

Date: December 03, 2007

To: T10 Committee (SCSI)

From: George Penokie

Subject: SAS-2: Transport layer read and write flowcharts

1 Overview

Disclaimer: The information in this document is based on SAS-2 r13. In any discrepancy between this document and the current version of the SAS standard the current SAS standard shall be complied with. This document does not contain any normative SAS information. It should only be used as a reference.

This document contains flow charts which represent the reading and writing of data as represented in the SAS-2 initiator transport layer state machines and target transport layer state machines. Only the part of the state that covers the reading or writing is represented in these flowcharts. In some cases, not every error condition handled by the state is represented in the flowchart and some states (e.g, ST_TTS1 and ST_TTS2) carry out functions for both reads and writes that are flowcharted separately.

The following states are in full or partially covered in this document:

- a) initiator read:
 - A) ST_ITS6:Receive_Data_In state (see figure 1);
- b) initiator write:
 - A) ST_ITS1:Initiator_Start state (see figure 2);
 - B) ST_ITS2:Initiator_Send_Frame state (see figure 3 and figure 4); and
 - C) ST_ITS5:Prepare_Data_Out state (see figure 5);
- c) target read:
 - A) ST_TTS1:Target_Start state (see figure 6);
 - B) ST_TTS2:Target_Send_Frame state (see figure 7 and figure 8); and
 - C) ST_TTS3:Prepare_Data_In state (see figure 6);

and
- d) target write:
 - A) ST_TTS1:Target_Start state (see figure 9);
 - B) ST_TTS2:Target_Send_Frame state (see figure 10);
 - C) ST_TTS4:Prepare_Xfer_Rdy state (see figure 9); and
 - D) ST_TTS5:Receive_Data_Out state (see figure 11).

2 ST_ITS transport layer read data flowcharts

DATA OFFSET field = Contains the first offset location into read data buffer for the current DATA information unit
 Data-In Buffer Offset = Offset into read data buffer for the last received data frame.
 Data-In Buffer Size = The number of bytes to be read as requested by the application client.

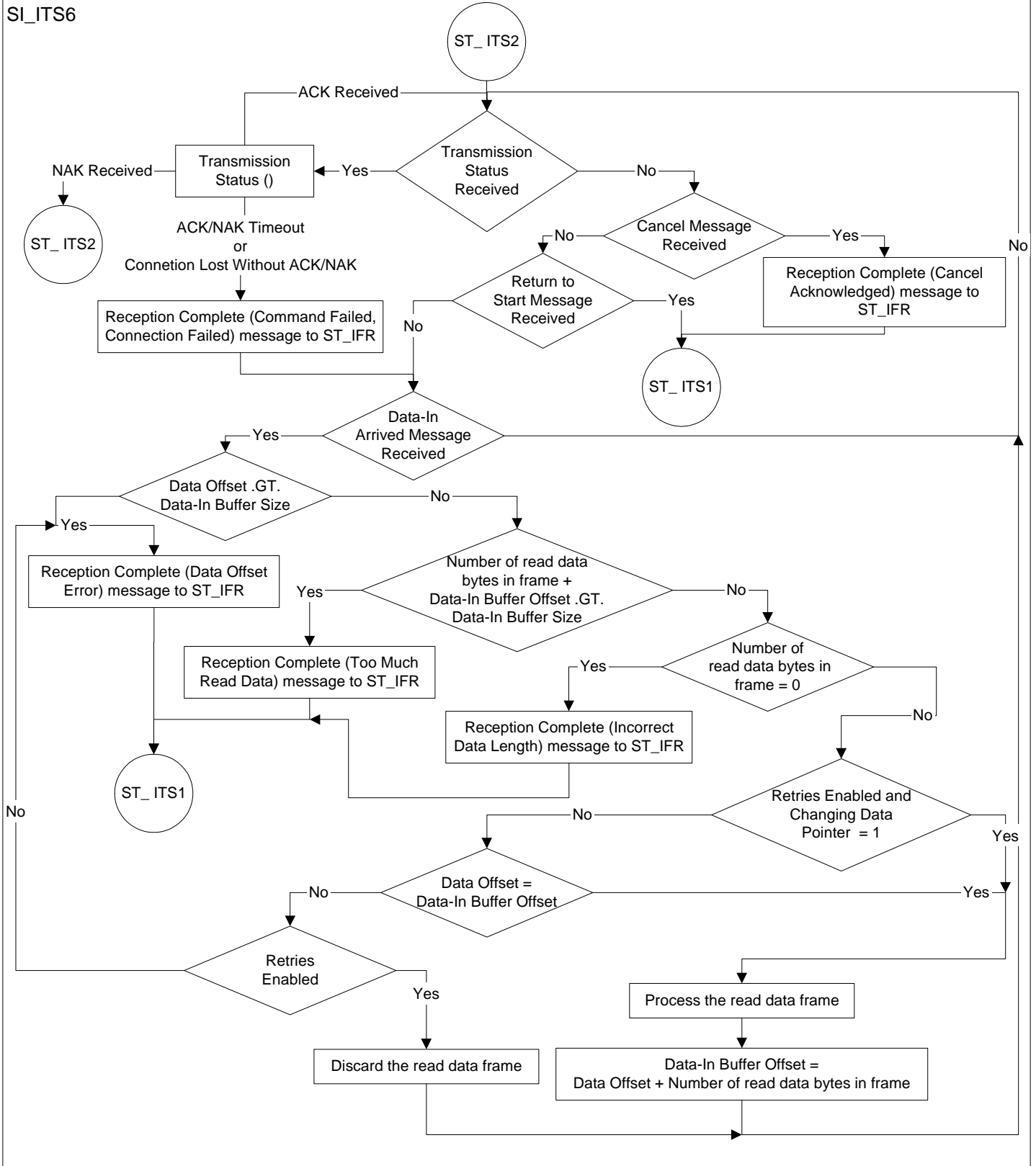


Figure 1 — Representation of transport layer (i.e., ST_ITS6) read data operation

3 ST_ITS transport layer write data flowcharts

Data-Out Buffer Offset = Offset into the application client write buffer.
Data-In Buffer Offset = Offset into the application client read buffer.

