SMPTE STANDARD

for Television —
Mapping of SYNC Stream Block in ATM Common Layer to ATM Adaptation Layer Type 1

1 Scope

This standard defines the mapping format of the SYNC stream block (SSB), defined in SMPTE 354M, to ATM adaptation layer type 1 (AAL1).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE 354M, Television — ATM Common Layer for Transport of Packetized Audio, Video and Data over Asynchronous Transfer Mode using ATM Adaptation Layer Type 1

ITU-T I.363.1 (08/96), B-ISDN ATM Adaptation Layer (AAL) Specification: Type 1 (AAL)

3 Specification of AAL type 1

The ATM adaptation layer (AAL) supports the mapping between the ATM layer and the next higher layer and functions required by the next higher layer.

3.1 Functions of AAL type 1 for packetized audio, video and data transport

Functions and protocols of AAL type 1 (AAL1) to be used are those described in ITU-T I.363.1.

The layer services at the AAL service access point (AAL-SAP) provided by AAL1 to the AAL user are:

– transfer of AAL-service data units (AAL-SDU) with a constant source bit rate and the delivery of them with the same bit rate;

– transfer of timing information between source and destination;

– cell loss and cell error correction capability.

AAL1 is composed of two sublayers. The lower layer is the segmentation and reassembly (SAR) sublayer and the upper layer is the convergence sublayer (CS). SAR is in conformity with ITU-T I.363.1. CS for video signal transport defined in ITU-T I.363.1/clause 2.5.1.2 shall be used for AAL application. These functions are listed in detail below.

3.1.1 Handling of AAL user information

The length of the AAL-SDU is one byte and the time interval between two consecutive AAL-SDU should be constant, when utilizing the correction methods described in ITU-T I.363.1/clause 2.5.2.4.

3.1.2 Handling of cell delay variation (CDV)

It is mandatory to perform this function to reduce CDV values. A buffer is used to perform this function. In the event of buffer underflow, it may be necessary for the CS to maintain bit counter integrity by inserting the appropriate number of dummy bits. In the event of buffer overflow, it may be necessary for the CS to maintain bit counter integrity by dropping the appropriate number of bits.

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3.1.3 Handling of lost and misinserted cells

The sequence count values (SC) are further processed to detect lost and misinserted cells. Detected misinserted cells are discarded.

3.1.4 Handling of the timing relationship

In order to provide a timing relationship between the source and destination, end-to-end synchronization is required. The adaptive clock method described in ITU-T I.363.1/clause 2.5.2.2.1 shall be used. The receiver recovers the source clock frequency by averaging the amount of received data.

3.1.5 Correction of bit errors and lost cells

To transmit packetized audio, video, and data stream, a long interleaver matrix which combines forward error correction (FEC) and byte interleaving shall be used to correct bit errors and cell losses (see figure 1). FEC uses the Reed-Solomon (128,124) code. This interleaver matrix is defined in ITU-T I.363.1/clause 2.5.2.4. The byte interleaver is organized as a matrix of 128 columns and 47 rows.

The interleaver is used as follows:

– at the input, incoming 128-byte-long blocks are stored row by row (one block corresponding to one row);

– at the output, bytes are read out column by column.

4 SYNC stream block (SSB) mapping format to AAL1

The common layer, which is defined in SMPTE 354M, is the next higher layer of the AAL1 and provides transmission packets of applications. The common layer consists of two layers: The lower layer is the SYNC layer and the higher layer is the container layer. The SYNC layer defines the SYNC stream block (SSB) which is defined in SMPTE 354M. SSB is mapped to the AAL1 long interleaver matrix payload as described in 3.1.5. The size of the SSB depends on the application. The position of the SSB byte data is not synchronized with the interleaver matrix (see annex A).

