Introduction

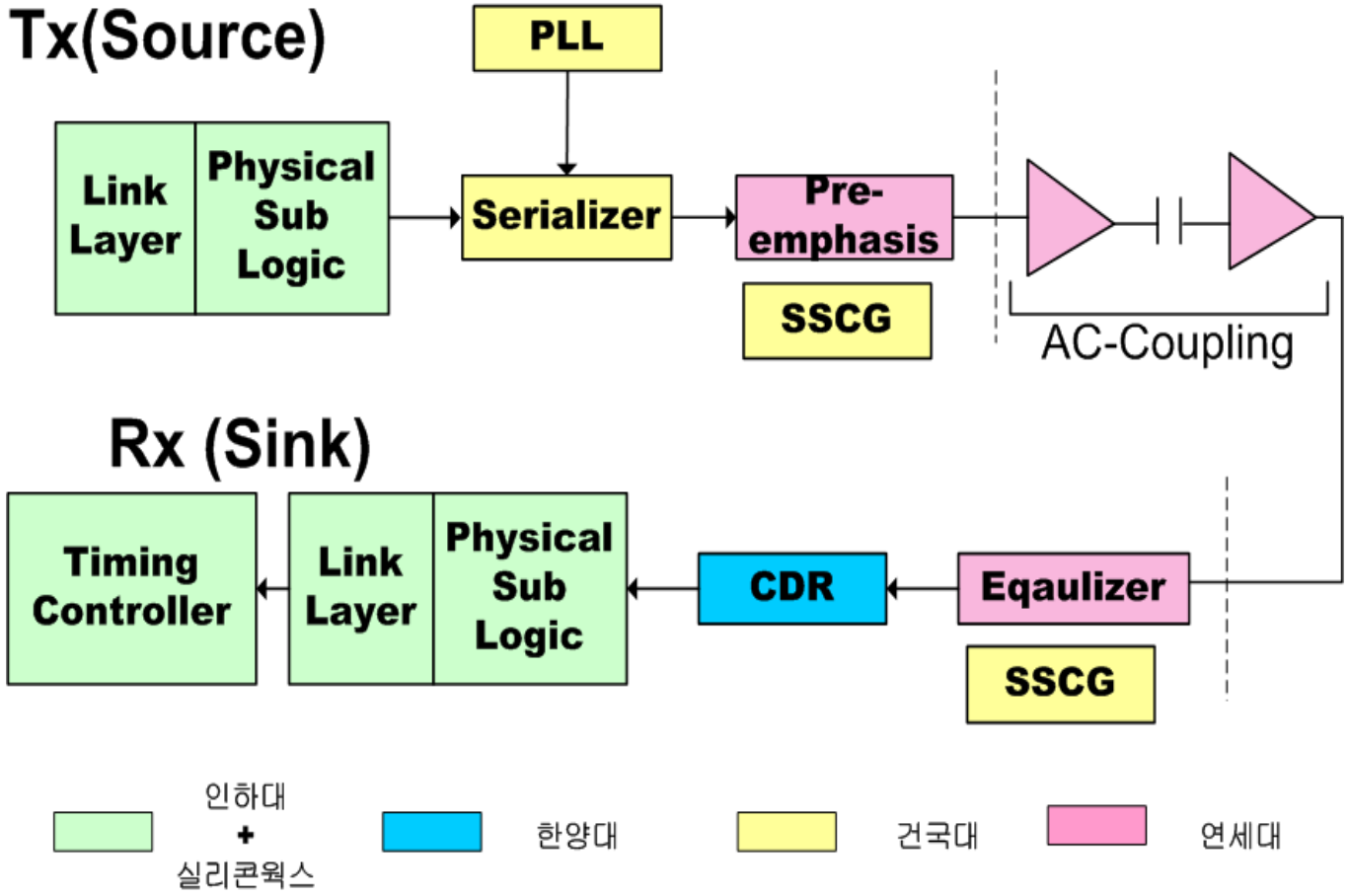
- Topic
  - Channel link analysis and design for Displayport 1.1 standard