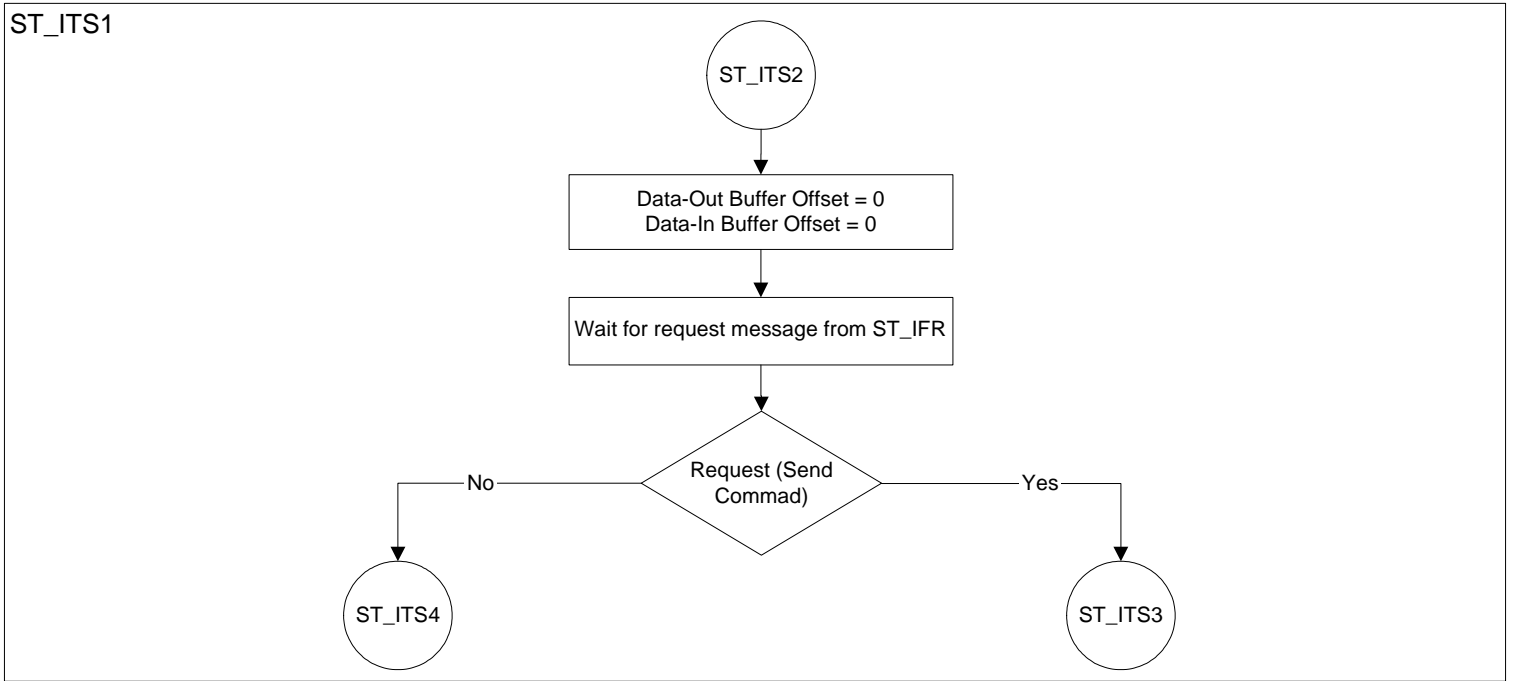


Figure 2 — Representation of transport layer (i.e., ST_ITS1) write data operation

Data-Out Buffer Size = Size of the application client write buffer.
 Data-Out Buffer Offset = Offset into the application client write buffer.
 Requested Offset = The value in the current Xfer_Rdy's Requested Offset.
 Write Data Length = The value of the current Xfer_Rdy's Write Data Length.