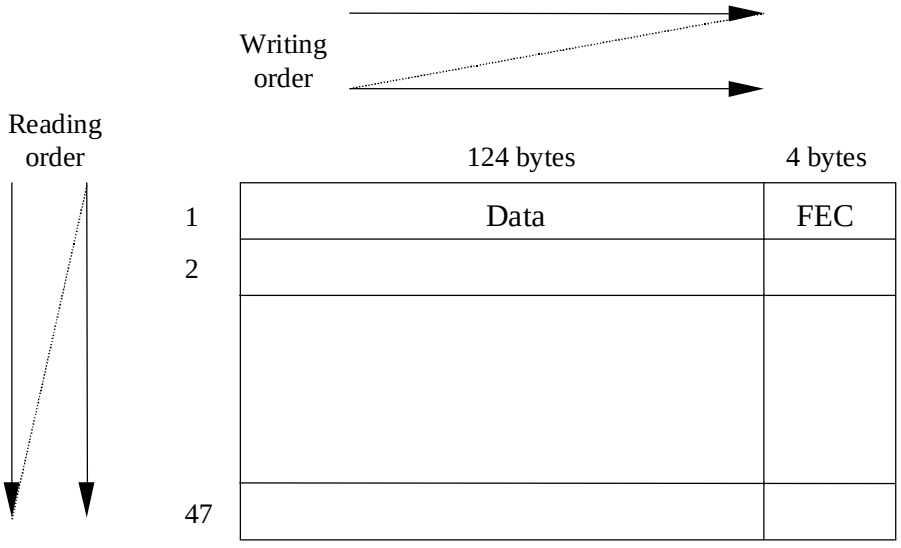

Figure 1 – Structure and format of the long interleaver matrix

Annex A (informative)
Long interleaver matrix

The size of the AAL1 long interleaver matrix payload is 5828 bytes (124*47). As defined in SMPTE 352M, one unit of SSB is transferred in one video frame period. In figure A.1, the size of the nth SSB, SSB(n), is set to X bytes, so the size of X becomes as follows: X = P + 5828 * M + Q [bytes].

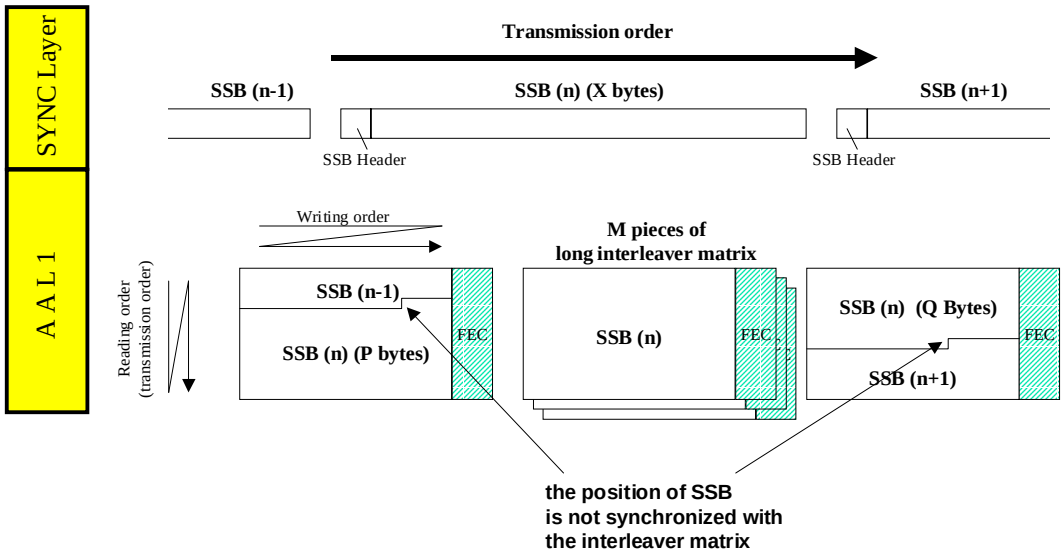

Figure A.1 – SSB asynchronous mapping to AAL1 long interleaver matrix

Annex B (informative)
Bibliography

SMPTE 352M-2001, Television — Video Payload Identification for Digital Television Interfaces

ITU-T I.356 (03/00), B-ISDN ATM Layer Cell Transfer Performance

ITU-T I.361 (02/99), B-ISDN ATM Layer Specification