- Team member
  - Team member: D.H Kim, K.C Choi, and J.S Yoon
    - Channel analysis: K.C Choi
    - Circuit design: D.H Kim, J.S Yoon

- Sponsor
  - "**System IC 2010**" project of Korea Ministry of Knowledge Economy

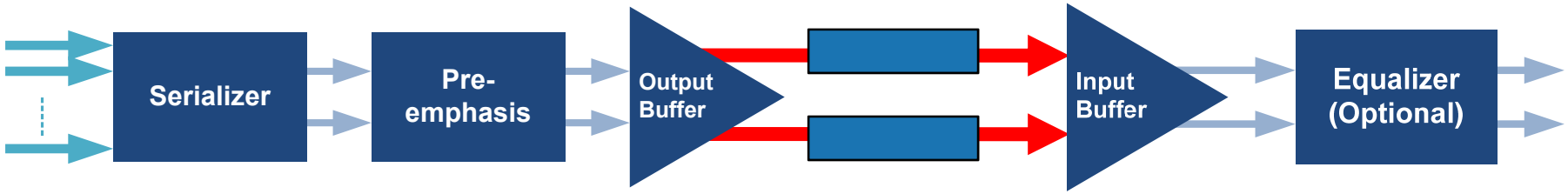
DisplayPort 표준 핵심 IP 및 통합 칩 설계

❖Joint research of 4 universities



