1) Modify Section 142.1.3 as shown below:

142.1.3 Burst Transmission

~~Figure 142–3 and~~ Figure 142–4 presents the details of the ONU burst transmission, in particular, details of the FEC-unprotected and the FEC-protected areas of the upstream burst with ~~several~~ three distinct synchronization pattern zones.

The upstream burst begins with a synchronization pattern, which is not FEC protected. The synchronization pattern comprises: SP1 zone, optimized for laser on (T_{on}) and Automatic Gain Control (AGC, $T_{rx\_settling}$); SP2 zone, optimized for Clock and Data Recovery (CDR, T_{CDR}); and SP3 zone, optimized for the start-of-burst delimiter (SBD) pattern. Each SP zone is a multiple of 257 bits, aligning with the PCS (defined in 142.2 and 142.3) line code of 256B/257B.

~~This three-zone arrangement is shown in Figure 142–4 for both normal operation (granted transmission) and the discovery operation. In the case of the discovery operation, the FEC-protected area comprises a single (shortened) FEC codeword.~~

~~In some implementations, only two explicit zones are needed: SP1 zone, optimized for laser on (Ton), Automatic Gain Control (AGC, Trx_settling), and Clock Data Recovery (CDR, TCDR); and SP2 zone, optimized for the start-of-burst delimiter (SBD) pattern. This arrangement is shown in Figure 142–3 for the normal (granting operation) and discovery operation.~~

Bit patterns transmitted within each SP zone are configured by the OLT using ~~the~~ three SYNC_PATTERN MPCPDUs (see 144.3.6.7) ~~by the OLT which announces the number of the SP zones (two or three)~~. ~~The decision to use two or three SP zones is implementation dependent and related to the design of the OLT burst-mode receiver.~~

In the bursts transmitted during the discovery operation, the SBD is followed by a single (shortened) FEC codeword carrying a single REGISTER_REQ MPCPDU. In normal operation, the SBD is followed by a number of FEC codewords, where the last codeword may be shortened to minimize the unused QC-LDPC codeword payload at the end of the burst (see 142.2.4).

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 these 257-bit data blocks and 10 of 257-bit blocks carrying QC-LDPC parity and codeword delimiter. 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 an 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.

2) Delete Figure 142-3.

3) Modify Section 142.1.3 as shown below.

(Note that another comment adds binary sequence to the definition of SP1 – SP3)

142.1.3.1 Default synchronization pattern parameters (informative)

To assist the device development, testing/verification, and interoperability efforts, this subclause provides a set of default synchronization pattern parameters.

~~The default number of synchronization pattern zones is two.~~

The SP1 synchronization pattern ~~zone covers T_{on}, $T_{rx\_settling}$, and T_{CDR} intervals and~~ has the value of 0x1-(55)32~~. The pattern~~ and is transmitted in a balanced form, i.e., every 257-bit block starting with the second one is an inversion of the previous block.

The SP2 synchronization pattern has the value of 0x1-(55)32 and is transmitted in a balanced form, i.e., every 257-bit block starting with the second one is an inversion of the previous block.

The ~~SP2~~ SP3 synchronization pattern zone represents the start-of-burst delimiter (SBD). It has the length of one block and the value of 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.

This combination of SP2~~1~~ and ~~SP2~~ SP3 synchronization pattern values is characterized by the Hamming distance of 110 or higher between the ~~SP2~~ SP3 and any preceding 257-bit long pattern, i.e., concatenation of *x* bits of ~~SP1~~ SP2 and *y* bits of ~~SP2~~SP3, where *x* is between 1 and 257, and $x + y = 257$.

4) Change the definition of SBD257 in 143.3.5.2 as follows:

SBD257

Type: 257-bit block

Description: The *SBD257* variable represents the start-of-burst delimiter, and its value is equal to ~~either SP2 or~~ SP3~~, depending on~~ from the most recently provisioned synchronization pattern (see 142.1.3.1).

