Consideration on the Upstream Burst Structure

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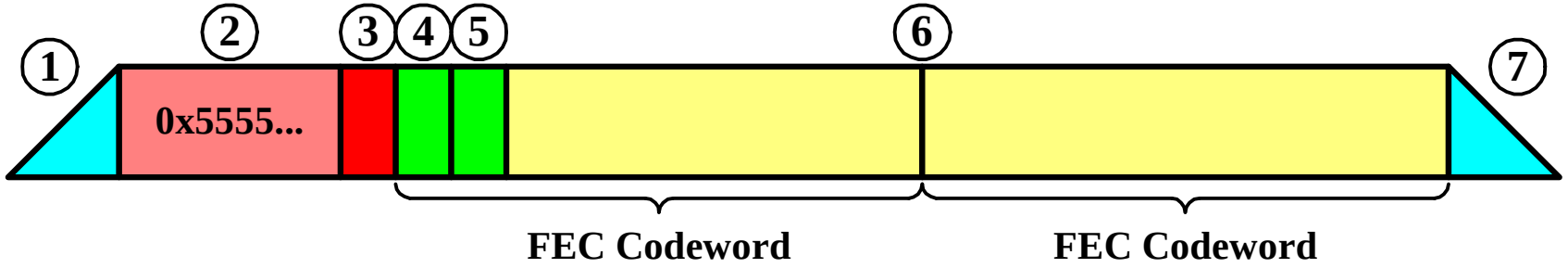
Review: Functionality of the Burst Structure

(3av_0701_effenberger_1.pdf, page 22)



① Laser turn on

② High frequency pattern: fast AGC and CDR

③ 66 bits burst delimiter: indicates the start of a FEC codeword

④ 1st scrambled IDLE block: uses for scrambler re-sync

⑤ 2nd scrambled IDLE block: delineates the first packet

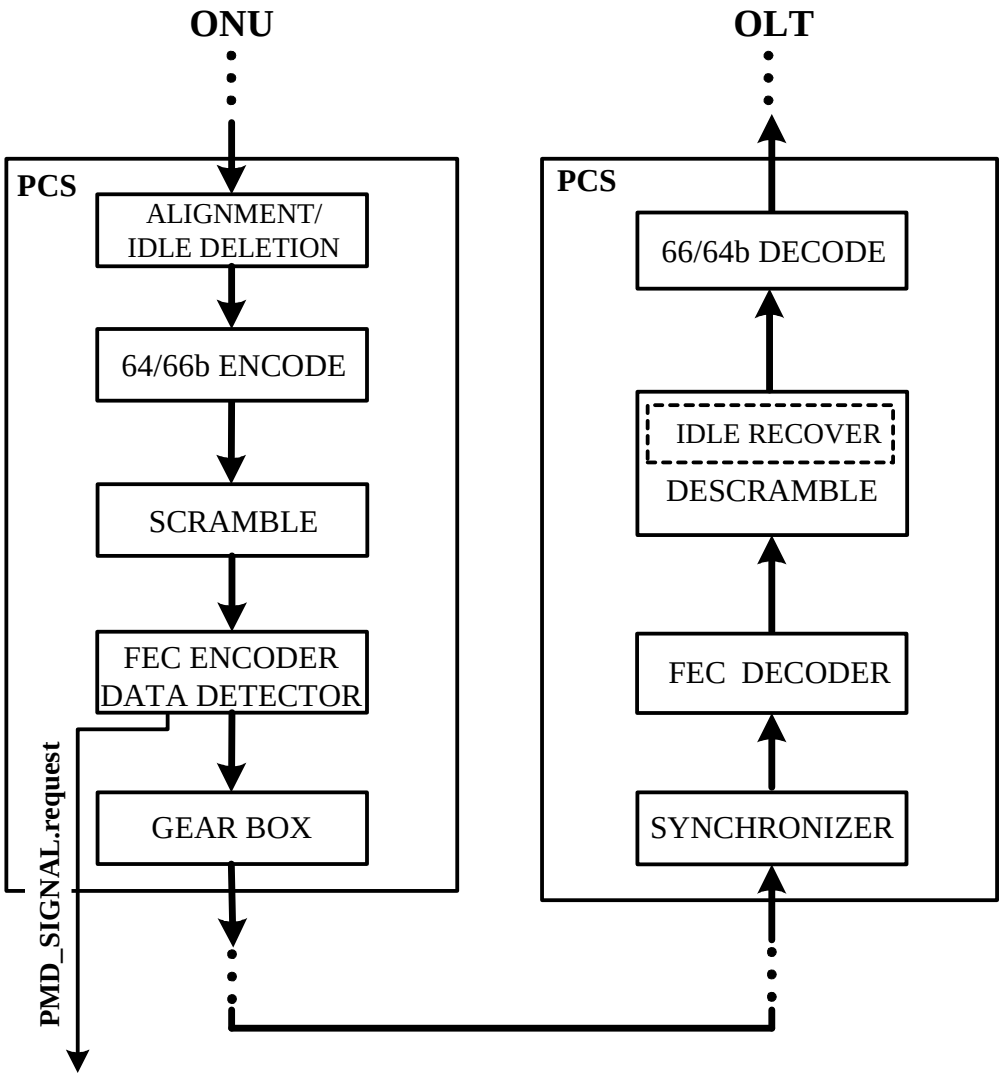
⑥ FEC codewords: RS(255,223)

