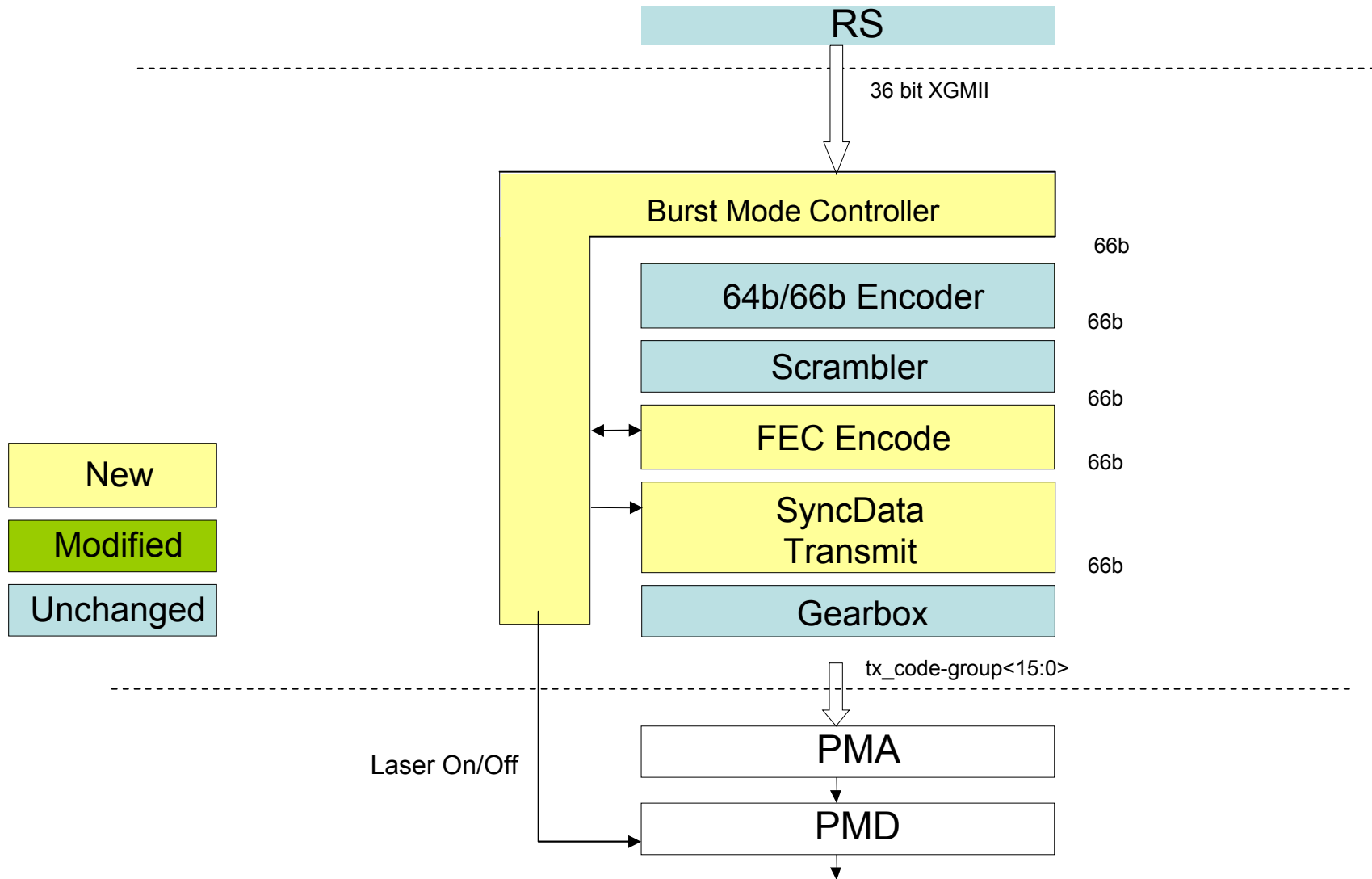


Upstream Synchronization Framework

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ONU PCS Functional Block Diagram (transmit direction)



Elements in the Functional Block Diagram

a) *Burst Mode Controller (BMC)*

- Functional element which includes 2 processes:
 - data detector process
 - Examines XGMII words directly
 - Enables simple alignment of the burst into the 66b block for more efficiency in calculation of required burst time
 - burst mode control process
 - Invokes “laser-on/laser-off” function in PMD
 - Controls the generation of synchronization patterns (ie. burst preamble and delimiter) during initialization
 - Performs necessary alignment of start of frame to beginning of 66b block

b) *FEC encoder*

- Builds FEC codewords (ie. calculates and inserts parity to datastream)
- Reports the “End of Burst” to the BMC
 - via *burst_complete* signal
 - raised after completion of FEC Codeword transmission - when *data_pending* signal is false)

c) *Sync Data Transmit*

- During the initialization phases: writes a constant 66b vector *initdata* provided by BMC to the gearbox
- After initialization: passes the output from the FEC encoder to the gearbox

