

142.2.2.2.1 Burst Mode operation (upstream only)

Figure 142–1 presents the details of the ONU burst transmission, in particular, details of the FEC-unprotected and the FEC-protected portions of the upstream burst with several distinct Sync Pattern zones.

The upstream burst begins with a FEC-unprotected area (Sync Pattern), comprising several explicit zones, each playing a separate role: SP_1 zone, optimized for laser on (T_{on}) and 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 142–1 for the normal (granting operation) and the discovery operation. In the case of the discovery operation, the FEC-protected area comprises a single (shortened) FEC codeword.

Editor’s Note (to be removed prior to publication): It was suggested that a better description of the content of the discovery operation burst might be needed, to make it clearer how many codewords and data blocks are present.

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 142–2 for the normal (granting operation) and the discovery operation. In the case of the discovery operation, the FEC-protected area comprises a single (shortened) FEC codeword.

Editor’s Note (to be removed prior to publication): It was suggested that a better description of the content of the discovery operation burst might be needed, to make it clearer how many codewords and data blocks are present.

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 Clause 142 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 from long LDPC codewords 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 of 257-bit data blocks and 10 of 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.

The default number of Sync Pattern zones shall be 2, i.e., the *Repeat Count SP_3* field value in the DISCOVERY_GATE MPCPDU and REGISTER MPCPDU are set to the value of zero (0).

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

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

The default configuration SP₂ 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)

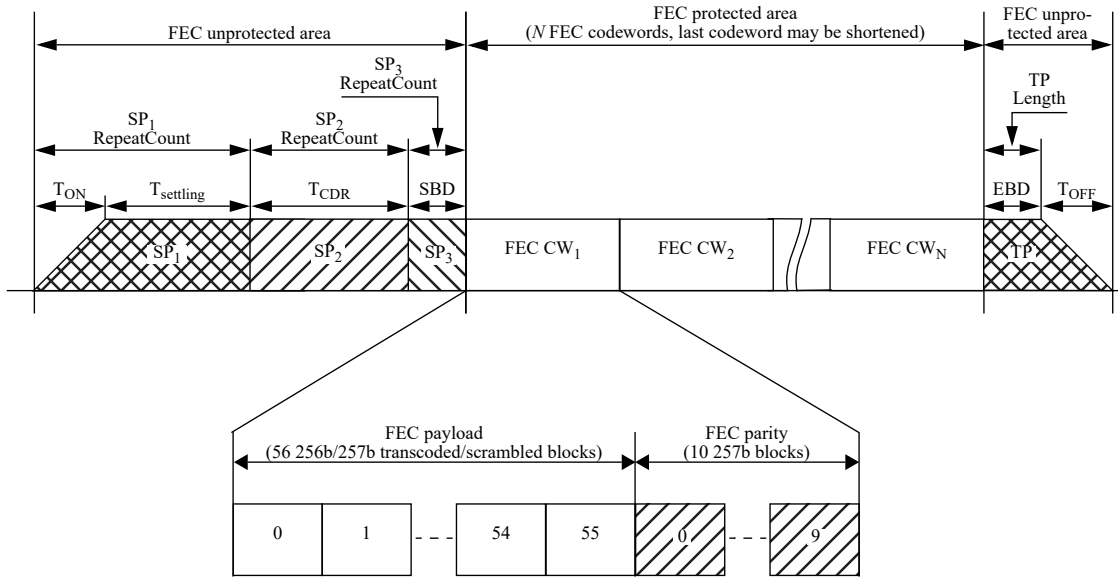


Figure 142-1—ONU burst structure, 3 zones

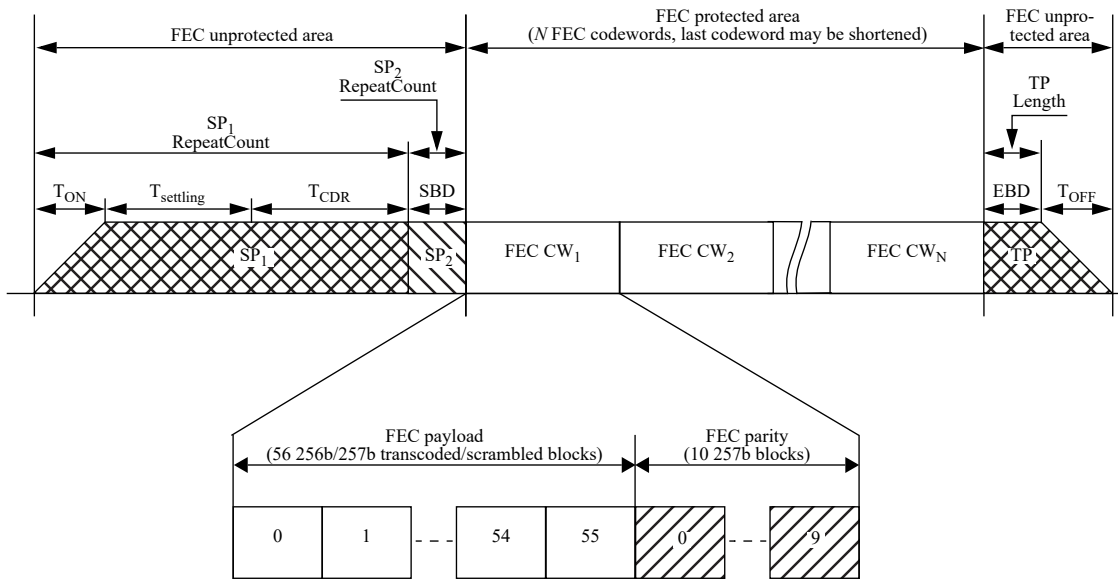


Figure 142-2—ONU burst structure, 2 zones

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