⑦ Laser turn off

Refinement on the Upstream Burst Structure

- The 1st scrambled IDLE block is used to re-sync the scrambler. This block will not be descrambled properly.
- Therefore, the 2nd scrambled IDLE block is required to allow Start of Packet delineation. This block will be descrambled properly.
- However, we can replace the improperly descrambled 1st IDLE block by a true IDLE block after the 1st IDLE block passes through the descrambler. The recovered IDLE block can facilitate the first packet delineation so as the 2nd IDLE block does.
- As a result, it is not necessary to transmit the 2nd IDLE block in the upstream burst structure.
- This refined upstream burst structure is more bandwidth efficient and makes no changes to the existing state machines.

Virtual block diagram with IDLE Recover



IDLE Recover

- When the FEC decoder passes its first decoded payload to the Descrambler, a signal from the FEC decoder shall also be sent to inform the Descrambler that the incoming data is a valid data.

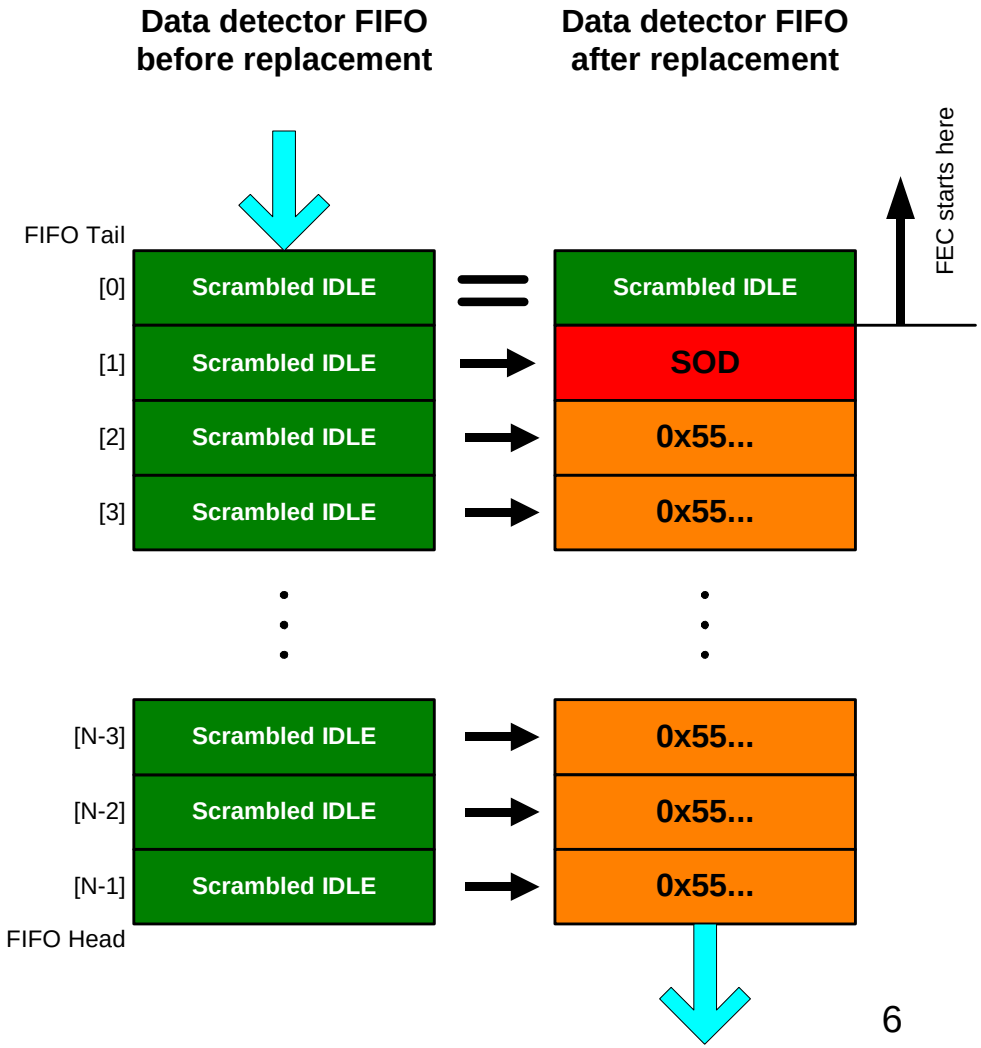
- When the Descrambler received the valid data indication from the FEC Decoder, the Descrambler knows that the first block that arrived will be an IDLE block.

- The Descrambler should then replace the improperly descrambled IDLE block with a true IDLE block.
  - Hence, the replaced IDLE block can be used for delineation.

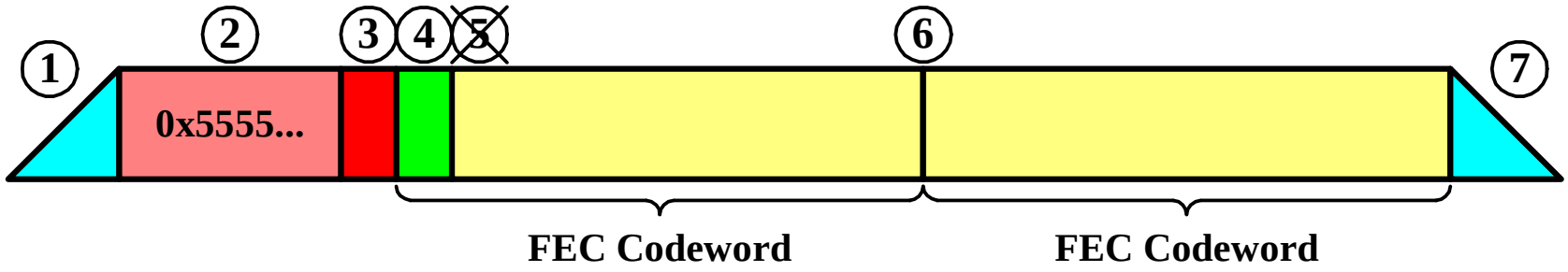
FIFO Replacement Procedure

(3av_0701_effenberger_1.pdf, page 24)

- The replacement happens just before the first non-idle block is added to the FIFO
- If FIFO contains N 66-bit blocks…
  1. Keep block 0 unchanged
  2. Replace block 1 by SOD
  3. Replace blocks 2 … N-1 by Sync Pattern (**0x55**)



Refined Upstream Burst Structure



① Laser turn on

② High frequency pattern: fast AGC and CDR

③ 66 bits burst delimiter: indicates the start of a FEC codeword

④ Scrambled IDLE block: uses for scrambler re-sync

⑤ X

⑥ FEC codewords: RS(255,223)

⑦ Laser turn off

Thank you