Value: see 142.1.3.1

5) Modify Section 144.3.6.7 as shown below

144.3.6.7 SYNC_PATTERN description

The SYNC_PATTERN message is transmitted by the OLT to announce a synchronization pattern (257-bit sequence) to be used by ONUs at the beginning of each upstream burst (i.e., as a burst preamble). The OLT ~~may~~ announces ~~two or~~ three distinct patterns to be used at the beginning of every burst (see 142.1.3). An unregistered ONU does not respond to a DISCOVERY message if it did not receive all ~~the required~~three SYNC_PATTERN MPCPDUs before it received the DISCOVERY MPCPDU. As part of the Discovery Process, the SYNC_PATTERN MPCPDUs are transmitted in envelopes with the LLID equal to DISC_PLID (see 144.3.5) to allow unregistered ONUs to obtain the synchronization pattern. An ONU that received all ~~the required~~three synchronization patterns and subsequently registered with the OLT, continues to use the same synchronization patterns after the registration (unless changed by the OLT).

6) Modify the Table 144-8 – *PattrenInfo* as follows:

1) Change "Valid range for index is 0 to *Count*-1" to "Valid values for index 0, 1, or 2."
2) Delete row for *Count*
3) Show the row Reserved for bits 2 to 6.

7) Change the second paragraph in 144.3.7 as shown below. Leave the rest of this subclause as is.

144.3.7 Discovery Process

The Discovery process begins with the announcement of the *SpValue* structure using the SYNC_PATTERN MPCPDU exchange between the OLT and the ONU. T~~wo or t~~hree separate SYNC_PATTERN MPCPDUs are sent by the OLT, announcing the value of SP1, SP2, and ~~optionally~~ SP3 portions of the FEC unprotected area in the head of the upstream burst (see 142.1.3). Repeat counts for SP1, SP2, and ~~optionally~~ SP3 during the discovery window are announced within the DISCOVERY MPCPDU. Repeat counts for SP1, SP2, and ~~optionally~~ SP3 outside of the discovery window (normal granting operation) are announced within the REGISTER MPCPDU. Combined, this allows the OLT to effectively configure the synchronization pattern structure and optimize it for the specific OLT receiver implementation. If a SYNC_PATTERN MPCPDU ~~directed to the *DISC_PLID*~~ is received prior to the transmission of a REGISTER_REQ MPCPDU of an ONU responding to a previous discovery window (see Figure 144–22) that registration is aborted and the ONU waits for a subsequent *SpValue* announcement and the discovery window to register.

8) In Figure 144-19, delete footnote 3

9) Add the following definition to section 144.3.7.1 Constants

SP_COUNT
Type: Integer
Description: The number of synchronization patterns used at the beginning of each burst
Value: 3

10) In definition of GrantMargin, delete ", if it is configured."

11) Modify definition of SpSeq as follows:

SpSeq

Type: 2-bit unsigned integer

Description: This variable indicates the index of the synchronization pattern announced by the OLT in the SYNC_PATTERN MPCPDU. The *SpSeq* variable takes values ~~0 or 1 in the case when two synchronization patterns are used, or~~ 0, 1, or 2~~, in the case when three synchronization patterns are used~~. Details about individual synchronization pattern elements~~, their number, and meaning~~ are covered in 142.1.3.

12) In definition of BurstLength(), delete ", if it is used"

13) Modify definition of MsgBursSync as follows:

