Editors: update Figure 100-3 to the following: summary of changes: removal of scrambler and gearbox from PCS, removal of interleaver and OFDM framer in PMA, expansion of symbol mapper and frame timing boxes, added staging to pilot insertion box, added new arror from PHY Link to staging and pilot insertion box.

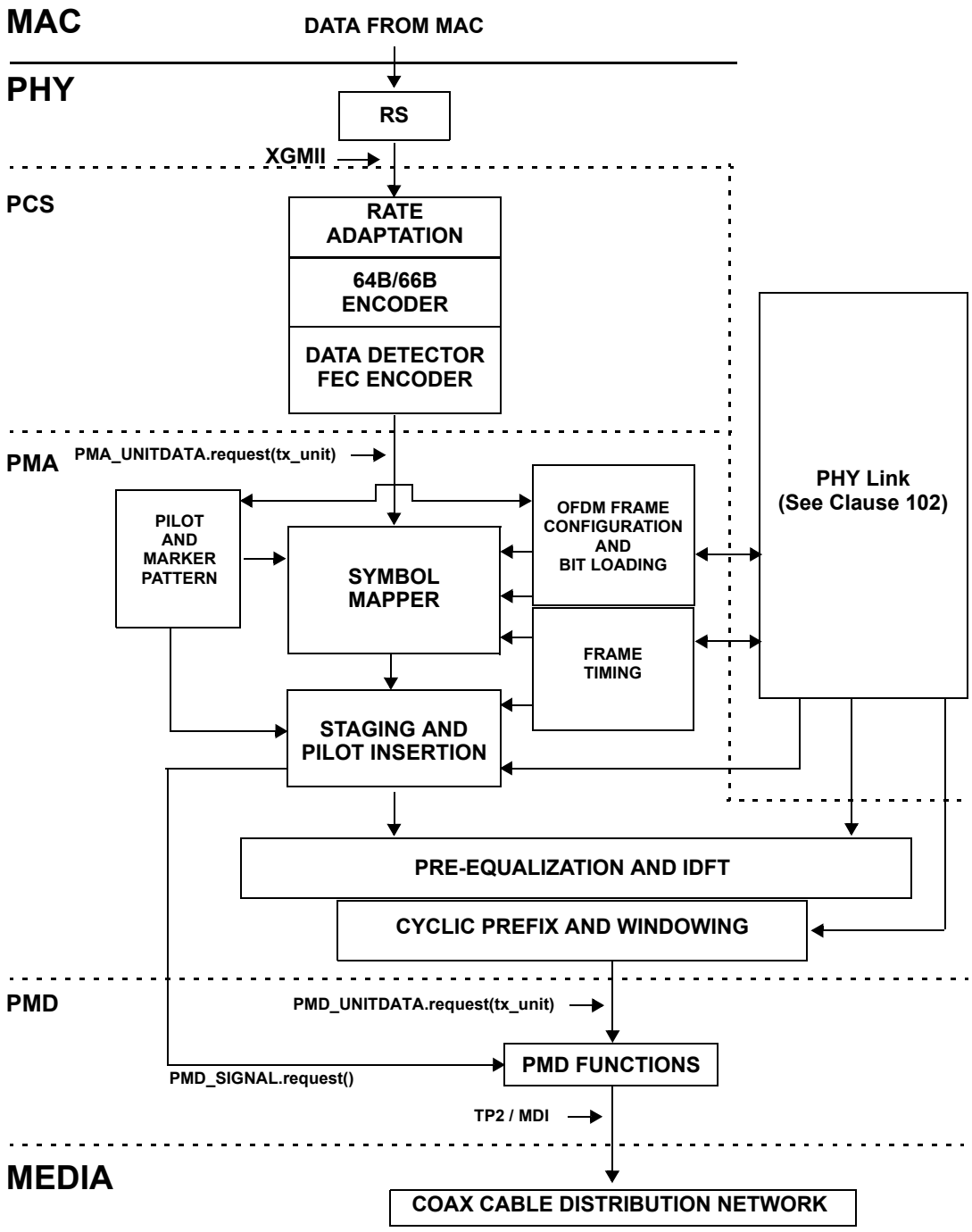

Figure 0–1—Functional blocks within 10GPASS-XR-U CNU transmit PCS, PMA, and PMD sublayers

Editors: change subclause of 101.4.3.8 to Staging and Pilot Insertion. Move old 101.4.3.8 to 101.4.3.8.1. Add new text after 101.4.3.8 for Staging.

101.4.3.8 Staging and Pilot Insertion

The Staging function accepts an *RB_Frame* and *RB_Type* array from the Symbol Mapper when transferred from the Symbol Mapper. Staging then accumulates (copies) a PHY Link RB Frame (8 subcarriers by resource block size 8 or 16) if available for this *RB_Frame*. If a PHY Link RB Frame was copied, the *RB_Type* entries for the corresponding subcarriers are set to "T2" (see *RB_Type* array in 101.x.x.x).

Pilot insertion then proceeds as per the procedure in 101.4.3.8.1.

Upon a positive transition of *RB_Frame_start* (value FALSE to value TRUE) as set by Frame Timing, the *RB_Frame* and *RB_Type* arrays are transferred to the IDFT process.

101.4.3.8.1 Pilot Insertion

Upstream pilot insertion is performed using a BPSK mapped bit sequence generated by a pseudo-random sequence (PRBS) generator defined by the polynomial $X^{12} + X^9 + X^8 + X^5 + 1$ (illustrated in Figure 102–27). Pilots are inserted after the RB Frame is processed by the symbol mapper (see 101.4.2.7) and the interleaving functions (see 101.4.3.11) and before the RB Frame is passed to the IDFT function.

The method for pilot insertion shall be as follows:

- The PRBS generator is initialized with the seed value 0xBFF at the beginning of each RB Frame for the subcarrier with index k=0 of the IDFT Equation (101–14) (see 101.4.2.10).
- the PRBS generator is clocked once for every subcarrier of the IDFT.
- Pilots are inserted (mapped) into the "P" positions of PHY Link subcarriers in each subcarrier where a CNU is transmitting a PHY Link message (see 102.3.4) and in each resource block to be transmitted containing a data burst designated as Type 1 or Type 2 resource block (see 101.4.3.7).
- "P" pilots are BPSK modulated with the output of the feedback shift register, with a value of 0 mapping to (1 + j0) and a value of 1 mapping to (-1 + j0).
- The same BPSK value is used for each "P" location in a subcarrier.

When an RB Frame has been process by this function, the RB Frame is passed to the IDFT function for further processing.

The Pilot Insertion function provides the PMD_SIGNAL.request primitive generation (see 100.2.1.4):

- If any "P" pilots are inserted in this RB Frame, PMD_SIGNAL.request(ENABLE) is asserted when the RB Frame is passed to the IDFT function.
- If no "P" pilots are inserted in this RB Frame, PMD_SIGNAL.request(DISABLE) is asserted when the RB Frame is passed to the IDFT function.

EDITORS NOTE (to be removed prior to publication): PMD_SIGNAL.request needs to be coordinated with the Probe Generator function and needs to be glitchless if the same CNU transmitted anything in the probe region followed by any transmission in the RB Frame following the probe region. Might be provided by an OR function on the same signal generation from each function before going into PMD Functions box in Figure 100-3, or something that just surveys the input to the IDFT after both functions (in this case, modify and move this text into that functional description based on any non-null I/Q bin input to the IDFT.

Editors: Create new subclause 101.4.3.3 and move existing 101.4.3.3 to 101.4.3.3.1. Remove 101.4.3.3.2 through 101.4.3.3.4 as this information is in other places in Clause 101. New subclauses beginning with 101.4.3.3.2 here, are new draft text. Need to update first paragraph of 101.4.3.3.1 to point to Table 101 variable table instead of Clause 45.

101.4.3.3 Frame Timing

The Frame Timing function is reset by the PHY Link during link auto-negotiation. The state machine of Framing Timing implemented the RB Superframe structure timing as per 101.4.3.3.1.

101.4.3.3.1 RB Superframe configuration and burst transmission

The upstream Superframe shall be composed of the Probe Period followed by 256 OFDMA symbols. Each Probe Period is six OFDMA symbols in duration. An RB Frame is one Resource Block column (i.e., one column of Resource Blocks over the entire upstream spectrum). Each Resource Block is composed of one subcarrier and has a duration identical to the time interleaver period as set using the *RBsize* variable, of either 8 or 16 symbols. See *RBsize* parameter in the 10GPASS-XR US OFDM control register 45.2.1.110.1. Changing the Resource Block duration results in a network restart. The superframe structure is illustrated in Figure 101–2.

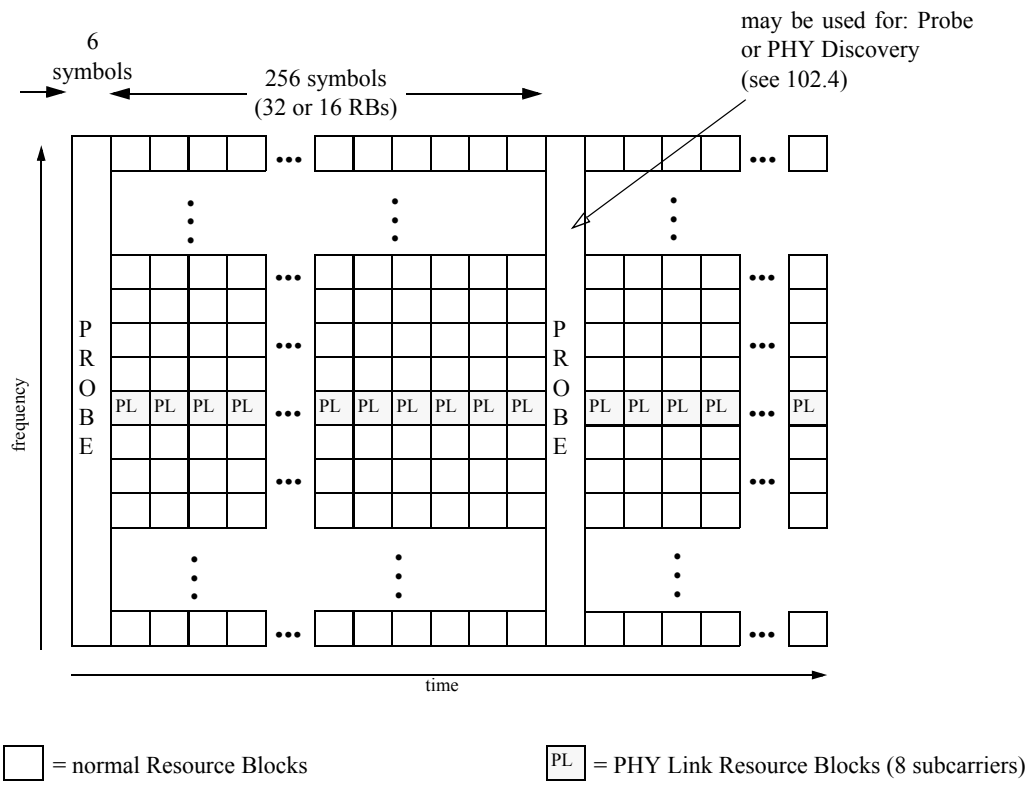

Figure 101–2—US superframe structure

101.4.3.3.2 Variables

RBsize
: TYPE: boolean
See Table 101-x

RBlen
: TYPE: integer
This integer represents the number of symbols for the configured resource block size.
Value: 8 when *RBsize* is 0, 16 when *RBsize* is 1.

SCLK
: TYPE: boolean
This Boolean is TRUE on every negative edge of a clock that is synchronized to the period of the Extended OFDM symbol time comprised of the 20 μsec useful symbol time plus the cyclic prefix time *USNcp*.

RBSF_reset
: TYPE: boolean
This boolean variable is used by the PHY Link to reset the Frame Timing state. A positive transition from value FALSE to value TRUE will cause the state machin to reset to the beginning of the RB Superframe on SCLK.

Probe_start
: TYPE: boolean
This boolean transitions from the value of FALSE to TRUE for the first symbol of the Probe region. At the end of the first symbol of the probe region, the value transitions to FALSE until the first symbol of the next RB Superframe.

RB_Frame_start
: TYPE: boolean
This boolean transitions from the value of FALSE to TRUE for the first symbol of each RB Frame in the RB Superframe as related to *RBsize*. The value is FALSE for all probe region symbols and for symbol 2 through *RBsize* for each RB Frame.

SYMcount
: TYPE: integer
This is variable is used for counting the symbols of the RB Superframe.

RBmod
: TYPE: integer
This variable is used to set the symbols per RB Frame upon reset.

101.4.3.3.3 State Diagram

The CLT PMA shall implement the frame timing process as shown in Figure 101–3.

In case of any discrepancy between state diagrams and the descriptive text, the state diagrams prevail.

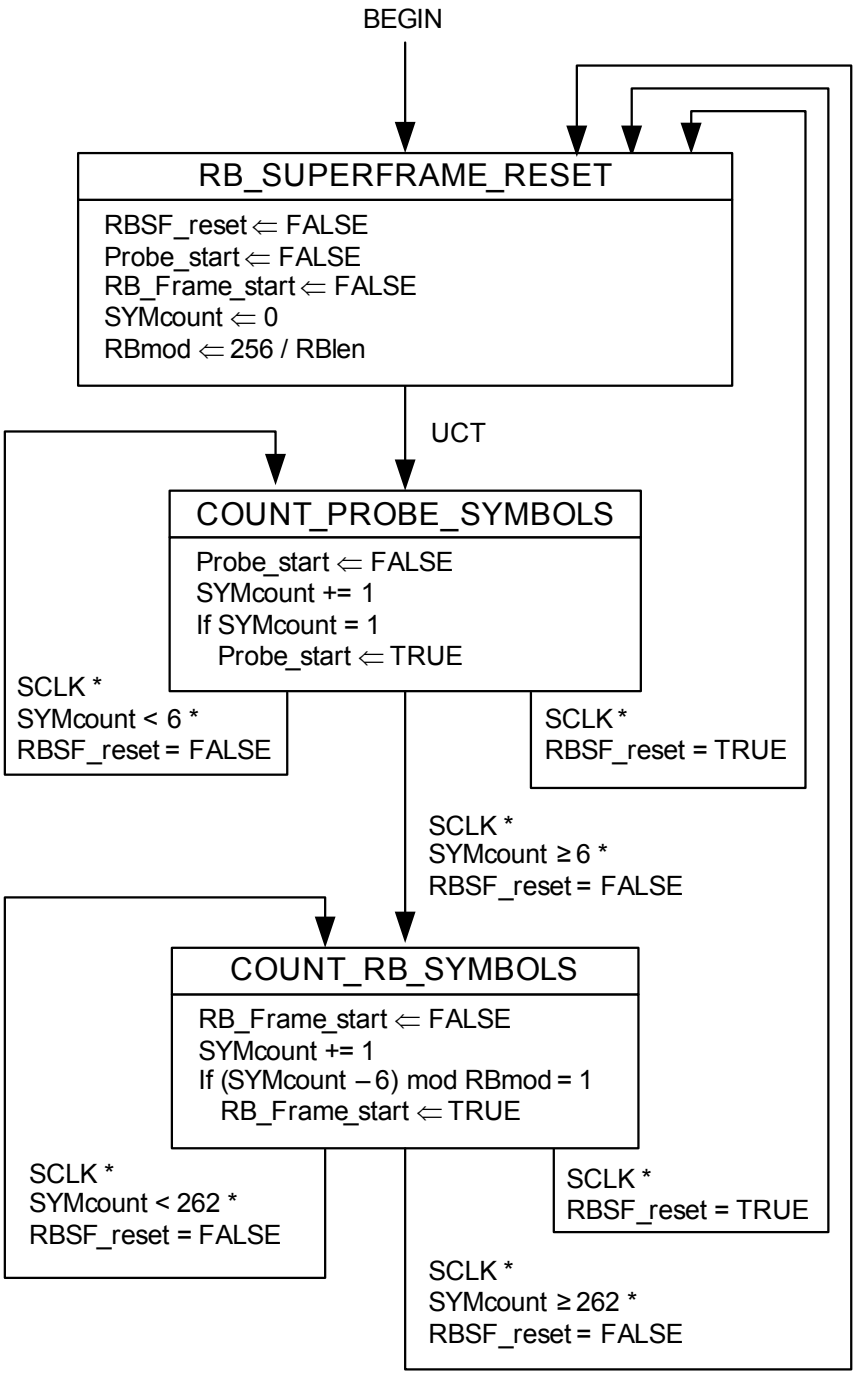

Figure 101–3—Framing Timing