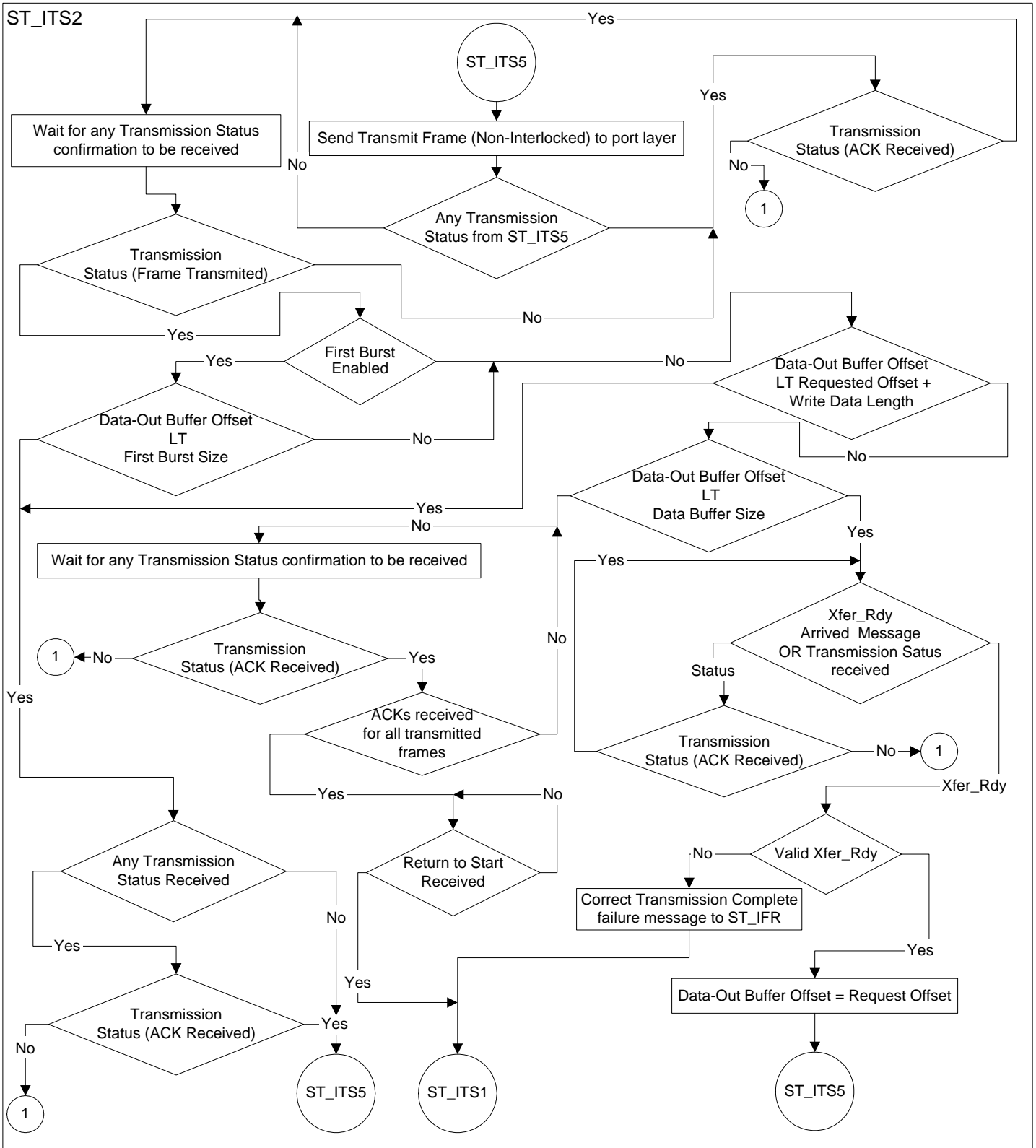


Figure 3 — Representation of transport layer (i.e., ST_ITS2) write data operation (part 1 of 2)

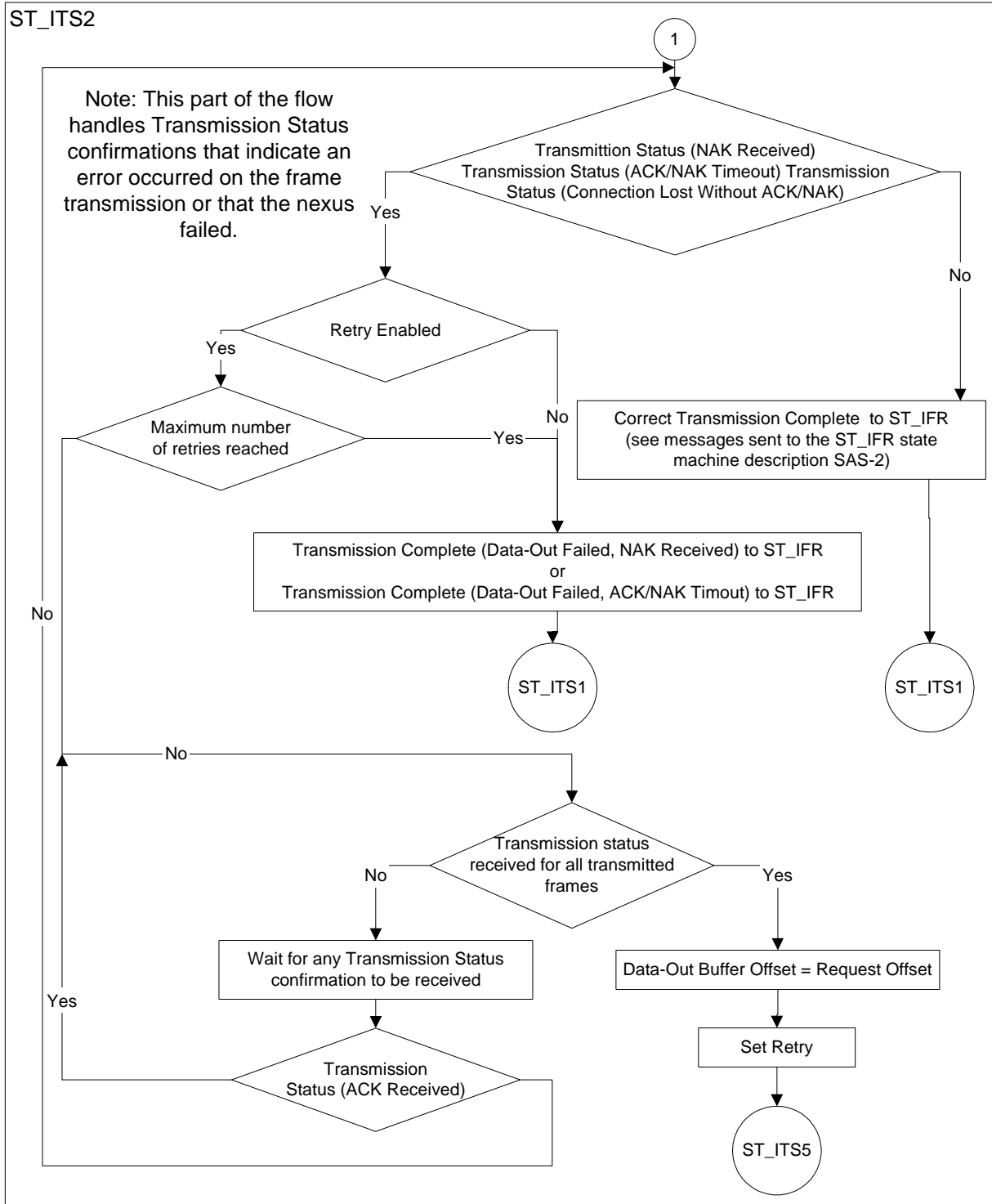


Figure 4 — Representation of transport layer (i.e., ST_ITS2) write data operation (part 2 of 2)

Data-Out Buffer Offset = Offset into the application client write buffer.
 Requested Offset = The value in the current Xfer_Rdy's Requested Offset.
 Write Data Length = The value of the current Xfer_Rdy's Write Data Length.