MsgBurstSync

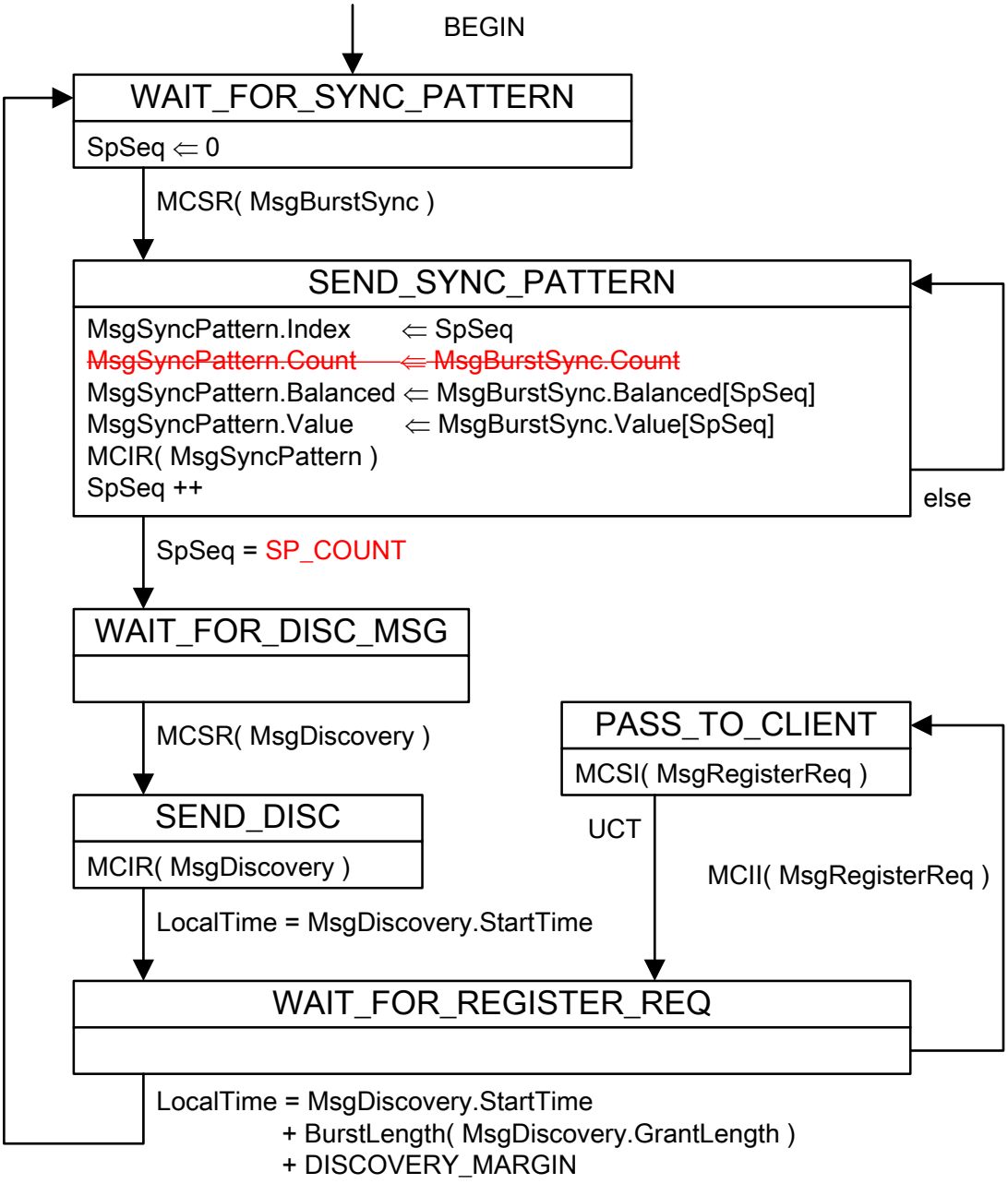
A set of parameters (operand_list) carried in multiple SYNC_PATTERN MPCPDUs. Within the OLT Discovery Initiation Process (see 144.3.7.6), the *MsgBurstSync* set is received from the MPMC Client and is transmitted in ~~2 or 3~~three SYNC_PATTERN MPCPDUs~~, as determined by the *MsgBurstSync.Count* parameter~~. Within the ONU Registration Process (see 144.3.7.8), the parameters received in multiple SYNC_PATTERN MPCPDUs are combined and passed to the MPMC Client as a single *MsgBurstSync* set. The *MsgBurstSync* set includes the following parameters:

~~*Count*: The number of synchronization patterns that the ONU is instructed to generate during the discovery attempt. The allowed values are 2 or 3.~~

Balanced[~~Count~~SP_COUNT]: An array of *SP_COUNT* Boolean values, where the n^{th} element of the array indicates whether the n^{th} synchronization pattern is balanced or not.

Value[~~Count~~SP_COUNT]: An array of *SP_COUNT* 257-bit values, where the n^{th} element of the array represents the n^{th} synchronization pattern.

14) Modify state diagram in Figure 144-20 as follows:



15) Modify state diagram in Figure 144-20 as follows: