

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

Triggering messages for broadcast applications –  
Part 2: Transport methods

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Messages de déclenchement pour les applications de radiodiffusion –  
Partie 2: Méthodes de transport

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FDIS	Report on voting
100/911/FDIS	100/950/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 62297 consists of the following parts, under the general title *Triggering messages for broadcast applications*:

Part 1: Format

Part 2: Transport methods

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## INTRODUCTION

This part of IEC 62297 focuses on the transport methods of the trigger messages defined in IEC 62297-1.

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# TRIGGERING MESSAGES FOR BROADCAST APPLICATIONS –

## Part 2: Transport methods

### 1 Scope

This part of IEC 62297 specifies how the trigger messages defined in IEC 62297-1 are transmitted. A trigger is defined as information sent from a service provider as part of a data broadcasting transmission that initiates an application in a receiver. Additional information in the trigger message allows filtering or prioritization techniques to be applied at the receiver. Examples of possible use include the forcing of the display of information to warn of severe weather conditions and advising of extreme content in the TV programme. In an interactive system, a message or icon might be displayed inviting on-line access to vote, to register an interest in an advertised product, or to browse programme-related content.

This standard specifies how trigger messages are broadcast using teletext technology. Both Page Format-Clear and Independent Data Line methods are defined, using protocols defined in ETSI EN 300 708.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62297-1, *Triggering messages for broadcast applications – Part 1: Format*

ISO/IEC 13818-6, *Information technology – Generic coding of moving pictures and associated audio information – Part 6: Extensions for DSM-CC*

ETSI EN 300 706, *Enhanced Teletext specification*

ETSI EN 300 708, *Data transmission within Teletext*

ETSI TS 101 231, *Television systems; Register of Country and Network Identification (CNI), Video Programming System (VPS) codes and Application codes for Teletext based systems*

### 3 Terms, definitions and abbreviations

#### 3.1 Definitions

For the purposes of this document, the following terms and definitions, in singular or plural form, apply.

##### 3.1.1

##### **Application Data Block**

one instance of the application data to be transmitted via the Page Format-Clear method and following the addition of any error protection/correction data

### 3.1.2

#### **Bundle**

group of 490 application bytes for transmission via IDL format B and to which the FEC algorithm is applied

### 3.1.3

#### **Bundle Information Structure**

data within the stream carried by the Page Format-Clear method that indicates the applications present in the stream

### 3.1.4

#### **Data Stream**

continuous or periodic sequence of data comprising application and transmission related components

### 3.1.5

#### **Hamming 8/4**

method of protecting data against transmission path errors. A protection bit is added for every data bit. Single bit errors per byte can be corrected, two bit errors can be detected

### 3.1.6

#### **Independent Data Line**

teletext packet with address 30 or 31 that does not form part of a teletext page and can be inserted at any point in the transmission cycle

### 3.1.7

#### **Page Format-Clear**

page-based method of broadcasting serial data streams via teletext when the application does not require encryption techniques to be applied to the data

### 3.1.8

#### **Structure Header**

data that precedes an Application Data Block to indicate the application to which it belongs and the size of the block

### 3.1.9

#### **Trigger message**

definition of a trigger event including a URL and optional attributes to specify, for example, a countdown time and an expire time

## 3.2 Abbreviations

<b>FEC</b>	Forward Error Correction
<b>IDL</b>	Independent Data Line
<b>MIP</b>	Magazine Inventory Page
<b>URL</b>	Uniform Resource Locator

## 4 Teletext-based methods

### 4.1 Page-format method

The Page Format-Clear protocol, fully defined in ETSI EN 300 708, is used to transmit one or more trigger messages. A serial data stream is formed and broadcast via successive versions of a Page Format-Clear encoded teletext page.

#### 4.1.1 Maximum length of a trigger message

The encoding method and the maximum payload size of the Page Format-Clear protocol limits the maximum length of a trigger message to 1 022 bytes.

#### 4.1.2 Data stream

A serial data stream according to 4.2 in ETSI EN 300 708 is created from Application Data Blocks, Structure Headers, Bundle Information Structures and Block Separators.

##### 4.1.2.1 Application Data Blocks

In preparation for transmission, each 8-bit byte of a trigger message defined according to IEC 62297-1 is divided into two four-bit nibbles. Each nibble is then Hamming 8/4 encoded according to 8.2 of ETSI EN 300 706. The low-order nibble is encoded, and ultimately transmitted, before the high-order nibble. The resulting bytes are assembled in sequence to form an Application Data Block.

##### 4.1.2.2 Structure Header

Each Application Data Block is preceded by a Structure Header, as defined in 4.2.2 of ETSI EN 300 708. This consists of application identity and block length information, all Hamming 8/4 encoded.

##### 4.1.2.3 Bundle Information Structure

Bundle Information Structures, coded according to 4.2.3 in ETSI EN 300 708, shall be inserted in the data stream at frequent intervals to indicate the type of application(s) present.

##### 4.1.2.4 Application Type value

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The Application Type value (0x0010) allocated to trigger applications and carried in the Bundle Information Structure is recorded in ETSI TS 101 231.

##### 4.1.2.5 Transport page

The page consists of a packet X/0 (mandatory), some or all of packets X/1-X/25, and X/28/0 (mandatory). Packets X/1-X/25 are used to carry Application Data Blocks and Bundle Information Structures. Packet X/28/0 provides a “signature” to help a receiver confirm that the page carries trigger information.

