142.2.2.2.1 Burst Mode operation (ONU only)

{TBD}

Figure 142–3 presents the details of the ONU burst transmission, in particular, details of the FEC-unprotected and the FEC-protected portions of the normal (granting) upstream burst with three distinct Sync Pattern zones. ~~The FEC-unprotected portion of the upstream burst surrounds the FEC-protected portion of the upstream burst.~~

The upstream burst begins with a FEC-unprotected area (Sync Pattern ~~zone~~), comprising several explicit zones, each playing a separate role: SP_1 zone, optimized for laser on (T_{on}), Automatic Gain Control (AGC, $T_{settling}$); SP_2 zone, optimized for Clock Data Recovery (CDR, T_{CDR}); and SP_3 zone, optimized for Start of Burst Delimiter (SBD) pattern. This arrangement is shown in Figure 142–3 for the normal (granting operation) and in Figure 142–5 for the discovery operation. In some implementations, only two explicit zones are needed: SP_1 zone, optimized for laser on (T_{on}), Automatic Gain Control (AGC, $T_{settling}$), and Clock Data Recovery (CDR, T_{CDR}); and SP_2 zone, optimized for Start of Burst Delimiter (SBD) pattern. This arrangement is shown in Figure 142–4 for the normal (granting operation) and in Figure 142–6 for the discovery operation. Bit patterns transmitted within each Sync Pattern zone are configured using the SYNC_PATTERN MPCPDU (see <new subclause with MPCPDU definition>). Each of the Sync Pattern elements is a multiple of 257 bits, aligning with the PCS line code of 256B/257B.

The SBD is followed by a number of FEC codewords, ~~where the last codeword~~ may be shortened to minimize the upstream transmission overhead ~~when long LDPC codewords are used~~. Each FEC codeword comprises a series of 256B/257B encoded and scrambled data blocks, followed by a series of 257-bit long parity blocks. Within a non-shortened FEC codeword, the FEC payload portion includes ~~56~~ 257-bit data blocks and ~~10~~ 257-bit parity blocks. Within a shortened FEC codeword, the FEC payload portion may be truncated to a number of data blocks smaller than 56, while the size of the FEC parity portion remains unchanged.

The upstream burst ends with a End of Burst Delimiter (EBD). When received at the OLT, the EBD pattern allows for the rapid reset of the OLT FEC synchronizer, preparing the OLT for the next incoming upstream burst. The EBD pattern is not part of the last FEC codeword.

The OLT announces the number of the Sync Pattern zones (two or three) using the SYNC_PATTERN MPCPDU. The decision to use two or three Sync Pattern zones is implementation-dependent and related with the design of the OLT burst-mode receiver. ~~By default, the OLT shall announce the two Sync Pattern zones, i.e., SP_1 and SP_2, setting *SpCount* in the SYNC_PATTERN MPCPDU to the value of two (2).~~

The default configuration SP_1 Sync Pattern zone shall be defined as follows:

— covers T_{on}, $T_{setting}$, and T_{CDR};
— *SpValue*: 0x1-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55-55 -55-55-55-55-55-55-55-55-55-55-55
— *SpBalanced*: True (1)

The default configuration SP_2 Sync Pattern zone shall be defined as follows:

— covers SBD;
— *SpValue*: 0x1-BF-40-18-E5-C5-49-BB-59-6B-F8-D8-12-D8-58-E4-AB-40-BF-E7-1A-3A-B6-44-A6-94-07-27-ED-27-A7-1B-54
— *SpBalanced*: False (0)

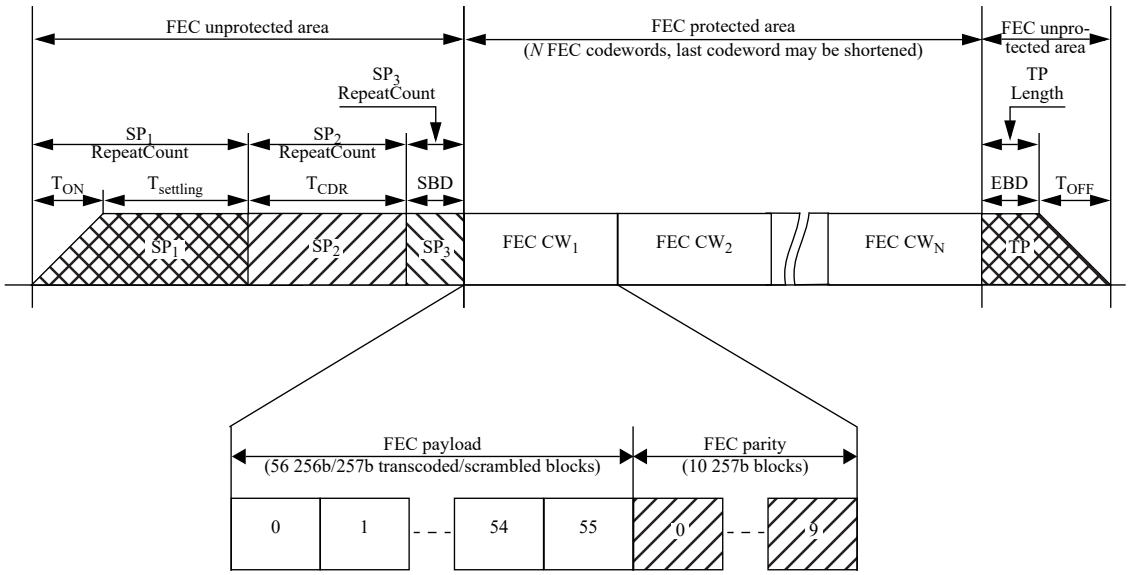

Figure 142–3—ONU burst structure, normal grant, 3 zones

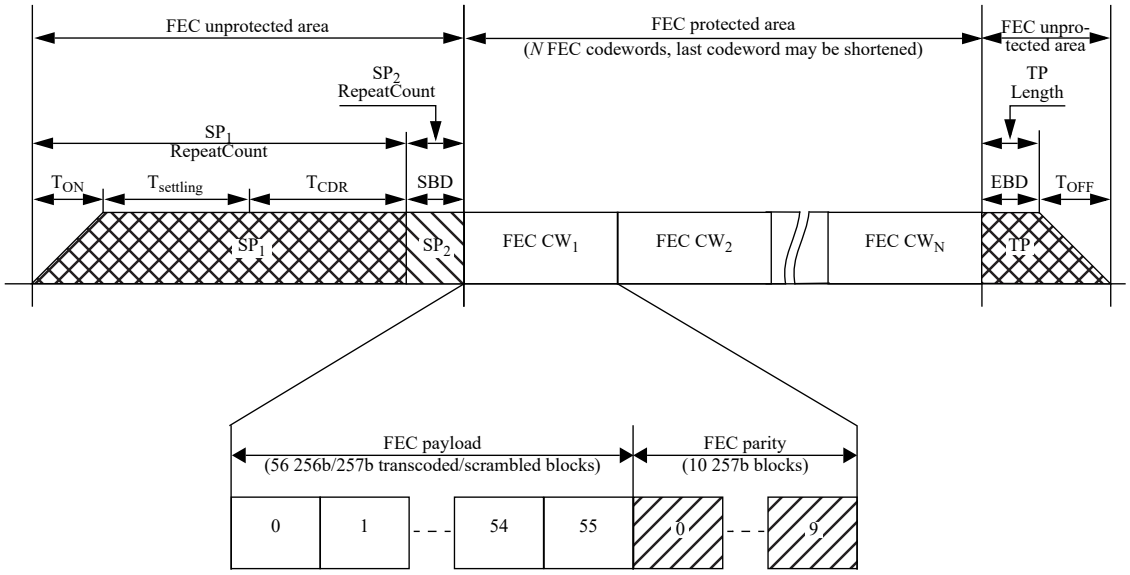

Figure 142–4—ONU burst structure, normal grant, 2 zones

142.2.2.3 64B/66B to 256B/257B transcoder

The 64B/66B to 256B/257B transcoder converts four consecutive 64B/66B blocks the into one 256B/257B block as described in 91.5.2.5 and passes the resulting 257-bit-wide block to the Scrambler functional block. In the OLT the 64B/66B blocks are received from Transmitter/Encoder functional block whereas in the ONU the 64B/66B blocks are received from the Data Detector.

