

Vertical Ancillary Data Mapping
of ANSI/SCTE 104 Messages



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative Practices. This SMPTE Engineering Document was prepared by Technology Committee D27.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

This Standard serves in conjunction with ongoing work under SMPTE S22 defining communications mechanisms between program originator's Traffic and Billing systems and their facility Automation Systems. One facet of the end-to-end program system is Automation System triggering of downstream Digital Program Insertion ("DPI"). Such insertion is triggered typically by the presence of ANSI/SCTE 35 messages in the MPEG-2 Transport Stream.

ANSI/SCTE 104 defines the Communications API between the Automation System and the associated Compression System that results in the insertion of those ANSI/SCTE 35 messages. ANSI/SCTE 104 was drafted with bidirectional TCP/IP data communications in mind, but made explicit provision for unidirectional carriage of messages in video signals.

1 Scope

This Standard specifies a mechanism for the mapping of ANSI/SCTE 104 messages (with a maximum size of 2000 bytes) into 10-bit vertical ancillary data space. It is equally applicable to standard definition digital systems as well as high definition digital systems.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

Unless otherwise specified the order of precedence of the types of normative information in this document shall be as follows. Normative prose shall be the authoritative definition. Tables shall be next, followed by formal languages, then figures, and then any other language forms.

3 Normative References

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

ANSI/SCTE 35-2004, Digital Program Insertion Cueing Message for Cable

ANSI/SCTE 104-2004, Automation System to Compression System Communications Applications Program Interface (API)

SMPTE 291M-2006, Television — Ancillary Data Packet and Space Formatting

SMPTE RP 168-2002, Definition of Vertical Interval Switching Point for Synchronous Video Switching

4 Definitions

4.1 Byte

Throughout this Standard, the term 'byte' shall refer to 8-bit values (and not 10-bit values) unless otherwise stated. In this Standard, 10-bit values are called "words."

4.2 Inserter

An Inserter is a device that places an ANSI/SCTE 104 message into the VANC space of a digital video data stream in response to receipt of that message via TCP/IP or serial data communications.

4.3 Injector

An Injector is a device (or combination of devices) that convert ANSI/SCTE 104 message data into an SCTE 35 splice_info_section() placed in an MPEG-2 TS. In the context of this document the Injector expects to receive the ANSI/SCTE 104 message data in VANC.

5 Format of VANC Data Packets

Each data packet shall comply with the format defined in SMPTE 291M for a 10-bit type 2 ancillary space (ANC) packet. It consists of the ancillary data flag (ADF), the data ID (DID), the secondary data ID (SDID), the data count (DC), the user data words (UDW), and the checksum (CS). The UDW consists of the data payload.

The DID word shall be set to the value 41h. The SDID word shall be set to the value of 07h. The same values of DID/SDID shall be used for all duplicated or continued packets (see § 5.2.2 and 5.2.3).

DC is a count of the number of words in the UDW.

Each ANSI/SCTE 104 message shall begin a new VANC data packet. If an ANSI/SCTE 104 message exceeds the capacity of a single VANC packet, multiple data packets will be required. No more than one complete ANSI/SCTE 104 message may be transmitted per video frame time.

An ANSI/SCTE 104 message utilizing this specification shall be limited to a maximum of 200 bytes in length for a single_operation_message() structure or a maximum of 2000 bytes in length for a multiple_operation_message() structure.

NOTE – Additional guidance on message length is provided by Informative § 5.3.3.

5.1 UDW Format

The UDW of each ANSI/SCTE 104 message starts with a one byte Payload Descriptor, followed by one or more bytes from the variable length ANSI/SCTE 104 message itself as shown in Figure 1. The format of the ANSI/SCTE 104 message bytes is defined in § 7 ("Message Formats") of ANSI/SCTE 104.

The ANSI/SCTE 104 single_operation_message() or a multiple_operation_message() structure (as the case may be) shall first be extracted from whatever outer message structure may have been used to transport it to the Inserter before being placed in VANC.

The ANC packet UDW shall be a sequence of 10-bit words. The ANSI/SCTE 104 message information is transmitted in bits b7 through b0 of the 10-bit data word. Bit b8 is even parity for bits b7 through b0 of the 10-bit data word, and bit b9 equals not bit b8.