##### 4.1.2.6 Page address

The default page number is allocated in ETSI EN 300 706 and has the value 0x1E7. However, if this page number is not available to the service provider, the page in use shall be indicated in a Magazine Inventory Page (MIP), as defined in ETSI EN 300 706. The MIP code for a page carrying trigger information is 0xFC.

##### 4.1.2.7 Coding of packet X/0

Packet X/0 shall be coded according to 4.3.1 in ETSI EN 300 708. Triggers must be encoded as data stream 1 (S3 = 0).

##### 4.1.2.8 Coding of packet X/28

The page shall include a packet X/28/0 format 1 to define unambiguously the page type and its coding. The general coding of a packet X/28/0, format 1, is defined in 9.4.2 of ETSI EN 300 706. The coding of the packet defined here in Table 1 replaces the generic Page Format-Clear coding specified in ETSI EN 300 708.

**Table 1 – Coding of Packet 28/0, format 1**

Triplet	Bits	Function
1	1-4	<b>Page function</b> These bits define the function of the data in packets 1 up to 25 of the page. They shall be set to the value 1 100 as allocated in ETSI EN 300 706 to indicate a page containing trigger messages defined according to IEC 62297-1
1	5-7	<b>Page coding</b> These bits define the coding of packets 1 up to 25 of the page. They shall be set to the value 011 as allocated in ETSI EN 300 706 to indicate that the packets are coded in the Hamming 8/4 format
1	8-18	Set to 11111111100 (bits 8 to 18). This value is chosen to ensure existing data broadcasting decoders, designed to Clause 5 of ETSI EN 300 708, ignore this page
2-13	1-18	<b>Reserved for future use</b>

#### 4.1.2.9 Coding of packet X/1 to X/25

Packets X/1 to X/25 carry the data stream formed from Application Data Blocks and Bundle Information Structures. One or more Block Separator bytes (value = 0xA1), as defined in 4.3.2.3 of ETSI EN 300 708, shall be inserted before each Structure Header. The first data byte of the packet contains the Block Pointer value, as defined in 4.3.2.4 of ETSI EN 300 708. This indicates the location in the packet of the first Block Separator byte, if present.

#### 4.1.3 Transmission aspects

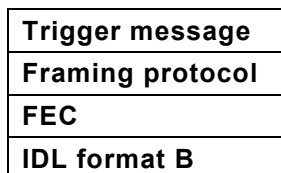
A page encoded in the Page Format-Clear protocol can be transmitted in several fragments. The decision whether or not to allow the page to be transmitted without a 20 ms delay between the packet X/0 and the remaining packets is left open and should be defined by the application.

Transmitting a page comprising a packet X/0, a packet X/28/0 format 1 and a single Bundle Information Structure starting in packet X/1 shall signal the presence of an inactive trigger service. Such a page should be broadcast at least once every teletext cycle ( $\pm 20$  s).

### 4.2 Independent data line method

IDL format B, fully defined in 6.8 of ETSI EN 300 708, allows serial data to be broadcast in an efficient way. A Forward Error Correcting (FEC) algorithm protects the user data.

To broadcast trigger messages, a serial data stream is formed from one or more trigger messages. The protocol stack is shown in Figure 1.

**Figure 1 – Protocol stack**

#### 4.2.1 Maximum length of a trigger message

The use of IDL format B does not place an upper limit on the size of a trigger message.

#### 4.2.2 Data stream

A data stream is formed from one or more trigger messages. The data stream is transmitted in the User Data bytes of the IDL.

The 8-bit data bytes of a trigger message are not modified or encoded in any way in preparation for transmission.

To allow a receiver to identify the start and finish of individual trigger messages, successive instances are delimited in the following manner, making special use of the code values 0xC0 and 0xDB.

- a) The code 0xC0 is used as a delimiter between messages and shall not appear in the data stream anywhere else. It shall be inserted immediately before the start of any trigger message. If a data byte within a trigger message has the code value 0xC0, it shall be replaced by the two-byte sequence 0xDB, 0xDC.
- b) If a data byte within a trigger message has the code value 0xDB, it shall be replaced by the two-byte sequence 0xDB, 0xDD.
- c) Any number of 0xC0 bytes may be inserted between trigger messages, allowing the byte to be used as a "time filler" if required. As a minimum, a single instance shall be inserted between successive trigger messages.

NOTE Conceptually, the substitution of bytes in the data stream with values 0xC0 and 0xDB during the encoding process is carried out once the data stream has been assembled. Thus, the substitution process does not alter the value of any message size, length or checksum values, etc. Accordingly, a receiver should substitute the sequences 0xDB, 0xDC and 0xDB, 0xDD with the appropriate single byte values before checking message sizes or checksums.

#### 4.2.3 Packet structure

The packet structure of an IDL format B is specified in 6.8.1 of ETSI EN 300 708.

##### 4.2.3.1 Data Channel and Designation Code

The four message bits of the Hamming 8/4 encoded Designation Code field shall be set to 1111 to specify an IDL. The possible values for the Data Channel are specified in 6.4.2 of ETSI EN 300 708. No more than one Data Channel shall transmit trigger services.

##### 4.2.3.2 Format Type

The four message bits of the Hamming 8/4 encoded Format Type byte in an IDL format B carrying trigger information have the function and coding shown in Table 2.

**Table 2 – Coding of the four message bits in the Format Type byte**

B4 (AN1)	B3 (AN0)	B2	B1	Function
0	0	0	1	Reserved for future use
0	1	0	1	Reserved for future use
1	0	0	1	Reserved for future use
1	1	0	1	Triggers in use

NOTE Bit 1 = 1, bit 2 = 0 define the IDL packet type to be Format B.