DisplayPort 표준 핵심 IP 및 통합 칩 설계

❖ Research topic of Yonsei university



1 Serializer

-CMOS logic level
-162 / 250 Mbps
-10 bit serializer

2 I/O Buffer

-Differential
-0.4/0.6/0.8/1.2 Vdiff
-1.62/ 2.7 Gbps

3 Pre-emphasis

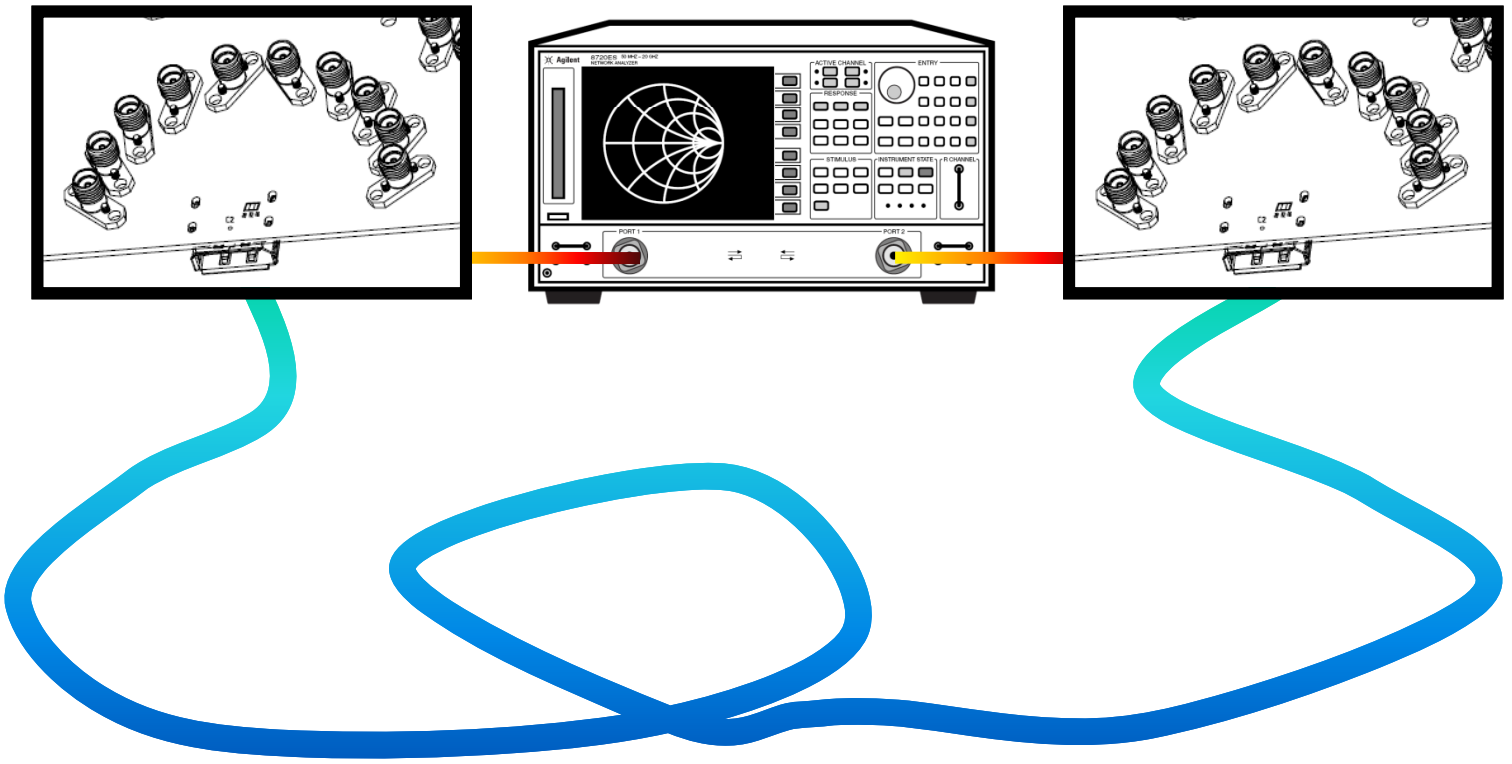
-0/ 3.5/ 6/ 9.5 dB
-Channel modeling

