



10GEPON Reference
Model

96.96 ps challenge

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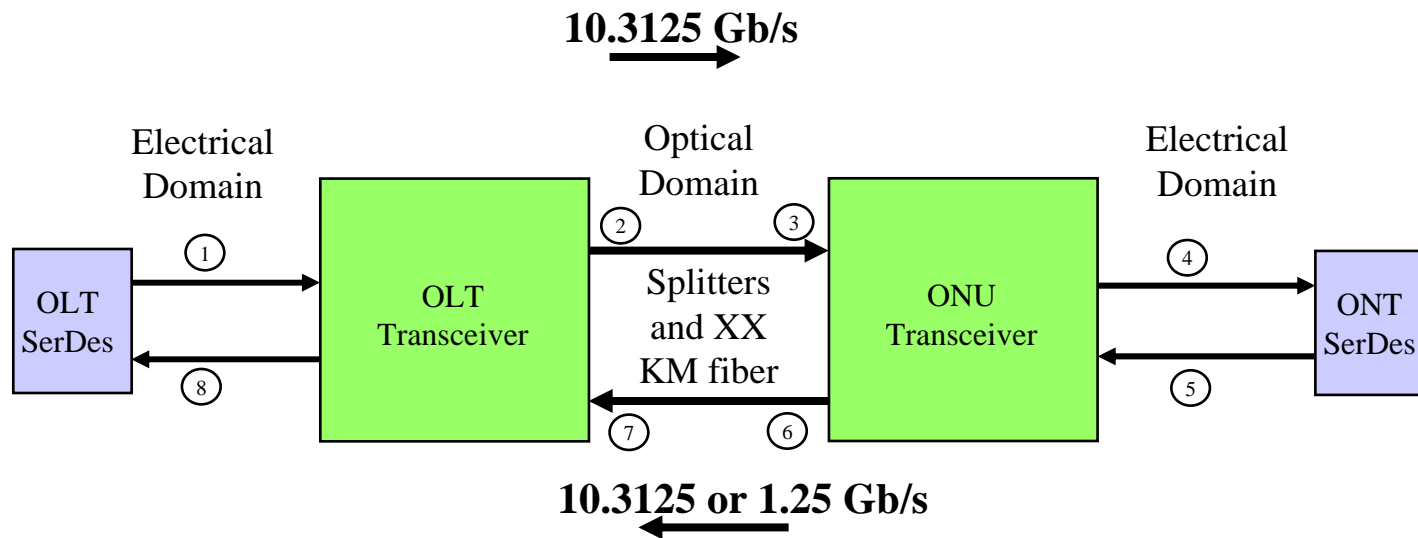
Kawasaki Microelectronics
America Inc



Motivation

- Lack of electrical domain specifications in ITU-T GPON
- Total jitter budget is less than 97 ps
 - To be shared between Optical transceivers , SerDes and the fiber
 - Important to describe relevant jitter components – Dj,Rj ,Sj.
 - Stressed eye to achieve xxxx BER
- Normative vs. Informative
 - 1G EPON defines most jitter specifications as informative. This may also apply to 10GEPON
 - To achieve reliable burst mode recovery, certain specifications may become mandatory
- Optical-electrical domains
 - Certain type of jitter (e.g. ISI and low freq. jitter) absorbed/tracked by SerDes
 - Will require collaborative efforts between optical and silicon vendors

PRX10/20/30 Jitter Budgets



Objective is to specify deterministic and random jitter components at the points marked in the diagram in worst case conditions. These are similar to TP1-TP4 defined in IEEE802.3ah specifications for EPON.

Table 60–10—1000BASE-PX10 and 1000BASE-PX20 downstream jitter budget (informative)

Reference point	Total jitter		Deterministic jitter	
	UI	ps	UI	ps
TP1	0.24	192	0.10	80
TP1 to TP2	0.191	153	0.15	120
TP2	0.431	345	0.25	200
TP2 to TP3	0.009	7	0	0
TP3	0.44	352	0.25	200
TP3 to TP4	0.309	247	0.212	170
TP4	0.749	599	0.462	370

Table 60–11—1000BASE-PX10 and 1000BASE-PX20 upstream jitter budget (informative)

Reference point	No Jitter input to ONU				Jitter input to ONU			
	Total jitter		<i>W</i>		Total jitter		<i>W</i>	
	UI	ps	UI	ps	UI	ps	UI	ps
TP1	0.19	152	0.06	48	0.24	192	0.11	88
TP1 to TP2	0.16	128	0.14	112	0.16	128	0.14	112
TP2	0.35	280	0.20	160	0.40	320	0.25	200
TP2 to TP3	0.09	72	0.05	40	0.09	72	0.05	40
TP3	0.44	352	0.25	200	0.49	392	0.30	24
TP3 to TP4	0.18	144	0.15	120	0.18	144	0.15	120
TP4	0.62	496	0.40	320	0.67	536	0.45	360

$$\text{Jitter Transfer} = 20 \log_{10} \left[\frac{\text{Jitter on upstream signal (UI)}}{\text{Jitter on downstream signal (UI)}} \right] \quad (60-2)$$

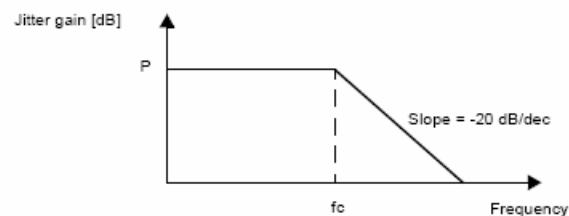


Figure 60–5—Jitter gain curve values for 1000BASE-PX10-U and 1000BASE-PX20-U

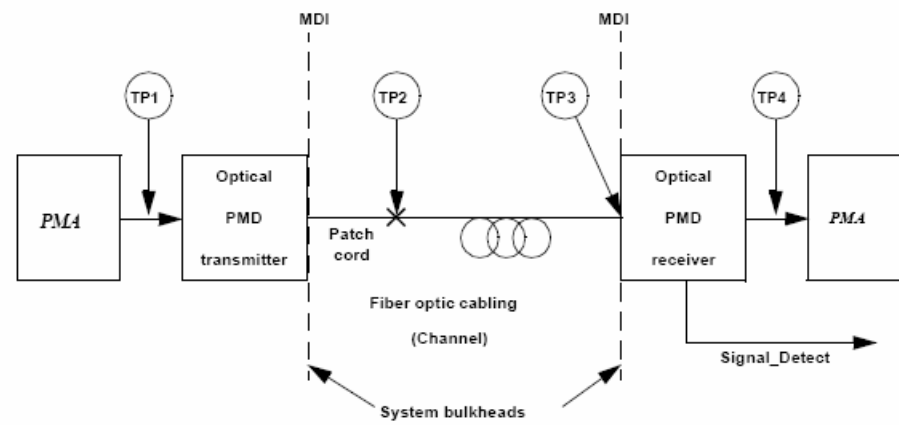


Figure 59-2—1000BASE-X block diagram

Straw Poll # 7

- Specify optical and electrical domain jitter budgets for PR and PRX in a format similar to IEEE802.3ah Table 60-10 and 60-11
- Yes ___36___
- No ___0___
- No opinion ___2___