# MB810 Applications for HARI Interface

**Dae Young Kim*, Tae Kyu Kang**, Sang Seob Song****

**Moo Jung Chu***, Sang Soo Lee***, Hyeong Ho Lee*****

***Chungnam Nat'l Univ., **Chonbuk Nat'l Univ., *** ETRI, Korea**

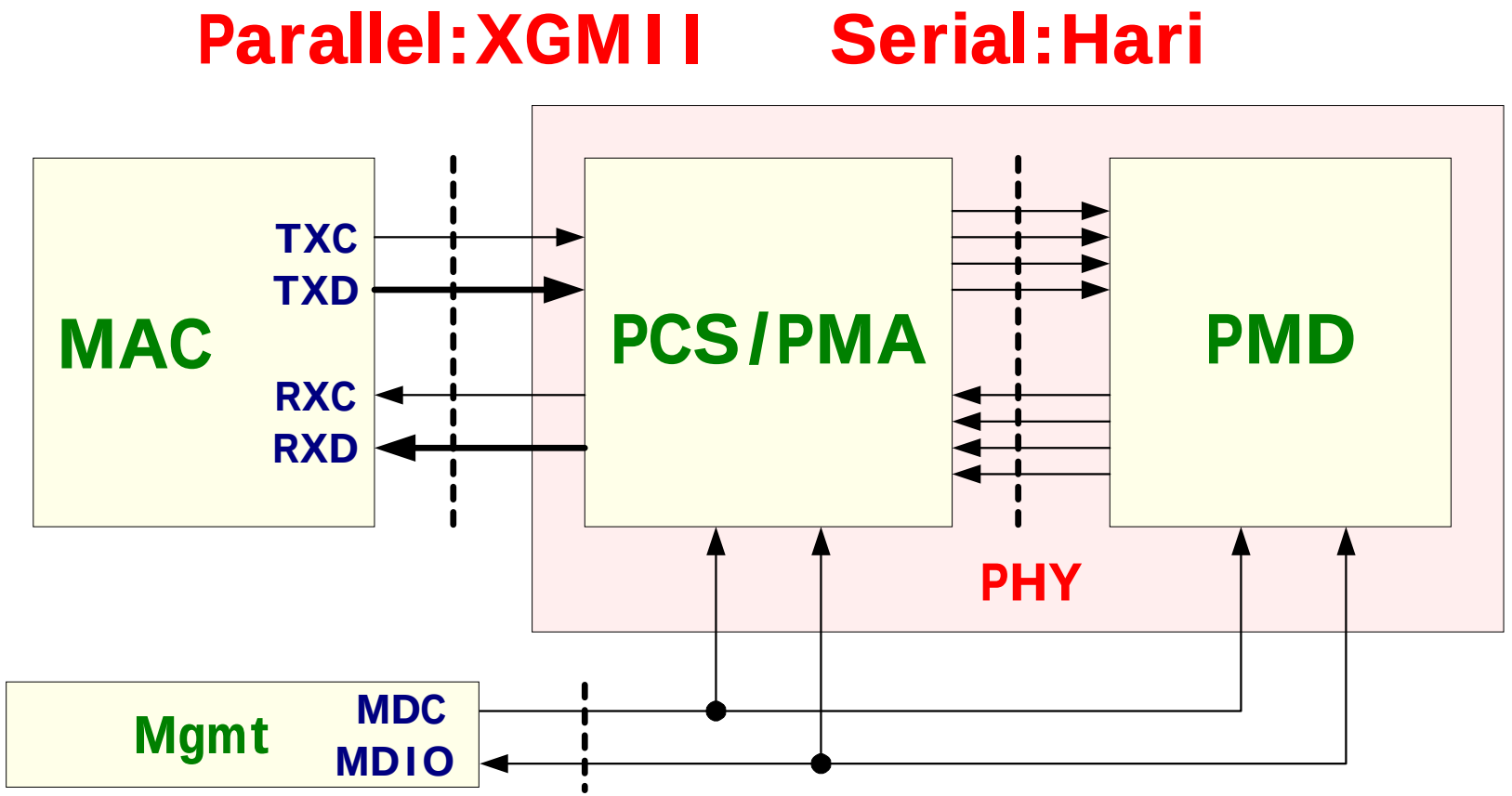
**e-mail: dykim@ccl.cnu.ac.kr**

***Abstract*: MB810 is proposed as a code for the HARI interface. It is shown how the special /K/ codewords of 8B/10B can be maintained without destroying the MB810 state diagram. It is asserted that, due to performance benefit, MB810 fits better for HARI than 8B/10B does. A dual mode receiver is suggested as a compromise.**