Channel Modeling

Evaluation Board
MOLEX

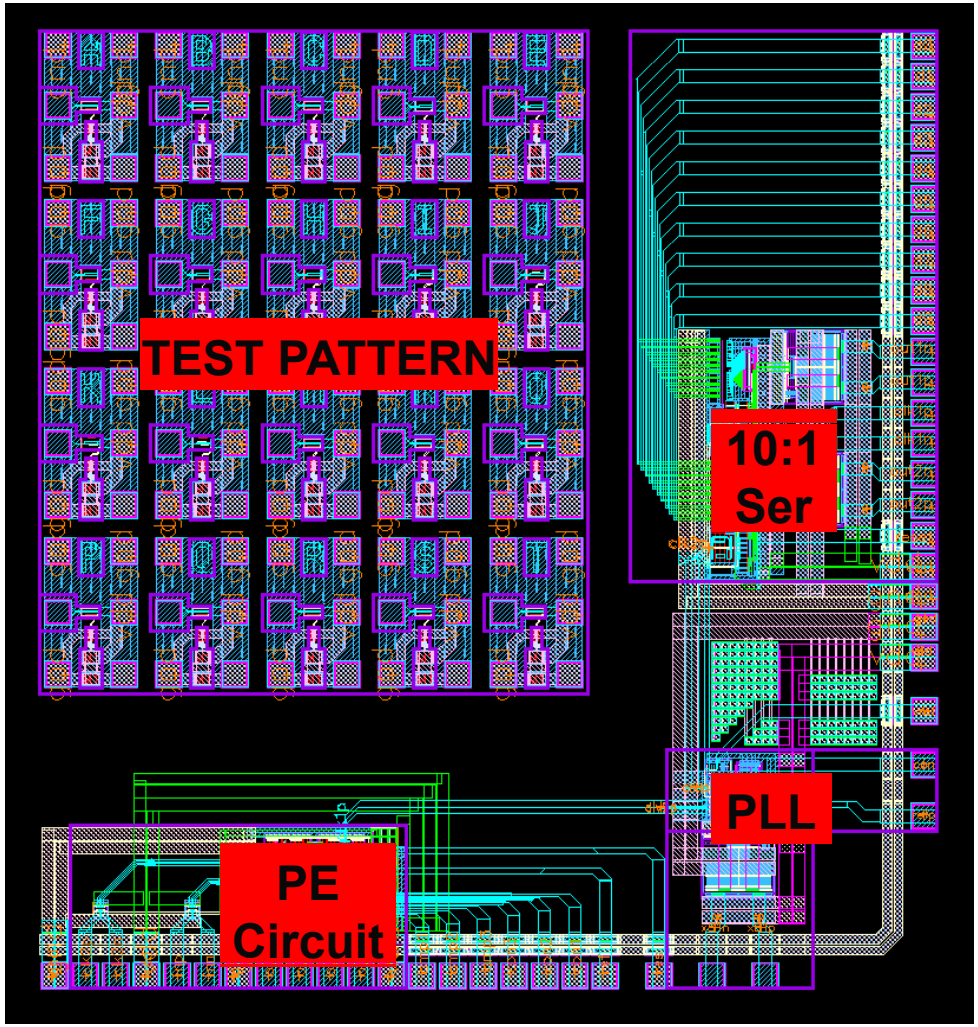
Network Analyzer
Agilent 8719ES

Evaluation Board
MOLEX



DisplayPort Cable
MOLEX

Chip#1 – Dongbu 0.18μm



Pre-Emphasis Circuit

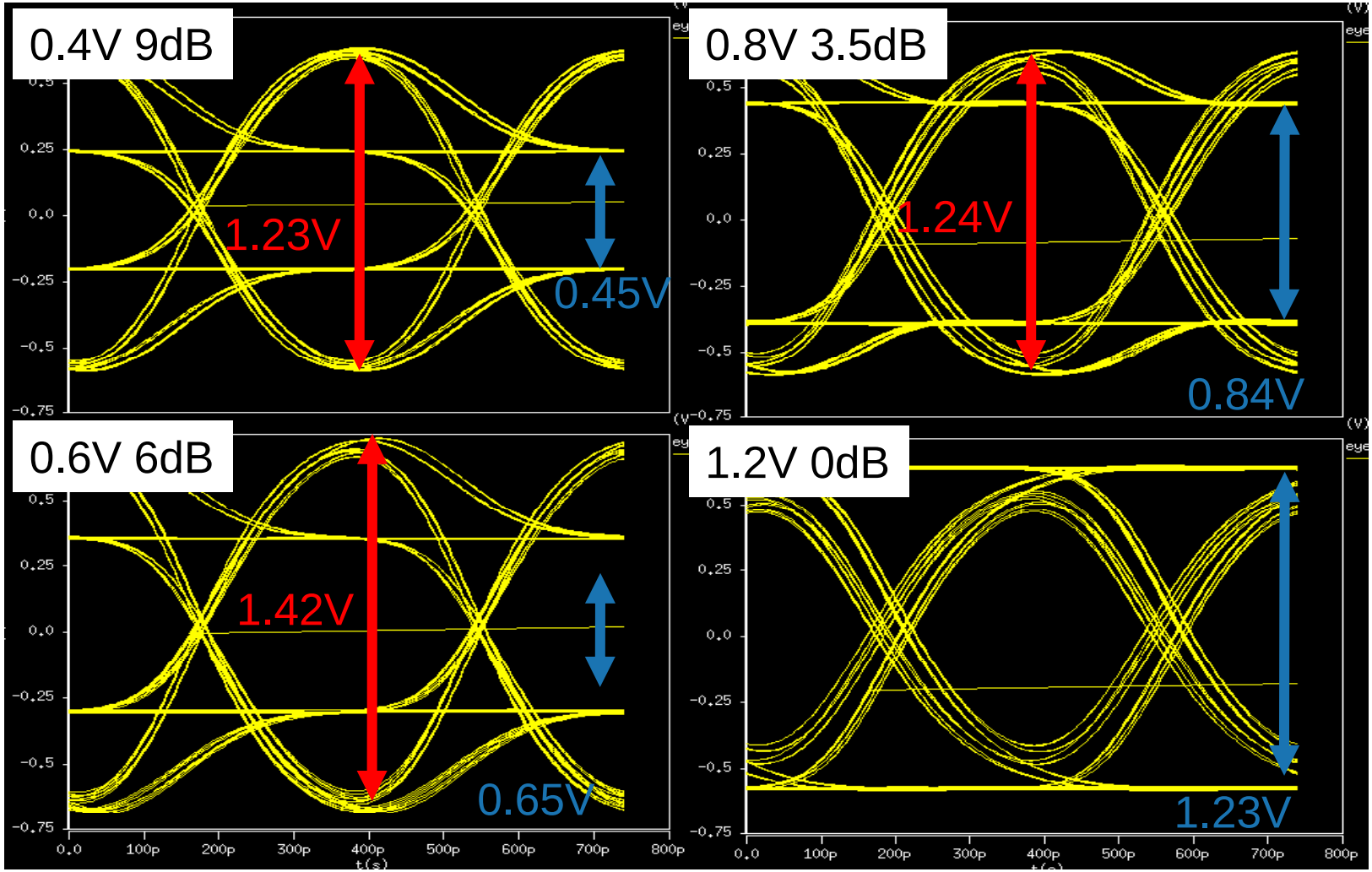
- 3.3V supply
- 220 X 250 ㎛
- Maximum 45mA (@1.2V swing)

