	
Table 93A-3 parameters			
Parameter	Setting	Units	Information
package_tl_gamma0_a1_a2	[0.0005 0.00089 0.0002]		
package_tl_tau	0.006141	ns/mm	
package_Z_c	[87.5 87.5 ; 95 95 ; 100 100; 100 100]	Ohm	
R_d	[50 50]	Ohm	[TX RX]
z_p (TX)	[12 33 33 33 ; 1.8 1.8 1.8 1.8 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (NEXT)	[12 33 33 33 ; 1.8 1.8 1.8 1.8 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (FEXT)	[12 33 33 33 ; 1.8 1.8 1.8 1.8 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (RX)	[12 33 33 33 ; 1.8 1.8 1.8 1.8 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
C_p	[0.4e-4 0.4e-4]	nF	[TX RX]
A_v	[0.4057 0.4143 0.4143 0.4143]	V	Vf=0.400
A_fe	[0.4057 0.4143 0.4143 0.4143]	V	Vf=0.399
A_ne	[0.600 0.600 0.600 0.600]	V	Vf=0.400
.END			

.START	PKG_HIR_CLASSB	[2.8 5.6 6.7 9.4] dB	
Table 93A-3 parameters			
Parameter	Setting	Units	Information
package_tl_gamma0_a1_a2	[0.0005 0.00065 0.000293]		
package_tl_tau	0.006141	ns/mm	
package_Z_c	[87.5 87.5 ; 95 95 ; 100 100; 78 78]	Ohm	
R_d	[50 50]	Ohm	[TX RX]
z_p (TX)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
z_p (NEXT)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
z_p (FEXT)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
z_p (RX)	[8 24 30 45 ; 2 2 2 2 ; 1.3 1.3 1.3 1.3 ; 1.5 1.5 1.5 1.5]	mm	[test cases]
C_p	[0.4e-4 0.4e-4]	nF	[TX RX]
A_v	[0.4049 0.4114 0.4132 0.4173]	V	Vf=0.400
A_fe	[0.4049 0.4114 0.4132 0.4173]	V	Vf=0.399
A_ne	[0.600 0.600 0.600 0.600]	V	Vf=0.400
.END			

.START	PKG_Module		
Table 93A-3 parameters			
Parameter	Setting	Units	Information
package_tl_gamma0_a1_a2	[0.0005 0.00089 0.0002]		
package_tl_tau	0.006141	ns/mm	
package_Z_c	[87.5 87.5 ; 95 95 ; 100 100; 100 100]	Ohm	
R_d	[50 50]	Ohm	[TX RX]
z_p (TX)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (NEXT)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (FEXT)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (RX)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
C_p	[0.4e-4 0.4e-4]	nF	[TX RX]
A_v	[0.4057 0.4057 0.4057 0.4057]	V	Vf=0.400
A_fe	[0.4057 0.4057 0.4057 0.4057]	V	Vf=0.399
A_ne	[0.600 0.600 0.600 0.600]	V	Vf=0.400
.END			

.START	PKG_Null		
Table 93A-3 parameters			
Parameter	Setting	Units	Information
package_tl_gamma0_a1_a2	[5e-4 0.001 0.03]		
package_tl_tau	0.006141	ns/mm	
package_Z_c	[92 92 ; 70 70; 80 80; 100 100]	Ohm	
R_d	[50 50]	Ohm	[TX RX]
z_p (TX)	[0 0 0 0 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (NEXT)	[0 0 0 0 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (FEXT)	[0 0 0 0 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (RX)	[0 0 0 0 ; 0 0 0 0 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
C_p	[0 0]	nF	[TX RX]
A_v	0.5	V	Vf=0.400
A_fe	0.5	V	Vf=0.400
A_ne	0.61	V	
.END			

Summary

- ❑ Syntax added align capability for packages to baseline
- ❑ Other syntax added to improve TF investigations toward baseline
- ❑ Bug fix for Rx FFE
 - not core to optimization method.
- ❑ Rx FFE hooks for next beta version added but not specified yet
 - For consensus activity

Thank You!