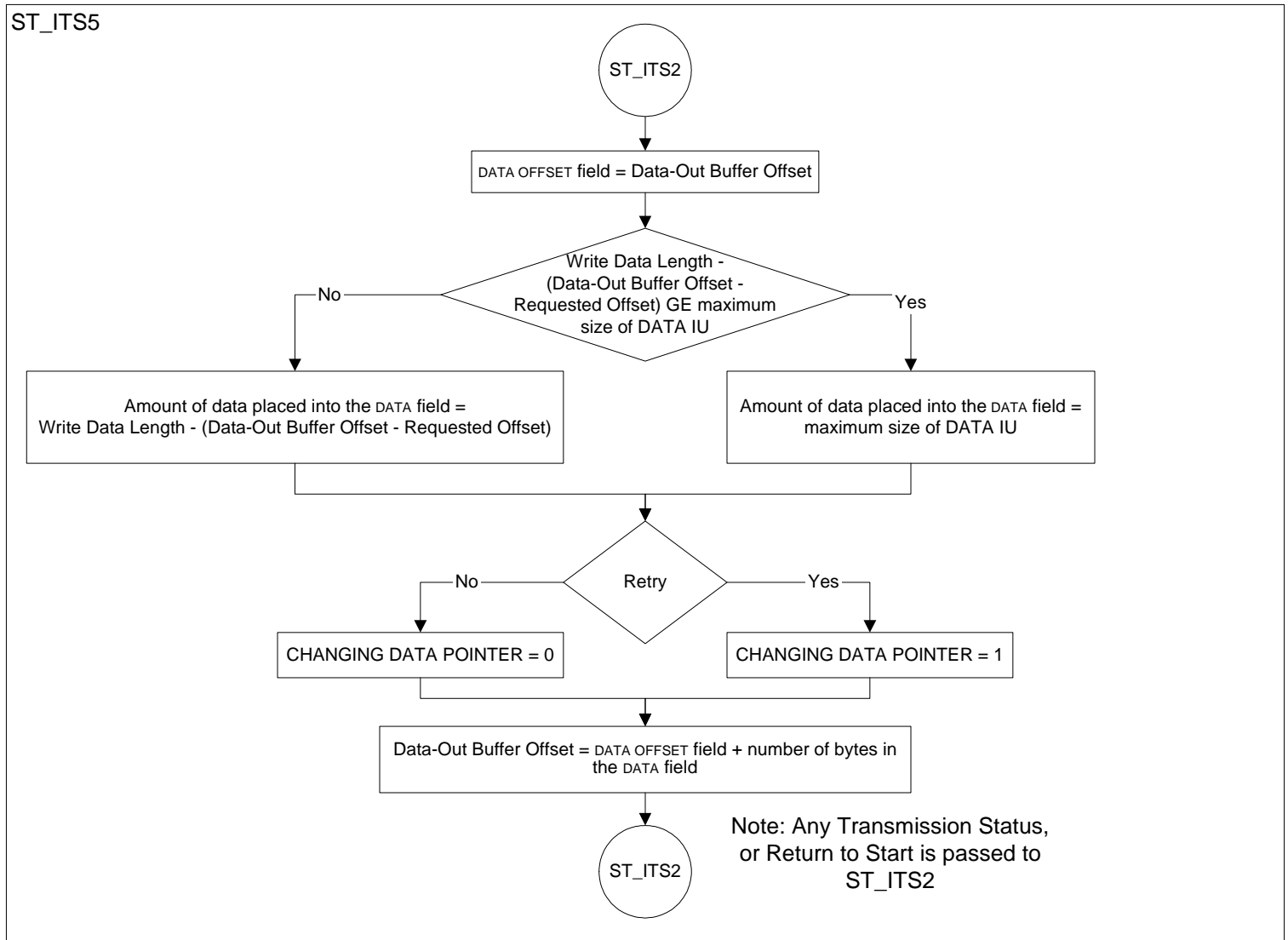


Figure 5 — Representation of transport layer (i.e., ST_ITS5) write data operation

4 ST_TTS transport layer read data flowcharts

Read Data Offset = Offset into application client read data buffer

Read Data Frames Transmitted = The number of Transmission Status (Frame Transferred) confirmations received

Read Data Frames ACKed = The number of Transmission Status (ACK Received) confirmation received.

Balance Point Read Data Offset = Offset into the application client read data buffer for last data frame that the number of frames transmitted = number ACKs received

Data-In Request Byte Count = The number of bytes requested to be transferred. Set by the device server.

Read Data Buffer End = Offset into the application client read buffer of last location into which data may be placed