10:1 Serializer

- 1.8V supply
- 120 X 290 ㎛
- 2.5mA

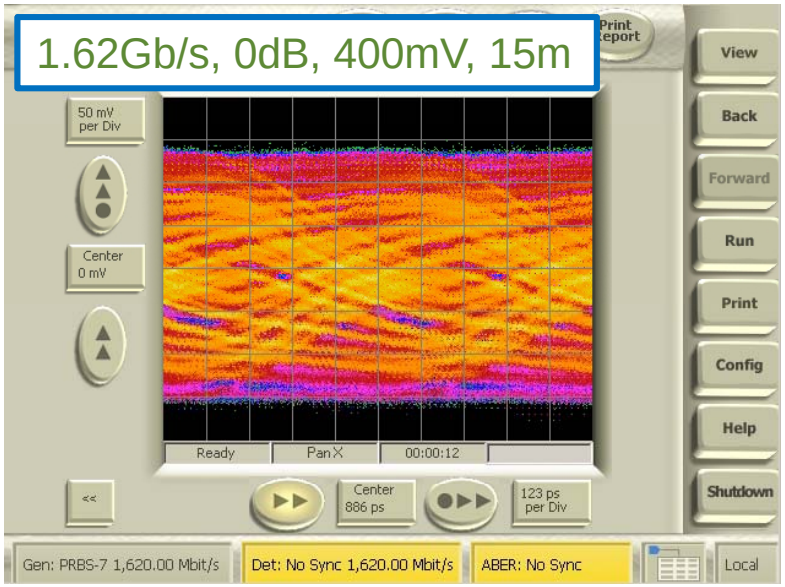
2008. 6.30 Chip out

Chip#1 – Simulation (@2.7Gb/s)

