COM 2.41 with 100GEL Update

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COM 2.41 (mellitz_3cd_01_081518_COM.zip)

- com_ieee8023_93a_241.m
  - Like com_ieee8023_93a_240 .m
    - Adds long FFE capability
  - Just changes FFE constraint
  - FV is the forcing vector , FV = `[... 0, 0, As, min( |bmax(1)*As|,|As|), 0, 0, 0, 0...]`
- 6 sample configurations
- 100 G KR PAM4 DFE24, 20, 16, 12
  - T1config_com_ieee8023_93a=100GEL-KR_DFE24.xls
  - T1config_com_ieee8023_93a=100GEL-KR_DFE20.xls
  - T1config_com_ieee8023_93a=100GEL-KR_DFE16.xls
  - T1config_com_ieee8023_93a=100GEL-KR_DFE12.xls
- 100 G KR PAM4 DFE1 FFE28 (3,1,24)
  - T1config_com_ieee8023_93a=100GEL-KR_DFE1_RxFFE3-24.xls
  - T1config_com_ieee8023_93a=100GEL-KR_DFE1_RxFFE3-20.xls
  - T1config_com_ieee8023_93a=100GEL-KR_DFE1_RxFFE3-16.xls
  - T1config_com_ieee8023_93a=100GEL-KR_DFE1_RxFFE3-12.xls
- 100 G C2M PAM4 Tx FFE3(2,1,0) and Rx FFE7 (2,1,4) TP0 to TP2
  - T1config_com_ieee8023_93a=100GEL_C2M_tp0_tp2_rxFFE7.xls

100 G KR PAM4 DFE

Table 93A-1 parameters			
Parameter	Setting	Units	Information
f_b	53.125	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[1.3e-4 1.3e-4]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 30]	mm	[test cases]
z_p (NEXT)	[12 30]	mm	[test cases]
z_p (FEXT)	[12 30]	mm	[test cases]
z_p (RX)	[12 30]	mm	[test cases]
C_p	[1.1e-4 1.1e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[50 50]	Ohm	[TX RX]
A_v	0.41	V	
A_fe	0.41	V	
A_ne	0.6	V	
L	4		
M	32		
filter and Eq			
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.3:0.05:0]		[min:step:max]
c(-2)	[0:0.025:0.1]		[min:step:max]
c(-3)	[-0.1:0.025:0]		[min:step:max]
c(-4)	0		[min:step:max]
c(1)	[-0.2:0.05:0]		[min:step:max]
N_b	24	UI	
b_max(1)	0.7		
b_max(2..N_b)	0.2		
g_DC	[-20:1:-0]	dB	[min:step:max]
f_z	21.25	GHz	
f_p1	21.25	GHz	
f_p2	53.125	GHz	
g_DC_HP	[-6:1-0]		[min:step:max]
f_HP_PZ	0.6640625	GHz	
ffe_pre_tap_len	0	UI	
ffe_post_tap_len	0	UI	

I/O control		
DIAGNOSTICS	1	logical
DISPLAY_WINDOW	1	logical
CSV_REPORT	1	logical
RESULT_DIR	.\results\100GEL_WG_{date}\	
SAVE_FIGURES	0	logical
Port Order	[1 3 2 4]	
RUNTAG	KR_DFE_	
COM_CONTRIBUTION	0	logical
Operational		
COM Pass threshold	3	dB
DER_0	1.00E-04	
Include PCB	0	Value
T_r	6.16E-03	ns
FORCE_TR	1	logical

TDR and ERL options		
TDR	1	logical
ERL	1	logical
ERL_ONLY	0	logical
TR_TDR	0.01	ns
N	1000	
TDR_Butterworth	1	logical
beta_x	1.70E+09	
rho_x	0.18	
fixture delay time	0	
Receiver testing		
RX_CALIBRATION	0	logical
Sigma BBN step	5.00E-03	V

Noise, jitter		
sigma_RJ	0.01	UI
A_DD	0.02	UI
eta_0	8.20E-09	V^2/GHz
SNR_TX	32.5	dB
R_LM	0.95	

Table 93A–3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 1.734e-3 1.455e-4]	
package_tl_tau	6.141E-03	ns/mm
package_Z_c	90	Ohm (tdr sel)

Table 92–12 parameters		
Parameter	Setting	
board_tl_gamma0_a1_a2	[0 4.114e-4 2.547e-4]	
board_tl_tau	6.191E-03	ns/mm
board_Z_c	110	Ohm
z_bp (TX)	151	mm
z_bp (NEXT)	72	mm
z_bp (FEXT)	72	mm
z_bp (RX)	151	mm

N_b 24/20/16/12 UI

Proposed COM reference Model with Rx FFE

Base on Method 3* slide 3
Configurations for Gain at cursor,
and quantized DFE method not considered here

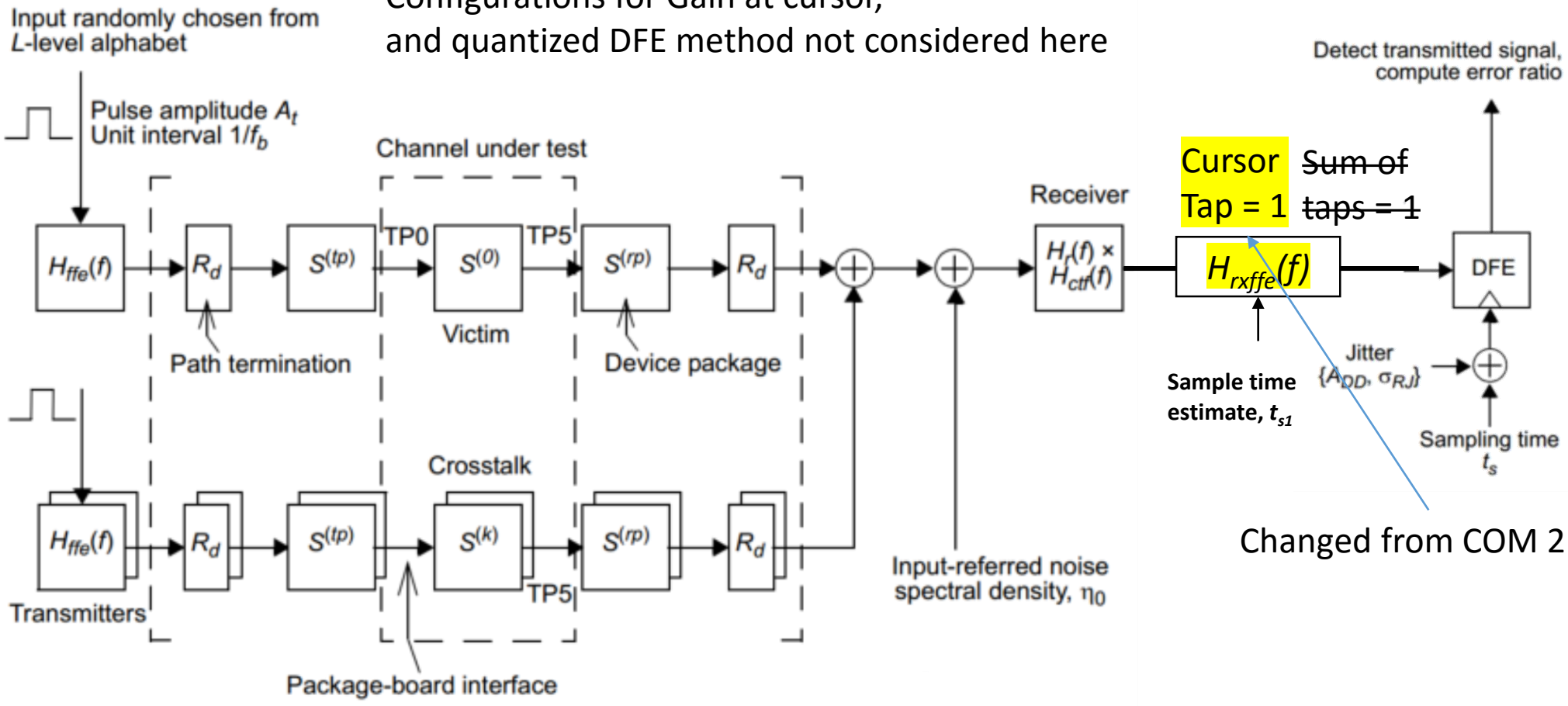

Figure 93A–1—COM reference model

* http://www.ieee802.org/3/ck/public/18_07/mellitz_3ck_01_0718.pdf

100 G KR PAM4 example with Rx FFE

Table 93A-1 parameters			
Parameter	Setting	Units	Information
f_b	53.125	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[1.3e-4 1.3e-4]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 30]	mm	[test cases]
z_p (NEXT)	[12 30]	mm	[test cases]
z_p (FEXT)	[12 30]	mm	[test cases]
z_p (RX)	[12 30]	mm	[test cases]
C_p	[1.1e-4 1.1e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[50 50]	Ohm	[TX RX]
A_v	0.41	V	
A_fe	0.41	V	
A_ne	0.6	V	
L	4		
M	32		
filter and Eq			
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.3:0.05:0]		[min:step:max]
c(-2)	[0:0.025:0.1]		[min:step:max]
c(-3)	0		[min:step:max]
c(-4)	0		[min:step:max]
c(1)	[-0.2:0.05:0]		[min:step:max]
N_b	1	UI	
b_max(1)	0.7		
g_DC	[-20:1:-10]	dB	[min:step:max]
f_z	21.25	GHz	
f_p1	21.25	GHz	
f_p2	53.125	GHz	
g_DC_HP	[-6:1:0]		[min:step:max]
f_HP_PZ	0.6640625	GHz	
ffe_pre_tap_len	3	UI	
ffe_post_tap_len	24	UI	

I/O control		
DIAGNOSTICS	1	logical
DISPLAY_WINDOW	1	logical
CSV_REPORT	1	logical
RESULT_DIR	.\results\100GEL_WG_{date}\	
SAVE_FIGURES	0	logical
Port Order	[1 3 2 4]	
RUNTAG	KR1_DFE1_RxFFE	
COM_CONTRIBUTION	0	logical
Operational		
COM Pass threshold	3	dB
DER_0	1.00E-04	
Include PCB	0	Value
T_r	6.16E-03	ns
FORCE_TR	1	logical

TDR and ERL options		
TDR	1	logical
ERL	1	logical
ERL_ONLY	0	logical
TR_TDR	0.01	ns
N	1000	
TDR_Butterworth	1	logical
beta_x	1.70E+09	
rho_x	0.18	
fixture delay time	0	
Receiver testing		
RX_CALIBRATION	0	logical
Sigma BBN step	5.00E-03	V

Noise, jitter		
sigma_RJ	0.01	UI
A_DD	0.02	UI
eta_0	8.20E-09	V^2/GHz
SNR_TX	32.5	dB
R_LM	0.95	

Table 93A–3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 1.734e-3 1.455e-4]	
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package_Z_c	90	Ohm (tdr sel)

Table 92–12 parameters		
Parameter	Setting	
board_tl_gamma0_a1_a2	[0 4.114e-4 2.547e-4]	
board_tl_tau	6.191E-03	ns/mm
board_Z_c	110	Ohm
z_bp (TX)	151	mm
z_bp (NEXT)	72	mm
z_bp (FEXT)	72	mm
z_bp (RX)	151	mm

ffe_post_tap_len 24/20/16/12 UI

100 G C2M PAM4 informative example: Tx FFE3(2,1,0) and Rx FFE7 (2,1,4) TP0 to TP2)

Table 93A-1 parameters			
Parameter	Setting	Units	Information
f_b	53.125	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[1.1e-4 0]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 30]	mm	[test cases]
z_p (NEXT)	[0 0]	mm	[test cases]
z_p (FEXT)	[12 30]	mm	[test cases]
z_p (RX)	[0 0]	mm	[test cases]
C_p	[0.9e-4 0.9e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[45 45]	Ohm	[TX RX]
A_v	0.41	V	
A_fe	0.41	V	
A_ne	0.6	V	
L	4		
M	32		
filter and Eq			
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.25:0.025:0]		[min:step:max]
c(-2)	[0:0.025:0.1]		[min:step:max]
c(-3)	0		[min:step:max]
c(-4)	0		[min:step:max]
c(1)	0		[min:step:max]
N_b	0	UI	
b_max(1)	0.7		
g_DC	[-15:1:0]	dB	[min:step:max]
f_z	21.25	GHz	
f_p1	21.25	GHz	
f_p2	106.25	GHz	
g_DC_HP	[-4:1:0]		[min:step:max]
f_HP_PZ	0.6640625	GHz	
ffe_pre_tap_len	2	UI	
ffe_post_tap_len	4	UI	

I/O control				
DIAGNOSTICS	1	logical		
DISPLAY_WINDOW	1	logical		
CSV_REPORT	1	logical		
RESULT_DIR	.\results\100GEL_WG_{date}\			
SAVE_FIGURES	0	logical		
Port Order	[1 3 2 4]			
RUNTAG	C2M_DFE1_RxFFE			
COM_CONTRIBUTION	0	logical		
Operational				
COM Pass threshold	3	dB		
EH_min	10	Value	EH limit	
EH_max	1000	Value	EH limit	
DER_0	1.00E-05			
Include PCB	0	Value		
T_r	6.16E-03	ns		
FORCE_TR	1	logical		

TDR and ERL options		
TDR	0	logical
ERL	0	logical
ERL_ONLY	0	logical
TR_TDR	0.01	ns
N	1000	
TDR_Butterworth	1	logical
beta_x	1.70E+09	
rho_x	0.18	
fixture delay time	0	
Receiver testing		
RX_CALIBRATION	0	logical
Sigma BBN step	5.00E-03	V

Noise, jitter		
sigma_RJ	0.01	UI
A_DD	0.02	UI
eta_0	0.00E+00	V^2/GHz
SNR_TX	33	dB
R_LM	0.95	

Table 93A–3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 1.734e-3 1.455e-4]	
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z_bp (TX)	151	mm
z_bp (NEXT)	72	mm
z_bp (FEXT)	72	mm
z_bp (RX)	151	mm

Thank You!