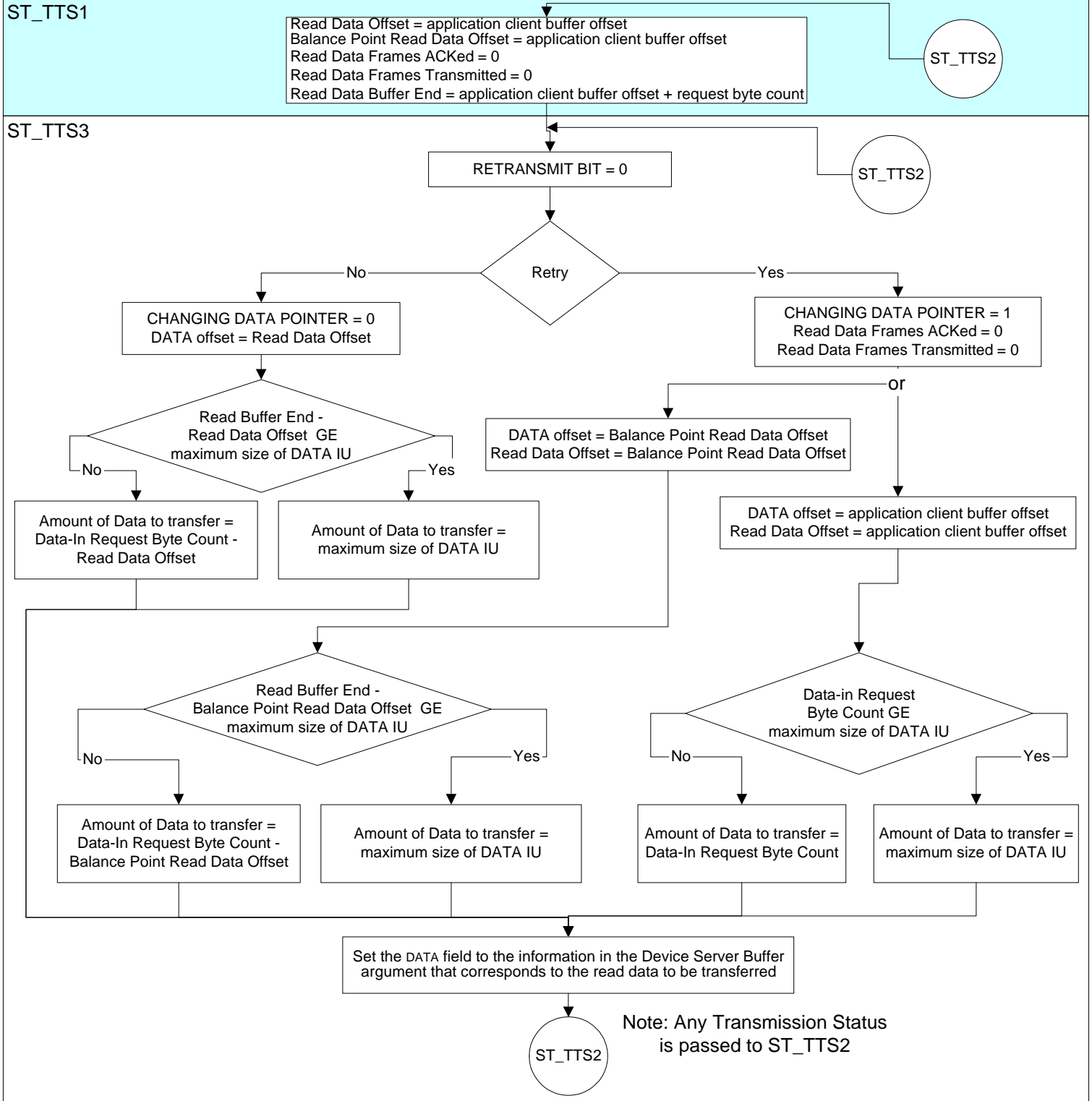


Figure 6 — Representation of transport layer (i.e., ST_TTS1 and ST_TTS3) read data operation

Read Data Offset = Offset into application client read data buffer and the device server read data buffer
 Read Data Frames Transmitted = The number of Transmission Status (Frame Transferred) confirmations received
 Read Data Frames ACKed = The number of Transmission Status (ACK Received) confirmation received.
 Balance Point Read Data Offset = Offset into the application client read data buffer for last data frame that the number of frames transmitted = number ACKs received
 Read Data Buffer End = Offset into the application client read buffer of last location into which data may be placed

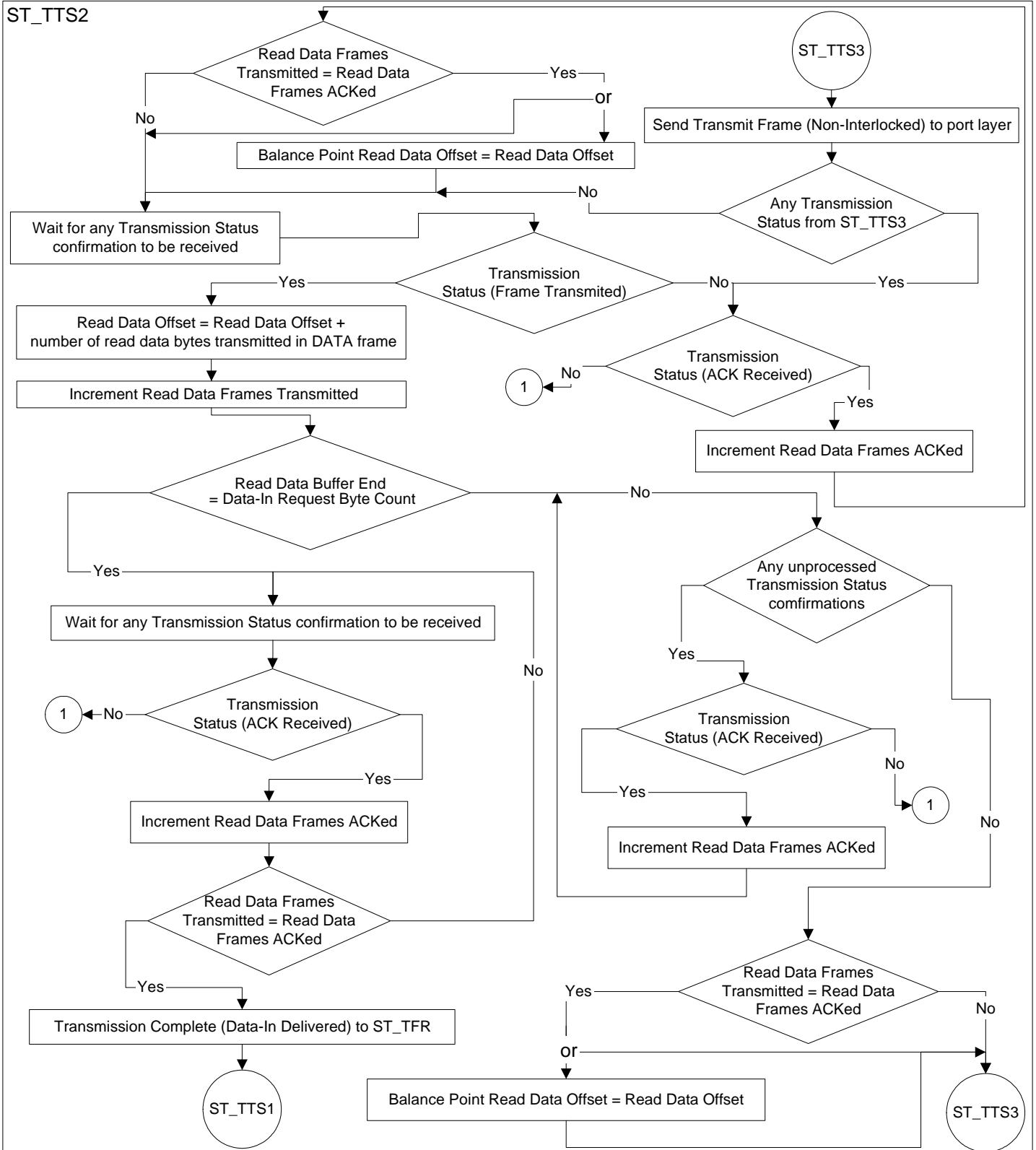


Figure 7 — Representation of transport layer (i.e., ST_TTS2) read data operation (part 1 or 2)

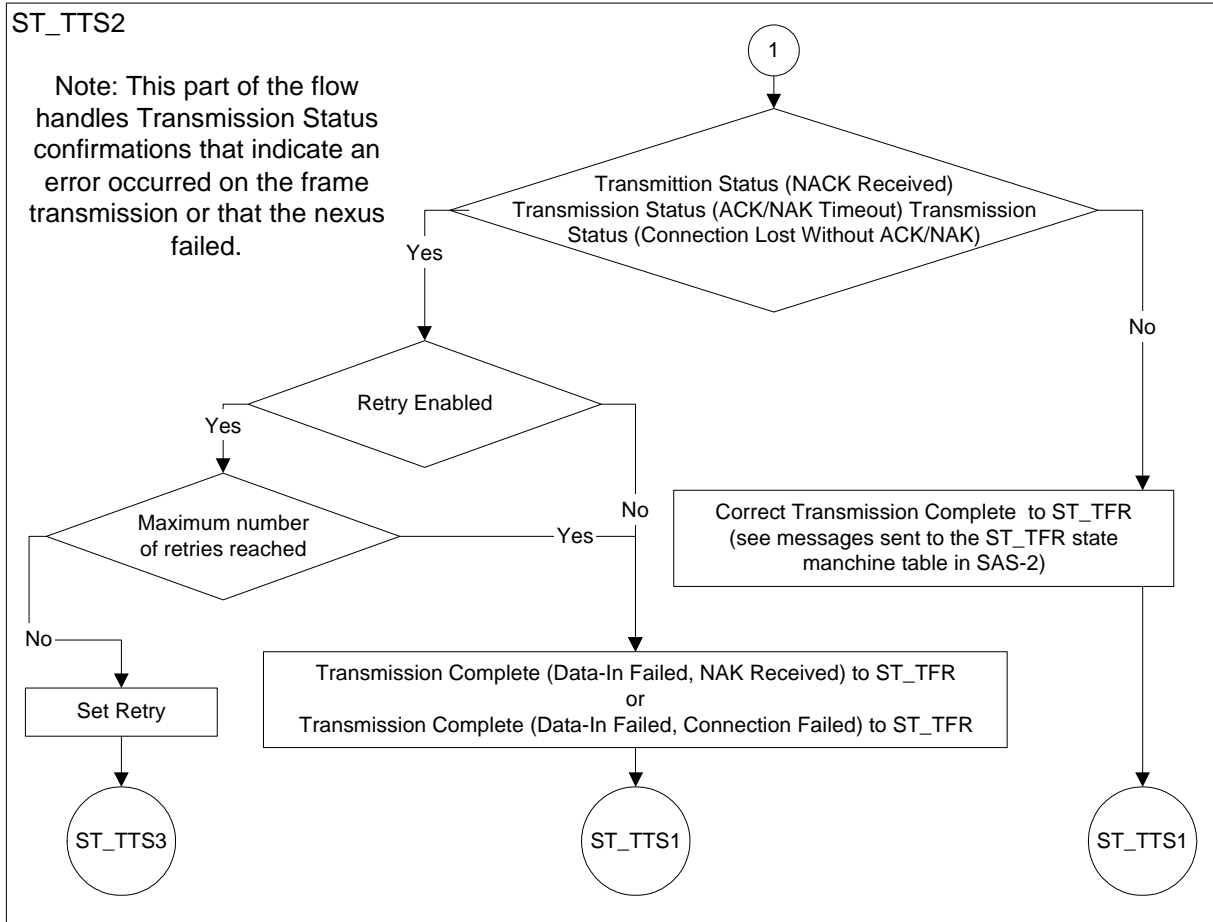


Figure 8 — Representation of transport layer (i.e., ST_TTS2) read data operation (part 2 of 2)

5 ST_TTS transport layer write data flowcharts

Requested Write Data Length = Amount of write data requested by the device server from the application client buffer
 Requested Write Data Offset = Device server requested offset in the application client buffer for write data
 Data-Out Request Byte Count = The number of bytes requested to be transferred. Set by the device server.
 Application Client Buffer Offset = The offset into the application clients buffer that contains the write data