# HARI Concerns

- Line code selection heavily affected
  - PMDs for codes other than 8B/10B become 'unnecessarily' complex.
  - Consequence: The interface code virtually dictates the line code.
- PCS is now in PMD; PMD a full PHY?
- Better to be left as an implementation choice? … Out of scope?

# Hari Interface



# Minimal HARI

- If any, restrictions should apply only to special control codewords, not to the whole data coding.
- Detection of K(=/K28.5/) MUST be done by a full 10-bit match; not by just partial 7-bit (Comma pattern) match.
- Any such conforming (8,10) block codes should be allowed.

# MB810 for HARI

- Uses the same special codewords.
  - K, S, E, R remain the same.
  - Two T's; $T_1$ & $T_2$
- Minimum Hamming distance = 3
- K(=/K28.5/) is detected by a full 10-bit match.
  - Either '0011111010' or '1100000101'

# Hamming Distance

- MB810 has two End of Packet Delimiters($T_1$, $T_2$).
- Minimum Hamming distance = 3

| | K | R | S | $T_1$ | $T_2$ |
|---|---|---|---|---|---|
| K | - | 6 | 7 | 7 | 4 |
| R | 6 | - | 7 | 3 | 8 |
| S | 7 | 7 | - | 4 | 5 |
| $T_1$ | 7 | 3 | 4 | - | 9 |
| $T_2$ | 4 | 8 | 5 | 9 | - |