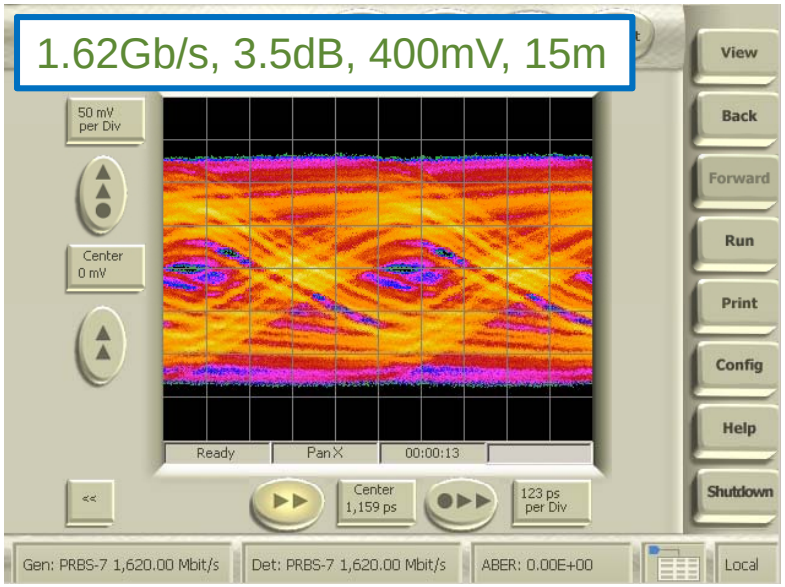


Chip#1 – Measurements

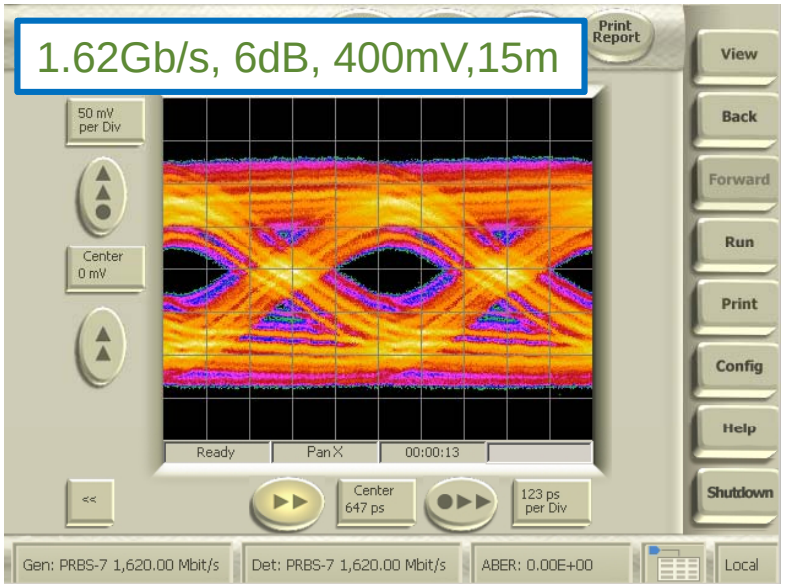
1.62Gb/s, 0dB, 400mV, 15m



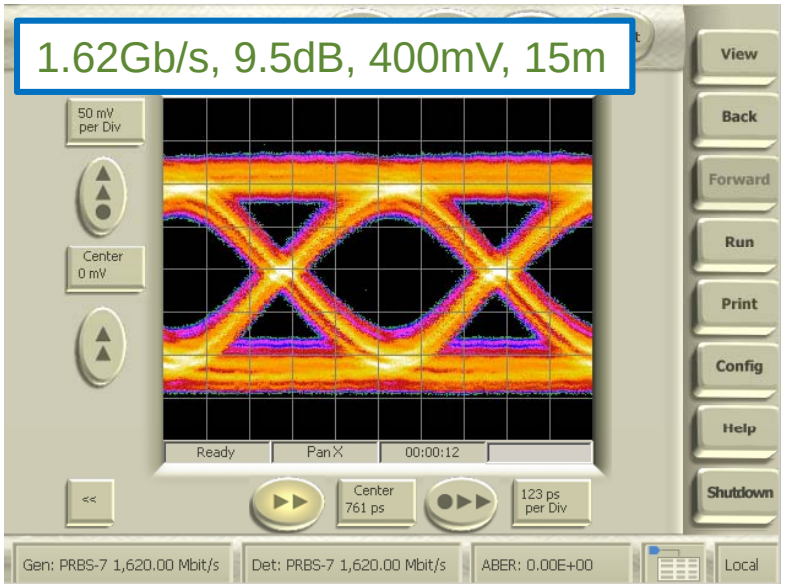
1.62Gb/s, 3.5dB, 400mV, 15m