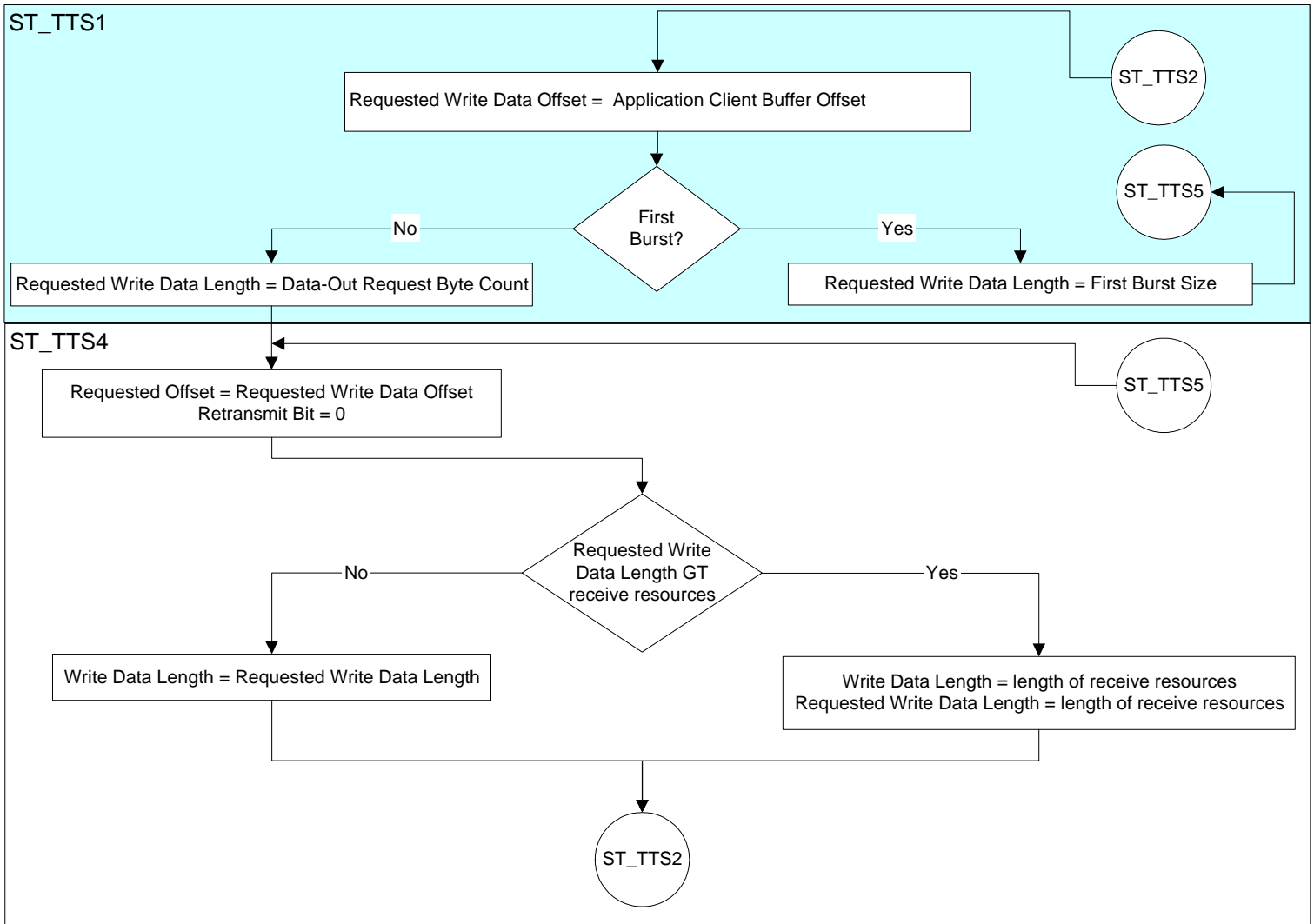


Figure 9 — Representation of transport layer (i.e., ST_TTS1 and ST_TTS4) write data operation