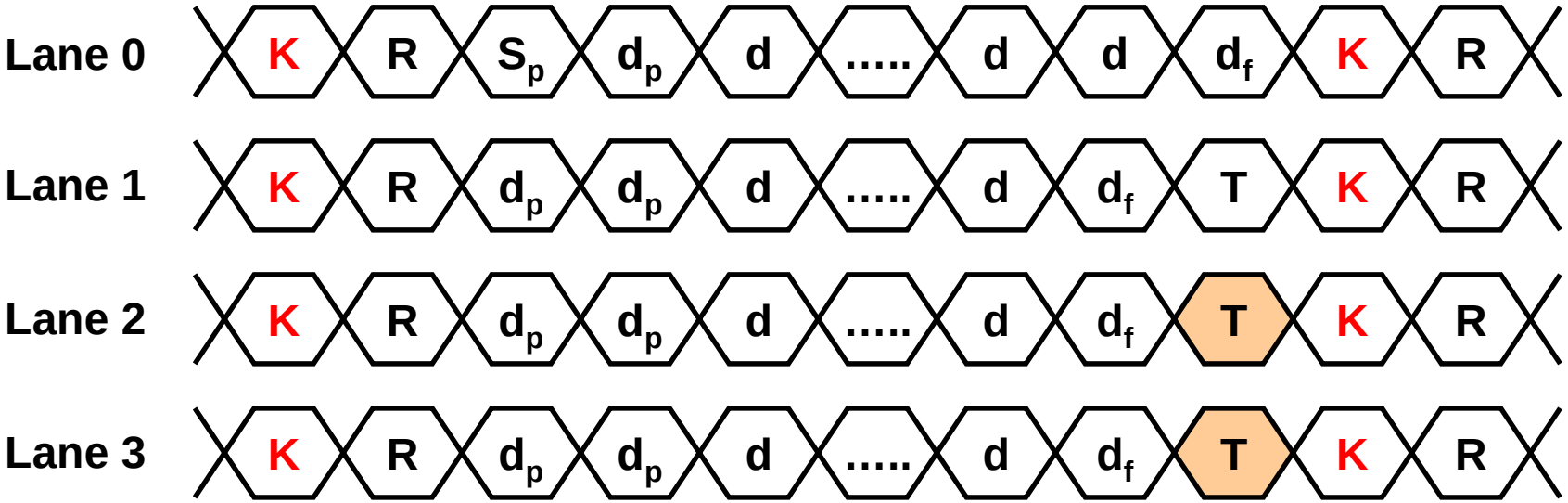
K, R = idle

S = Start of Packet

$T_1$, $T_2$ = End of Packet

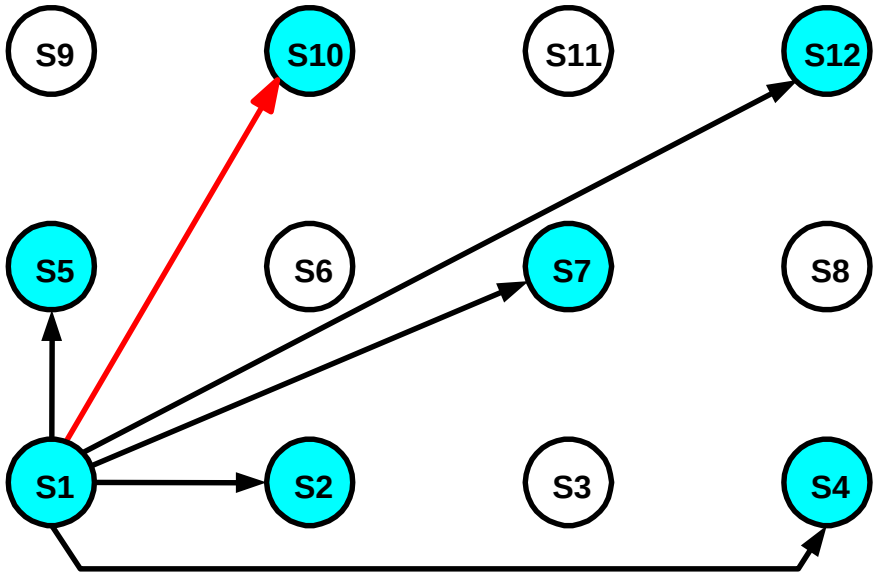
# MB810 Encoding for Hari Interface

- The same coding structure as 8B/10B except for data codewords /D/'s.
- Consequence: Better performance than with 8B/10B