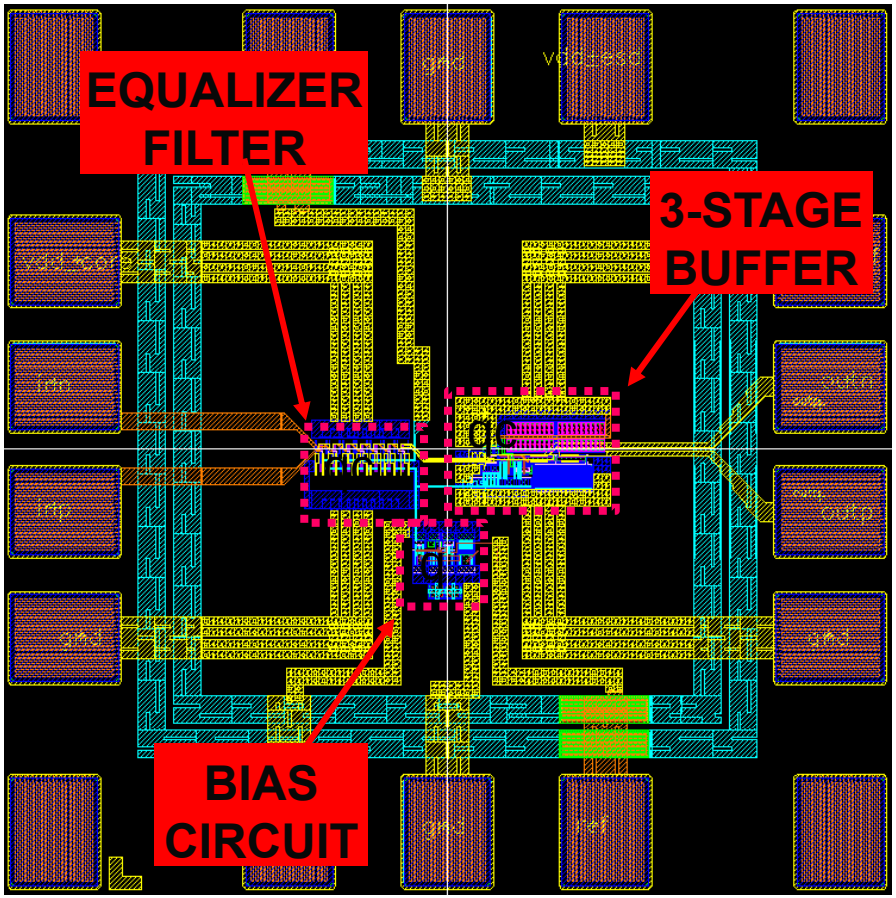
1.62Gb/s, 6dB, 400mV,15m



1.62Gb/s, 9.5dB, 400mV, 15m



Chip#2 - Dongbu 0.13μm



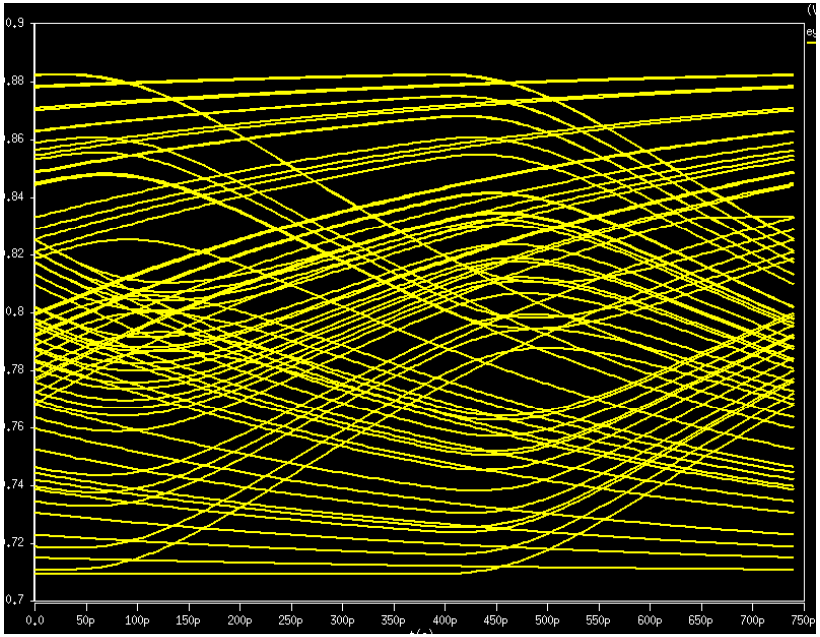
EQUALZER Circuit

- 1.2V supply
- 55 X 70 ㎛
- Maximum 1.26mW (@0.6V swing)

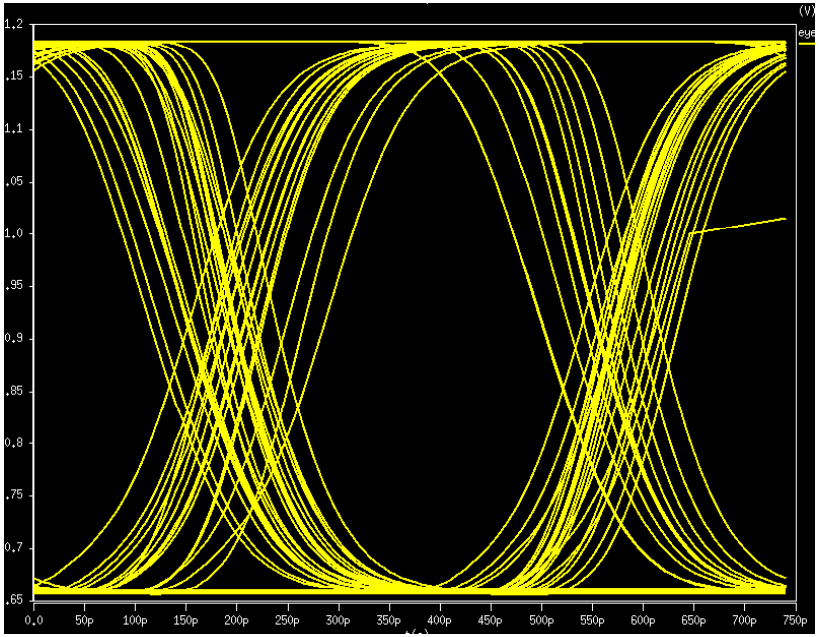
2008. 10.15 Chip out

Chip#2 – Simulation Results

- 2.7Gb/s, no pre-emphasis, 15m Cable

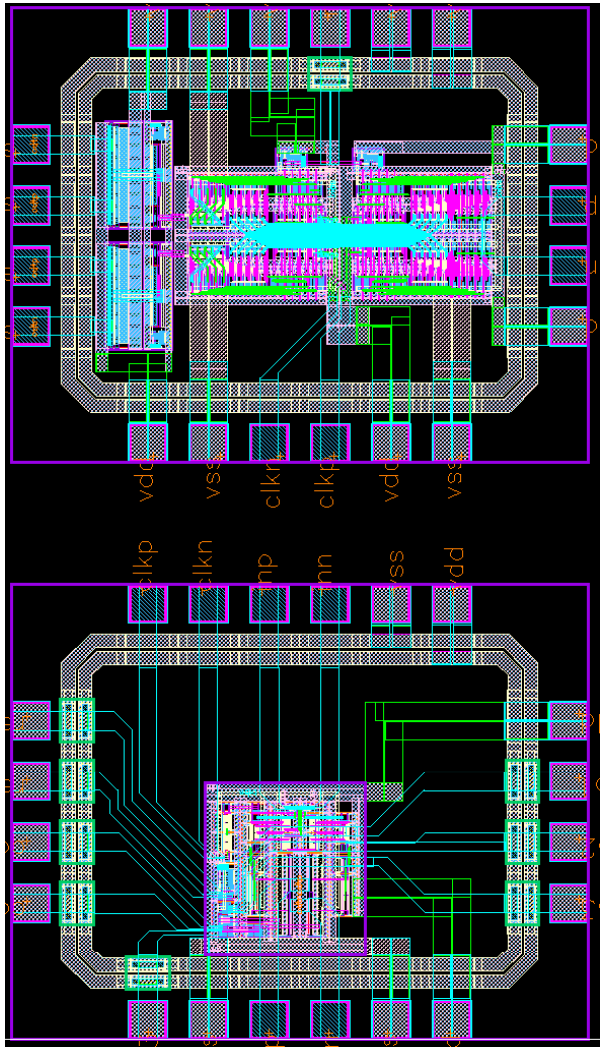


After 15m Cable



After Equalizer

Chip#3 – Dongbu 0.18μm



Pre-Emphasis Circuit

- 3.3V supply
- 260 X 280 ㎛
- Maximum 60mA (@1.2V swing)

10:1 Serializer

- 1.8V supply
- 230 X 270 ㎛
- 30mA

2008. 12. 1 Chip out