Elements in the Functional Block Diagram (2)

a) 64b66b encoder

- No changes, but the contents of the input vector $tx_raw<71:0>$ (clause 49.2.13) will be aligned by the Burst Mode Control process

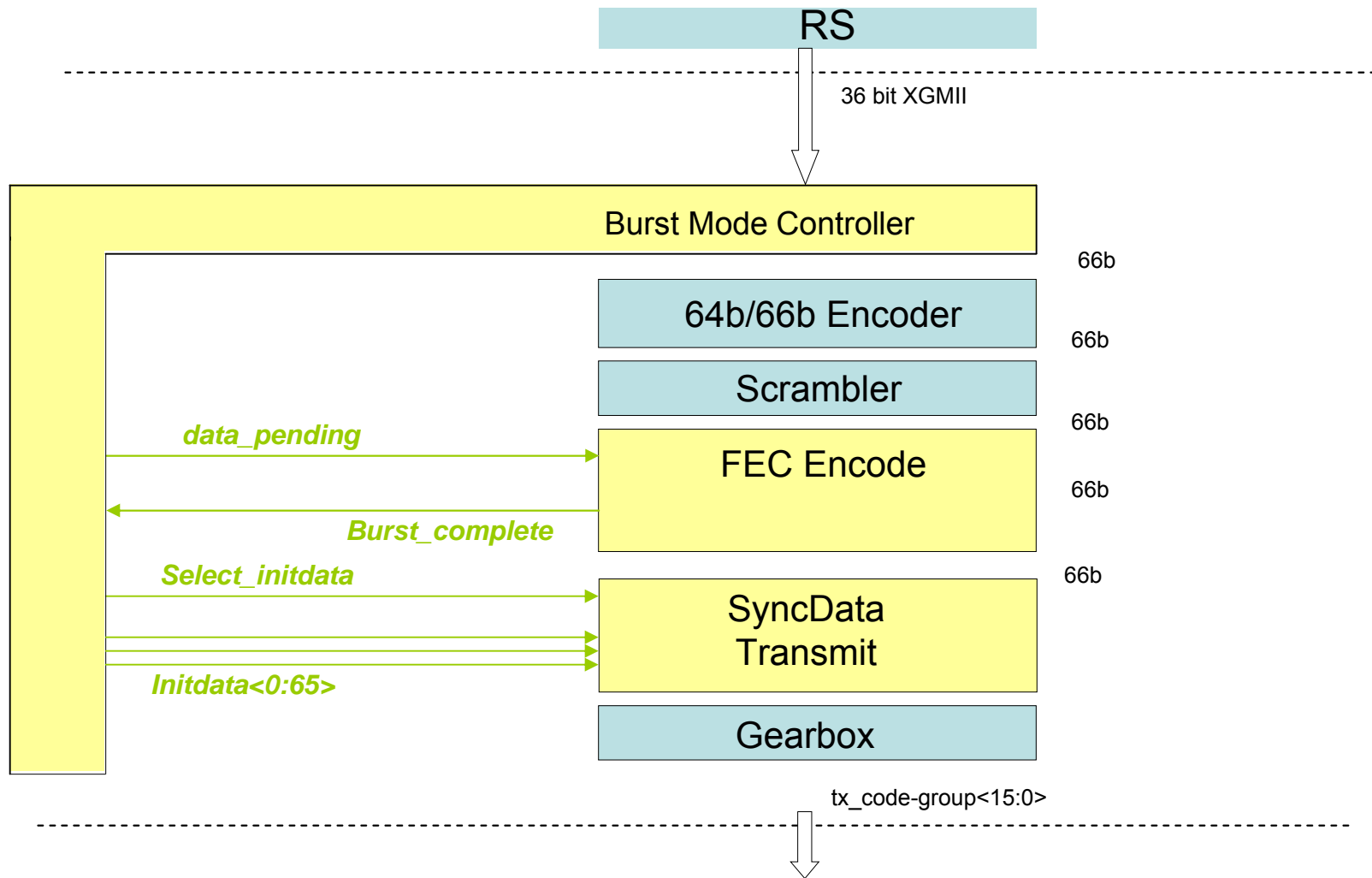
b) Scrambler

- No changes

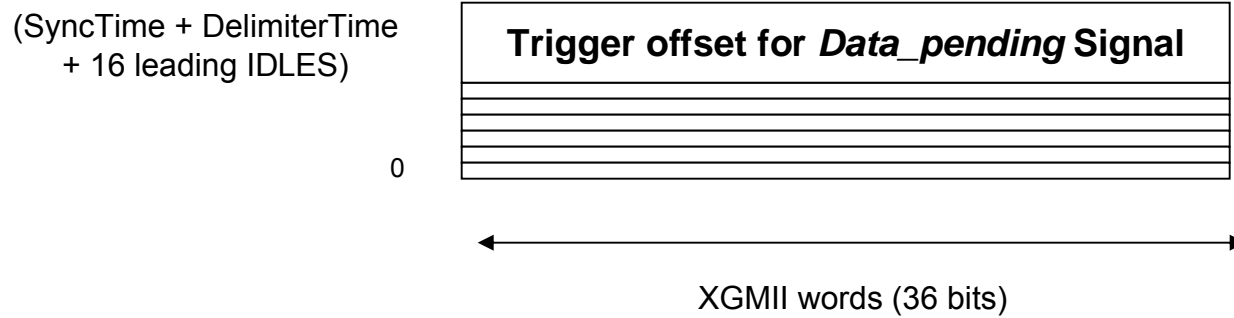
c) Gearbox

- No changes

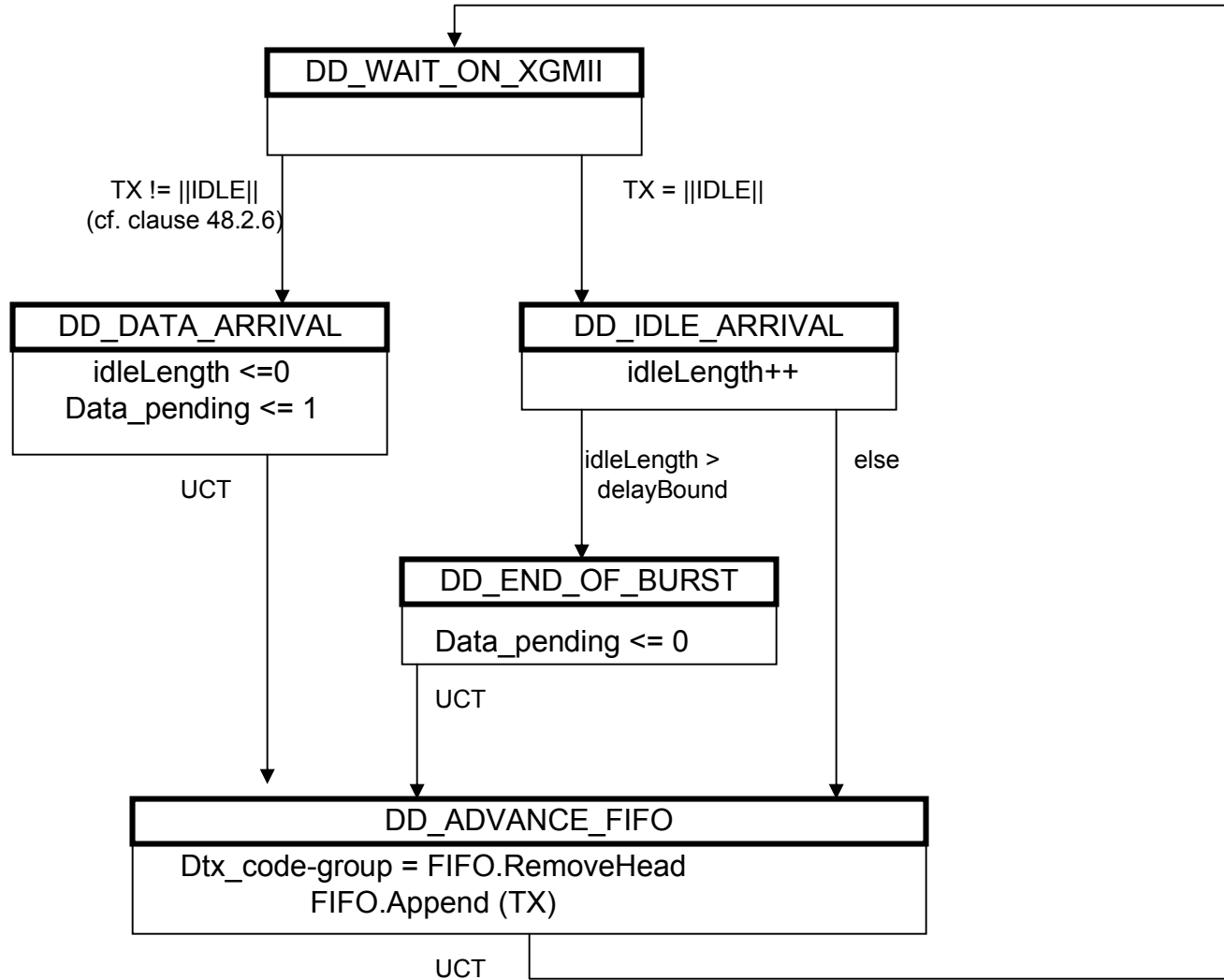
ONU PCS Functional Block Diagram (transmit direction)