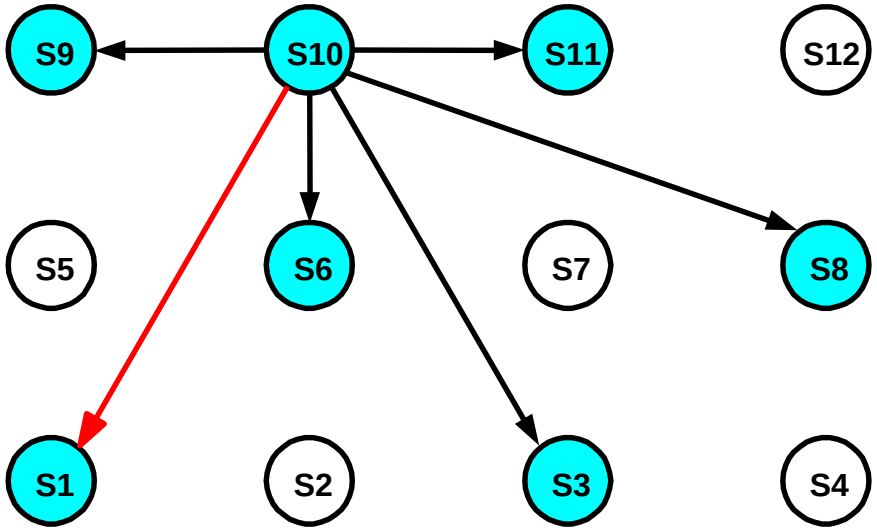

p = preamble, f = frame check sequence

# Relieved MB810 Transitions




Transitions from state S1

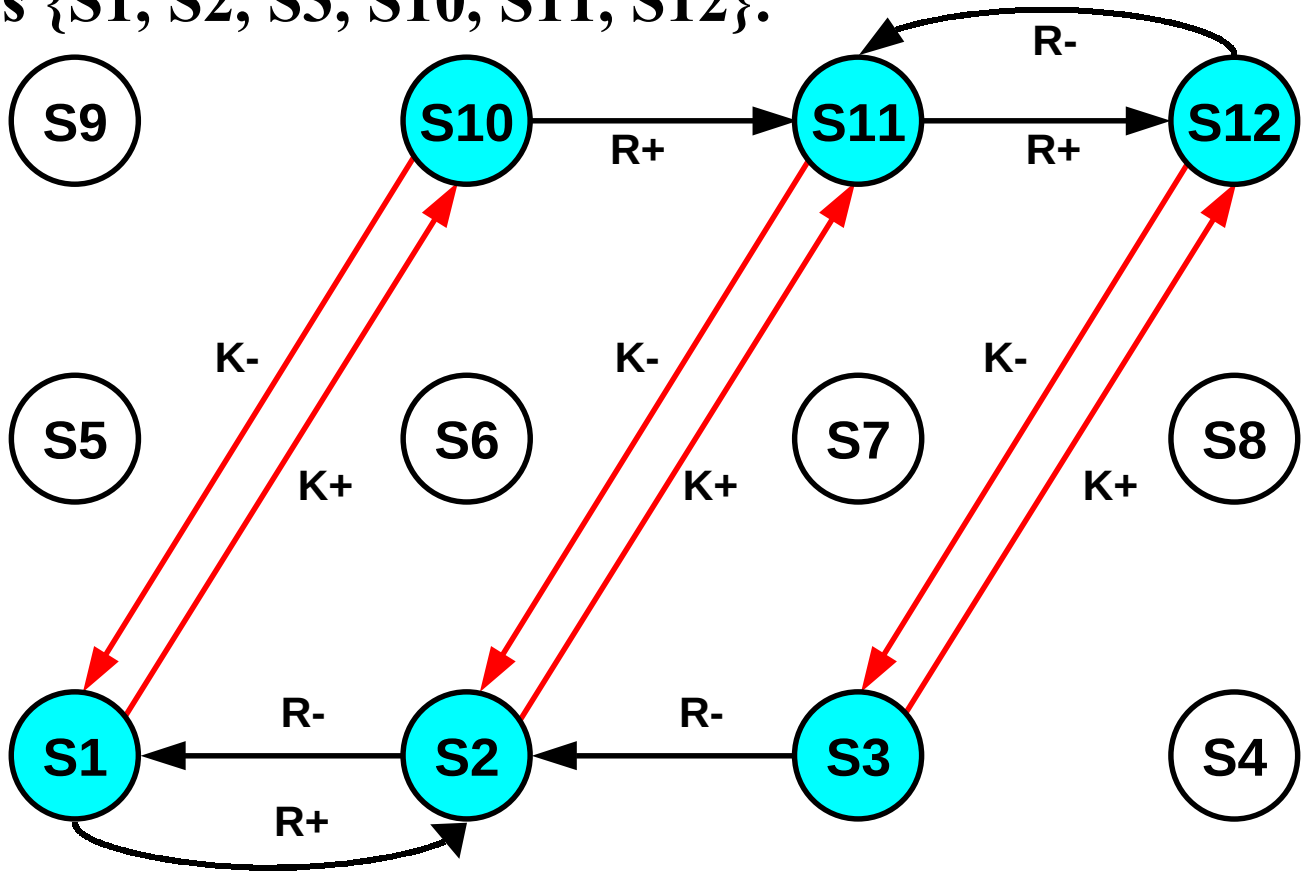
**State transitions are no more confined to adjacent neighbors.**




Transitions from state S10

# MB810 Transitions for /K

**It is arranged so that Lane 0 always starts at one of the 6 states {S1, S2, S3, S10, S11, S12}.**

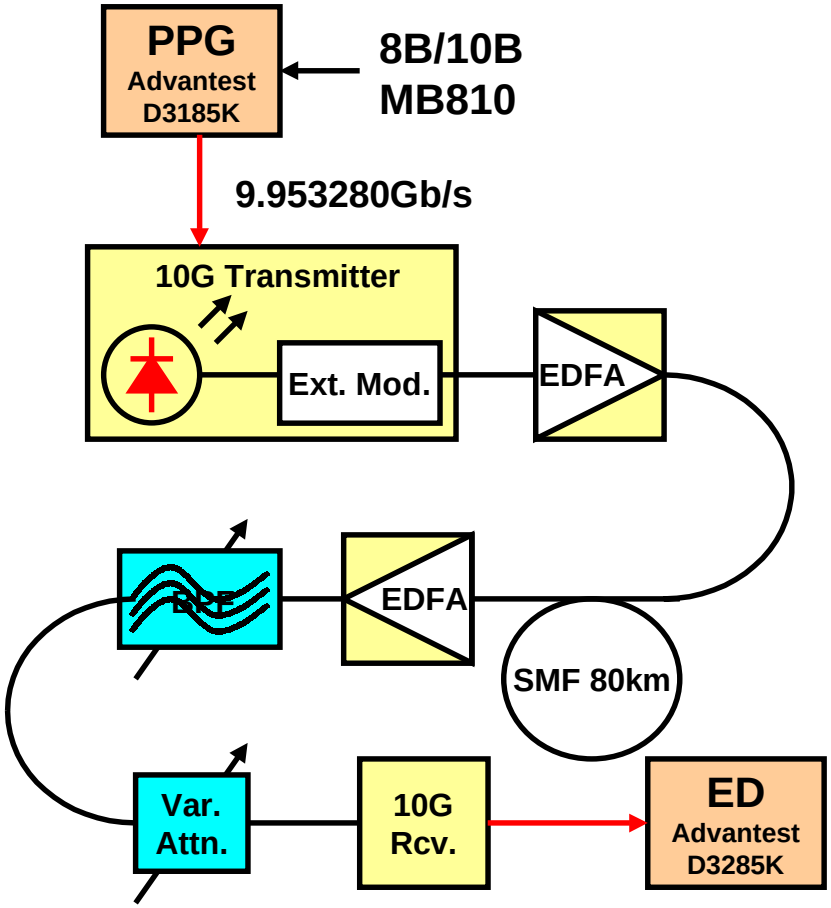


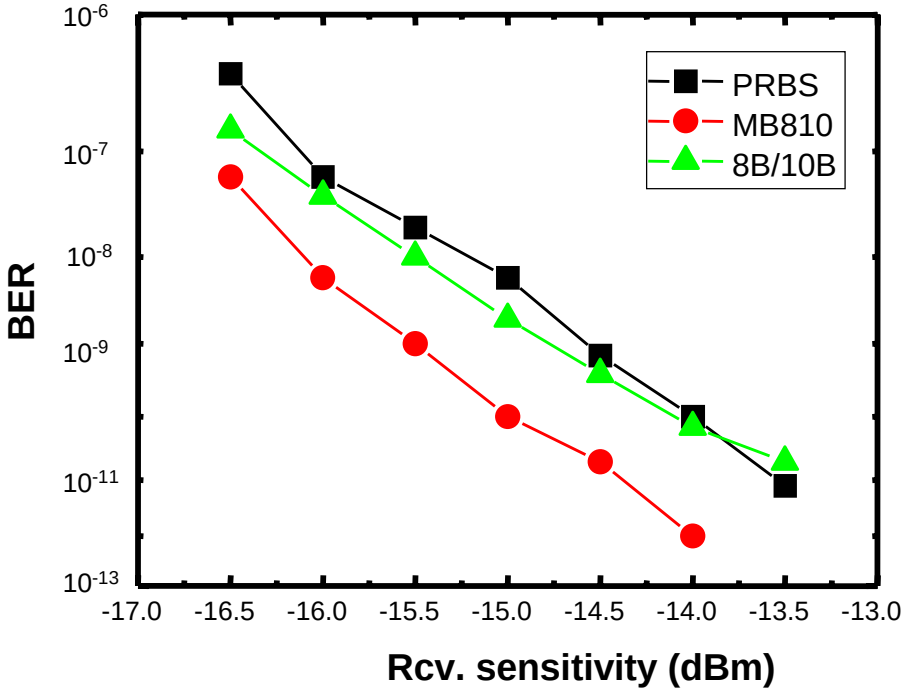
# Conclusion

- Not sure if HARI be a MUST.
- If MUST, MB810 can also be applied to HARI.
- Better performance with MB810 HARI
  - Better sensitivity, less jitter, less bandwidth
- Compromise: Dual mode receiver
  - 8B/10B and MB810; can be discriminated.

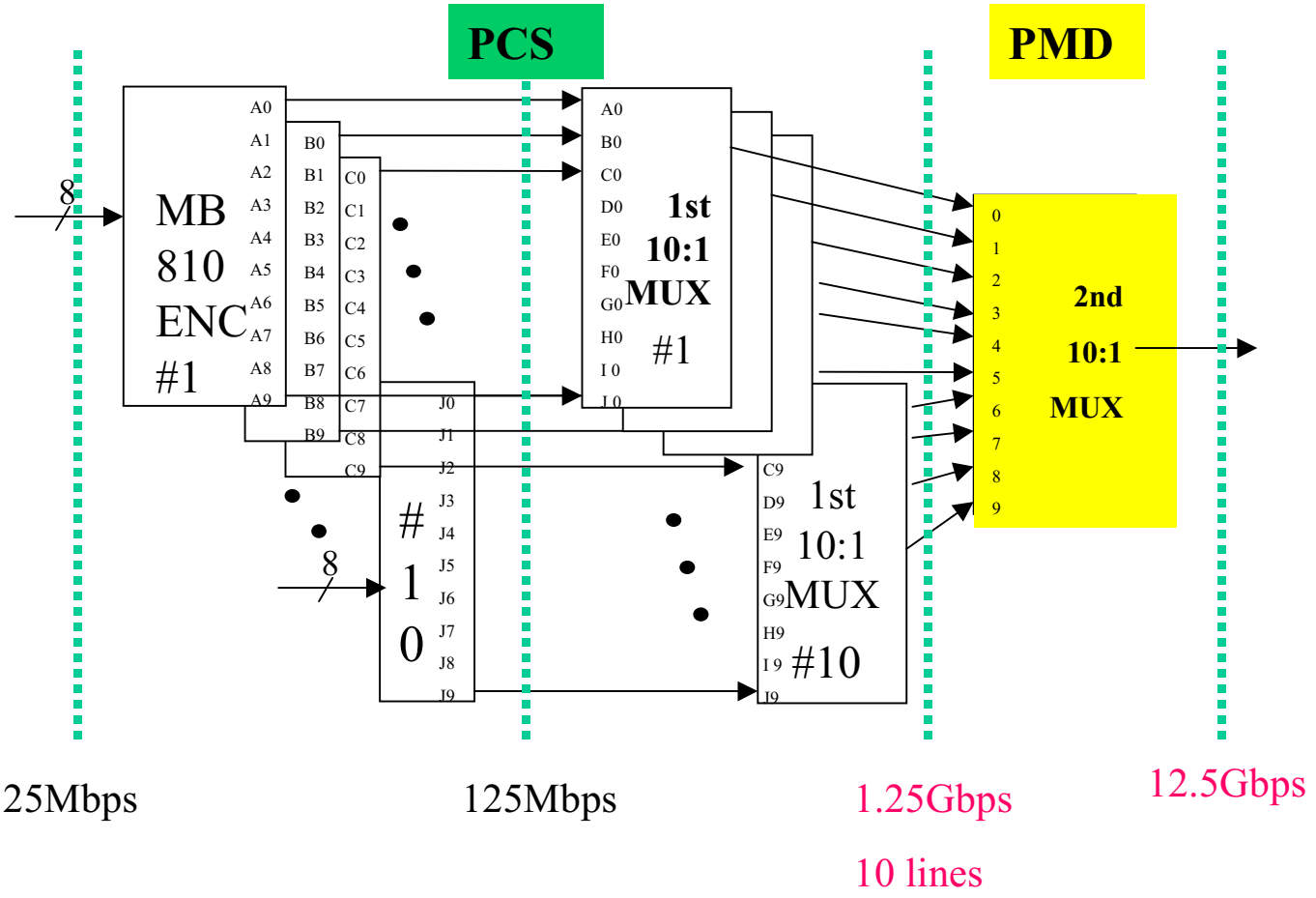
http://ccl.cnu.ac.kr/LineCoding
http://routertech.etri.re.kr/English/Standard

# Annex. Receiver Sensitivity



# Double Multiplexing



# Architectures