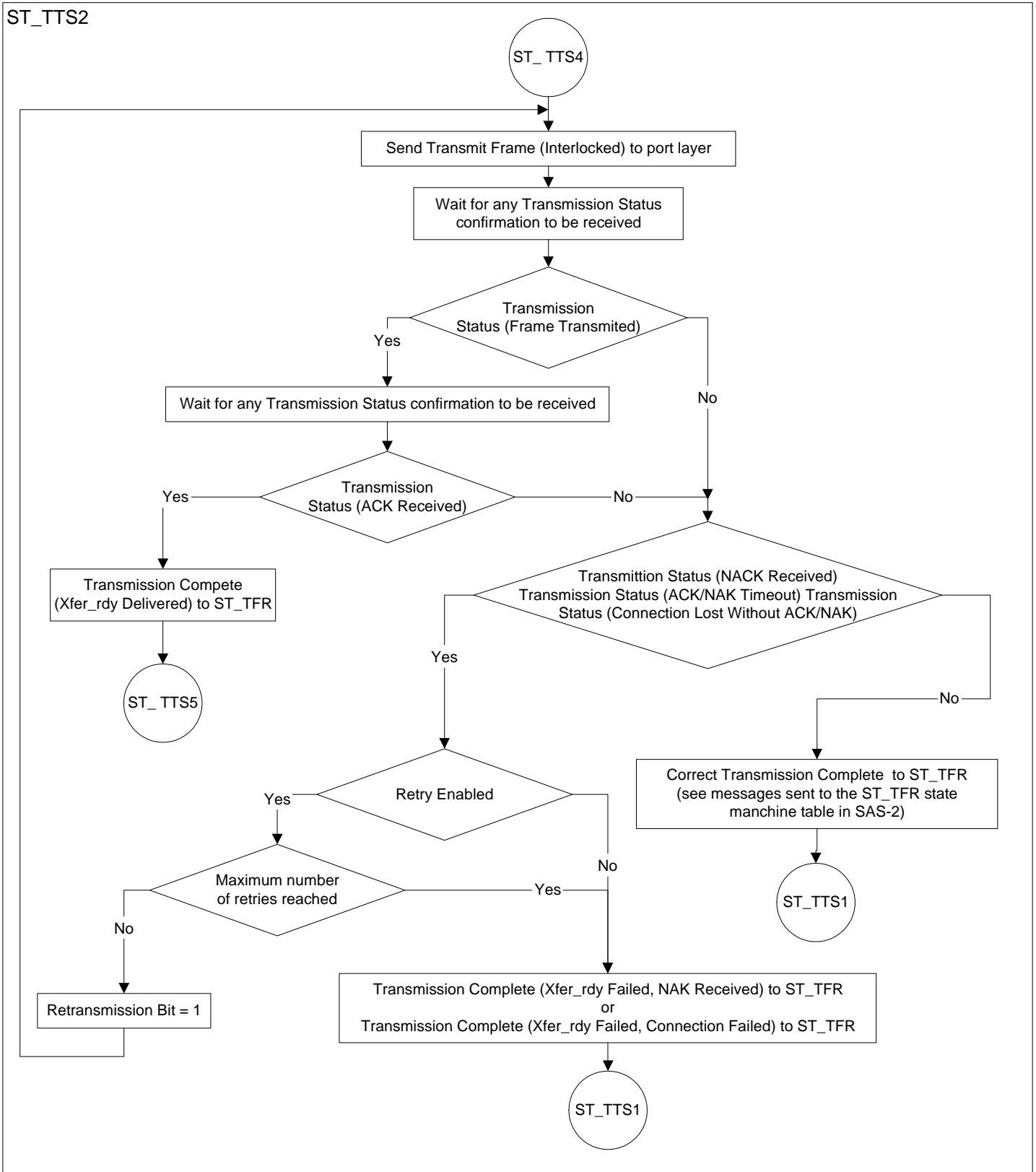


Figure 10 — Representation of transport layer (i.e., ST_TTS2) write data operation

Data Offset = Offset into application client write data buffer and the device server write data buffer (Data Offset field from received write Data IU).
 Requested Write Data Length = Amount of write data requested in the Xfer_rdy to be sent from the application client buffer.
 Requested Write Data Offset = Xfer_rdy information unit offset into the application client buffer for write data .
 Data-Out Request Byte Count = The number of bytes requested to be transferred by the device server.
 Write Data Offset = The current offset into the application clients buffer that contains the write data.
 Bytes received = The number of bytes in the last write Data information unit that was received.
 Application Client Buffer Offset = The initial offset into the application clients buffer that contains the write data.

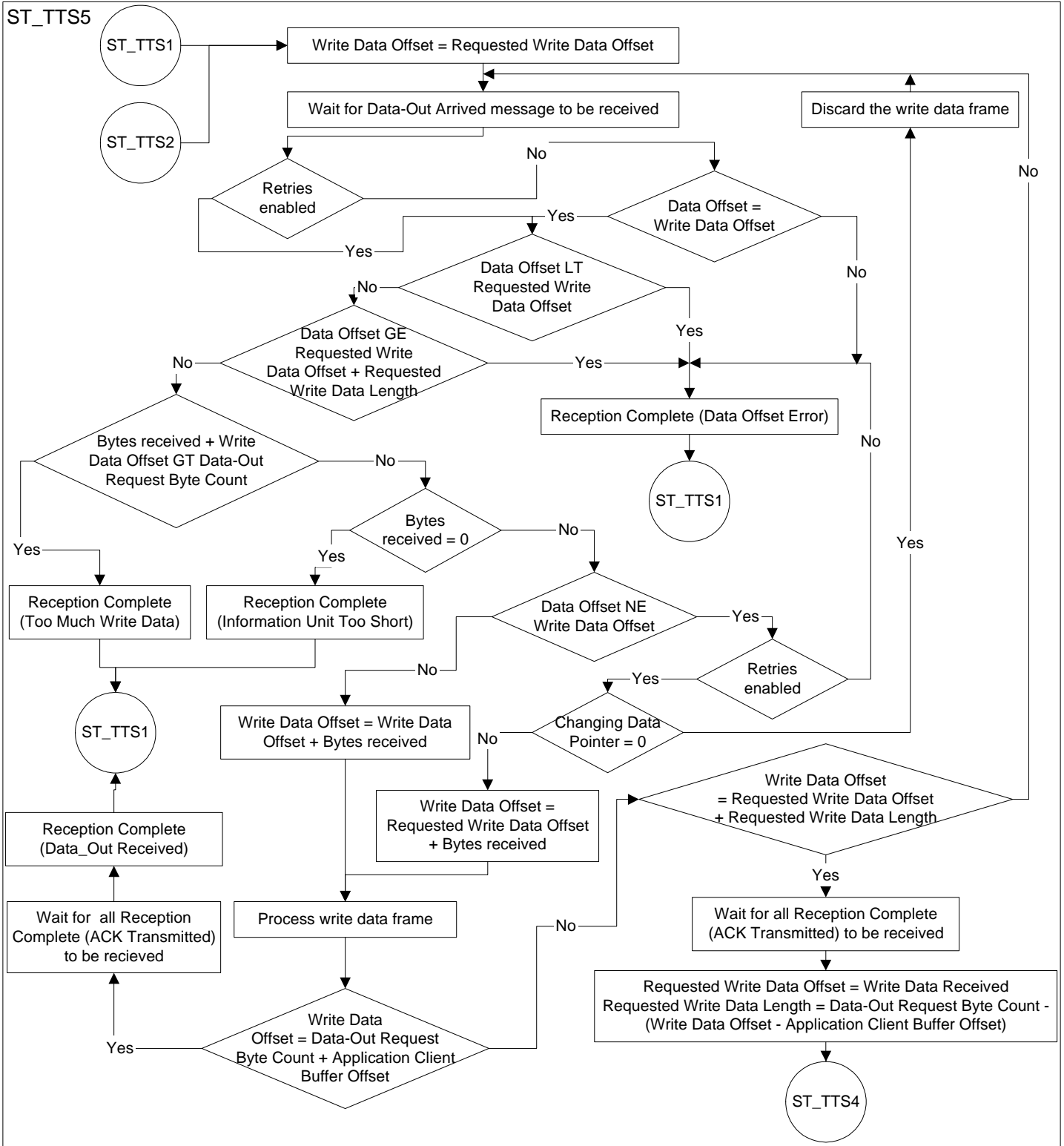


Figure 11 — Representation of transport layer (i.e., ST_TTS5) write data operation