142.2.2.4 Scrambler

See 49.2.6.

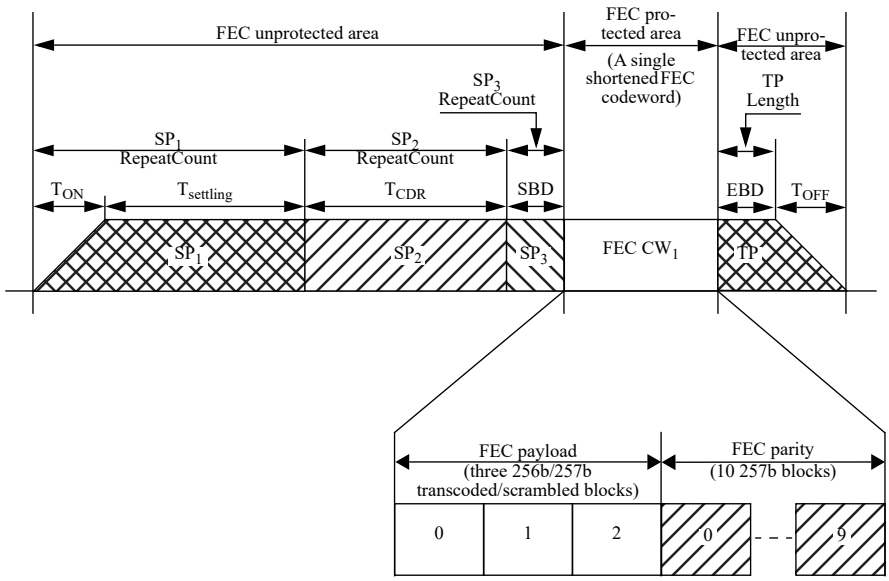

Figure 142–5—ONU burst structure, discovery grant, 3 zones

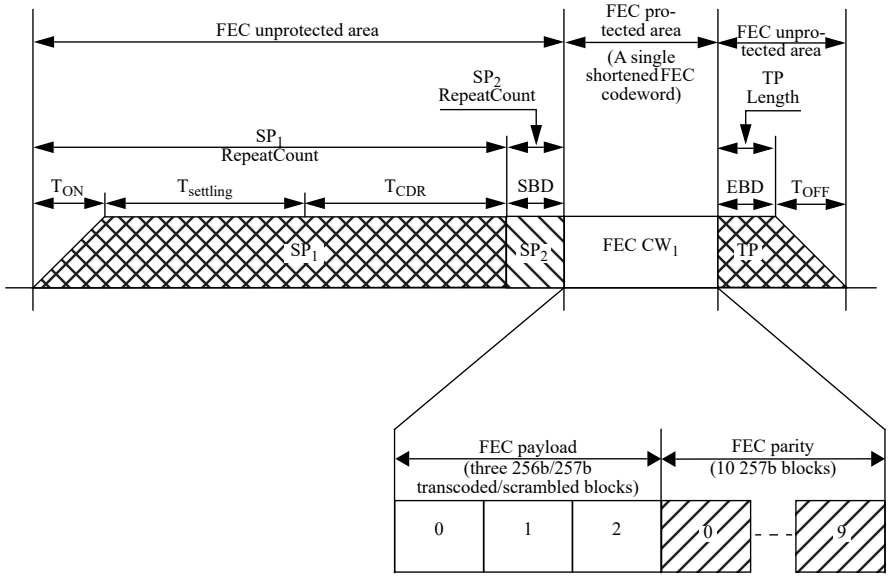

Figure 142–6—ONU burst structure, discovery grant, 2 zones

142.2.2.5 FEC encoding

The {NG-EPON type} PCS shall encode the transmitted data stream using {TBD} FEC. Annex {TBD} gives an example of {TBD} FEC Encoding.

142.2.2.5.1 Low Density Parity Check Coding

The bit sequence input for a given code block to channel coding is denoted by u_1, u_2, ..., u_K, where K is the number of bits to be encoded. The parity check bit sequence produced by FEC Encoder is denoted by p_1, p_2,