RP 220-2004
Revision of RP 220-2002

SMPTE RECOMMENDED PRACTICE

PAL/SECAM IP and Trigger Binding to VBI

1 Scope

This practice defines a standard manner for the delivery of SMPTE DDE content for both transport A (broadcast of triggers and pulling of data by the return channel) and transport B (broadcast of triggers and data) for the 625-line television system. Both transport types are based on carriage of IP multicast packets in VBI lines of a PAL/SECAM system by means of teletext packets with address 30 or 31.

NOTE – Since teletext data can be transported in any DVB transport stream, any SMPTE DDE-1 content carried following this practice may also be conveyed by encapsulating the teletext data in a DVB MPEG-2 transport stream.

2 Normative references

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

SMPTE 357M-2002, Television — Declarative Data Essence — IP Multicast Encapsulation

SMPTE 363M-2002, Television — Declarative Data Essence — Content Level 1

IETF RFC 1055, A Nonstandard for Transmission of IP Datagrams Over Serial Lines: Slip

ETSI ETS-300706, Enhanced Teletext Specification

ETSI ETS-300708, Data Transmission within Teletext (edition 2)

ETSI TR 101 231 v1.2.3 (2000-09), Television Systems; Register of Country and Network Identification (CNI) and of Video Programming System (VPS) Codes)

3 Acronyms

DDE: Declarative Data Essence
DVB: Digital Video Broadcast
ETSI: European Telecommunication Standard Institute
IDL: Independent Data Line
IETF: Internet Engineering Task Force
IP: Internet Protocol

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MPEG: Moving Picture Experts Group
PAL: Phase Alternate Line
RFC: Request For Comments
SECAM: Sequentiel à Mémoire
SLIP: Serial Line IP
VBI: Vertical Blanking Interval

4 SMPTE DDE binding on PAL/SECAM system (625-line television system)

In PAL/SECAM systems (625-line television systems), SMPTE DDE content (SMPTE 363M) shall be retrieved either using transport A (broadcast of triggers and pulling of data by the return channel) or using transport B (broadcast of triggers and data).

For transport A, each single trigger is carried in a single UDP/IP multicast packet and these IP multicast packets are delivered on the fixed address 224.0.23.13 and port 2670. Transport B is described in SMPTE 357M using IP encapsulation with address and port as assigned in the same reference, with the exception of address 224.0.1.173 and port 2670, which use is restricted to transport A. The processing of triggers is as defined in SMPTE 363M and is independent of the method used to carry them.

For both transport types, IP multicast data is broadcast by encoding bytes in the vertical blanking interval of individual video fields using the protocol stack shown in figure 1. To allow a receiver to recover IP packets, successive packets are delimited using SLIP (IETF RFC 1055) as a framing protocol. Data are transported in teletext packets with an address of 30 or 31 as defined by the IDL Format B specification (ETSI ETS-300708).

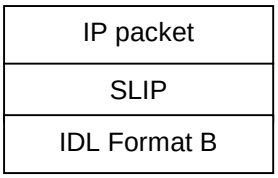

Figure 1 – Protocol stack used to transmit IP multicast packets

The independent data line format B is defined in clause 6 of the second edition of ETSI ETS-300708. IDLs are teletext packets with an address of 30 or 31 (see ETSI ETS-300706 for the definition of a teletext packet). The general structure of IDL-B is presented in figure 2.

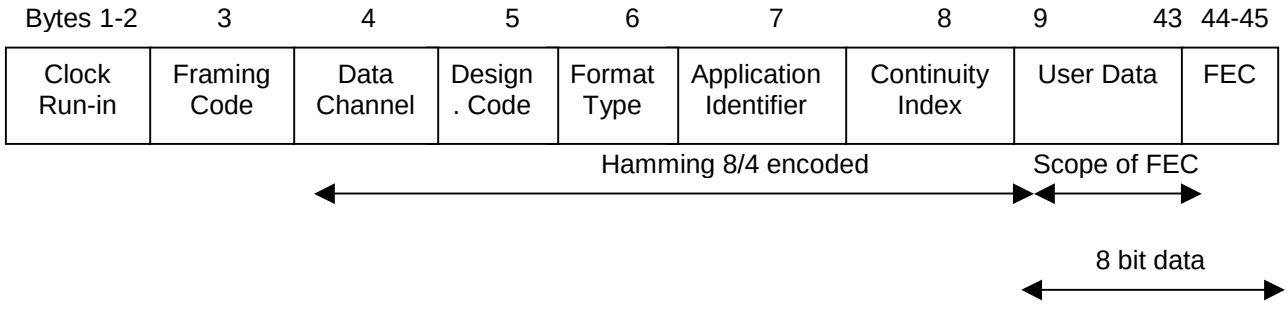

Figure 2 – Structure of an IDL format B packet

For the purpose of this specification, the different component fields of an IDL-B are defined as follows:

- Clock run-in: As defined in ETSI ETS-300706.
- Framing code: As defined in ETSI ETS-300706.
- Data channel: As defined in sub-clause 6.4 of ETSI ETS-300708.
- Designation code: As defined in sub-clause 6.4 of ETSI ETS-300708.
- Format type: The four message bits of the Hamming 8/4 encoded format type byte is 0001.
- Application identifier: The four message bits of this field is Hamming 8/4 encoded. The list of possible values is recorded in ETSI TR 101 231 v1.2.3. The value of these four message bits is either application dependant (for example the value 0101 is reserved for TAK) or fixed to 1000 (ETSI TR 101 231 v1.2.3). The latter four message bits are intended to be used when IP datagrams transporting declarative data essence (SMPTE 363M) content is supposed to be received by different kinds of platforms.
- Continuity index: As defined in ETSI ETS-300708.
- User data: This field carries a data stream made of IP datagrams delimited using the SLIP protocol. This protocol described in IETF RFC 1055 makes special use of the code values 0xC0 and 0xDB. The code 0xC0 is used as a delimiter between IP packets, and shall not appear in the data stream anywhere else. It shall be inserted immediately before the start of any IP packet. If a data byte within an IP packet has the code value 0xC0, it shall be replaced by the two-byte sequence 0xDB, 0xDC. If a data byte within an IP packet has the code value 0xDB, it shall be replaced by the two-byte sequence 0xDB, 0xDD. Any number of 0xC0 bytes may be inserted between IP packets. At a minimum, a single instance shall be inserted between successive IP packets.
- FEC: To ensure the integrity of the data, a forward error correcting scheme shall be used as defined in ETSI ETS-300708.