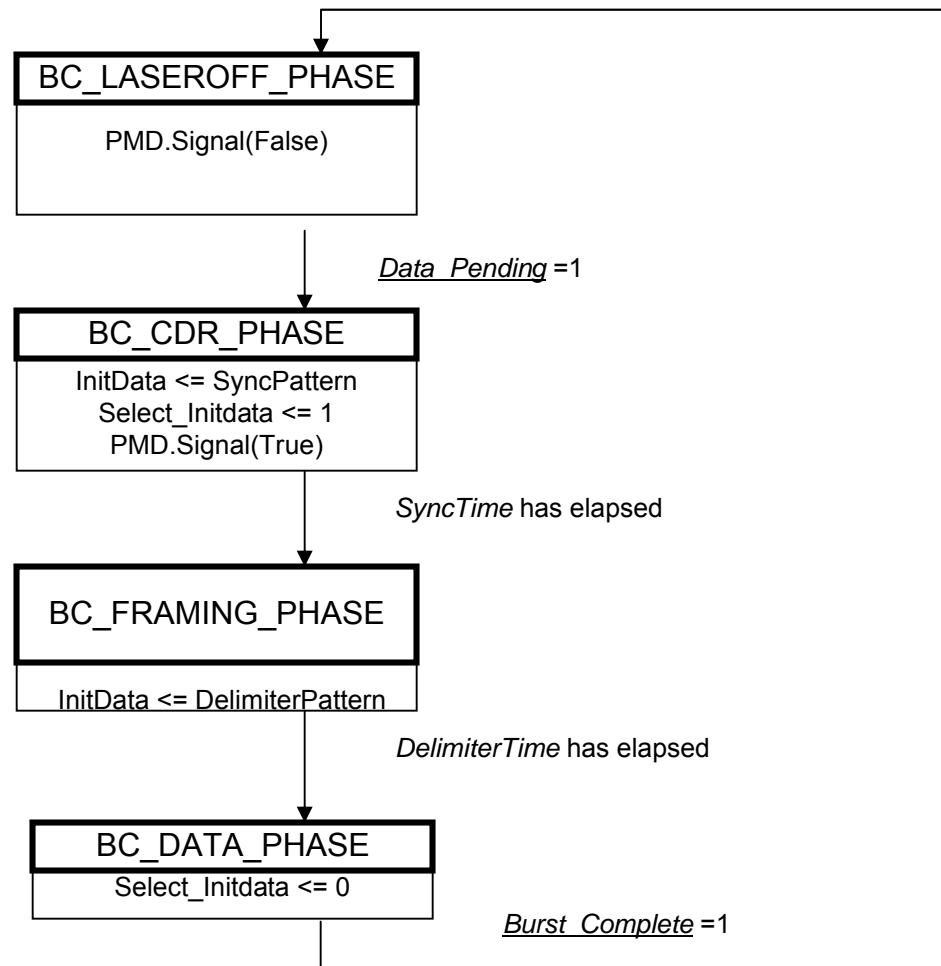
Data Detector Delay Line (FIFO)



Data Detector State Diagram



State Diagram for *Burst Mode Control*



Entry to CDR_Phase

Additional actions are performed when the BMC transitions to CDR_phase:

- a) Align the contents of the input vector `tx_raw<71:0>` (clause 49.2.13) so that `/S/` will appear in column 0
 - Delete the XGMII word of IDLEs immediately preceding the `/S/` (thus reducing the length of the delay fifo)
 - Restore an XGMII word of IDLEs to the FIFO after the laser is turned off

Entry to Framing_Phase

Additional actions are performed when the BMC transitions to Framing_phase:

- a) Reset the FEC encoder so that codeword build restarts

Thank you