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SMPTE RECOMMENDED PRACTICE

RP 179-2002

Revision of
RP 179-1994

Dialect Specification of Page-Line Directory Index for Television, Audio and Film Time and Control Code for Video-Assisted Film Editing



Page 1 of 13 pages

1 Scope

This practice specifies a method of coding film position, film frame to video frame phase relationship, transfer sync points, and production related data into binary groups of SMPTE time and control code.

The dialect specified defines the structure of directory page-lines 0A_h to 0F_h (page 0, lines 10 through 15), 1A_h to 1F_h (page 1, lines 10 through 15), 2F_h (page 2, line 15), and D0_h to EF_h (pages 13 and 14, lines 0 through 15). This conforms to the multiplexing structure specified in ANSI/SMPTE 262M.

The page-line directory index, located in binary groups 8 and 7 of each time code frame, fully specifies the type of data stored in the remaining binary groups of that frame.

The encoding method is suitable to both linear time code (LTC) and to vertical interval time code (VITC).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the editions indicated 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.

ANSI/SMPTE 262M-1995, Television, Audio and Film — Binary Groups of Time and Control Codes — Storage and Transmission of Data

SMPTE 12M-1999, Television, Audio and Film — Time and Control Code

3 Data structure

The page-line directory index, located in binary groups 8 and 7 of each time code frame, fully specifies the type of data stored in the remaining binary groups of that frame.

Data are stored in the binary groups of time and control code as single-frame and multiframe messages. This structure is described in ANSI/SMPTE 262M. The page-line directory index, shown throughout this practice as a two-digit hexadecimal number, specifies the data stored in the remaining binary groups of time code frame.

3.1 Data types

The transfer of film to video with accompanying audio may be described by a dynamic frame-by-frame definition of the film to video transfer relationship and/or by a sync point and transfer parameters. The application will determine which combination of data is used.

3.2 Dynamic transfer data

Dynamic transfer data consists of information such as film edge numbers which are changing throughout the transfer. These data may be encoded frame by frame as detailed in clause 4.

3.3 Static production data

Static production data include items such as scene, roll, and take numbers which remain constant for a section of a transfer. The data may be encoded at the beginning, before the active portion of the transfer, or as indicated by the application. Static data types and their encoding are detailed in clause 5.

3.4 Sync point data

Sync point data define a common point among sets of dynamically changing data. Where the relationship between dynamically changing sets of data is defined and remains constant, other points prior to and after the sync point may be calculated. The data and their encoding are detailed in clause 6.

4 Dynamic film transfer data

4.1 Bit assignment

The manufacturer's edge number data are specified in the appropriate SMPTE standard for the film gauge.

The frame offset and the units and tens digits of edge number are encoded into binary groups 1 through 4 of each frame. The frame offset is the positive frame offset from the identified edge number location. It is encoded as two BCD nibbles. The range of values for the frame offset is from zero to a value dependent on the film gauge and exposure format. Since the frames tens digit will not exceed the value three, only two bits are required.

The remaining two bits in binary group 2 may be used to define the film-to-video field pulldown.

The remaining data is multiplexed into binary groups 6 and 5 with the page-line index in binary groups 8 and 7. The data encoded into binary groups shall be assigned as shown in table 1.

4.1.1 Field 1 update flag

For the transfer of film media to video, the field one update flag shall be a one if the film frame changed at the beginning of video field one.

Table 1 – Binary group bit assignment

LTC bits	VITC bits	Binary group	Assignment
4–7	6–9	1	Frames units
12–13	16–17	2	Frames tens
14	18	2	Field 2 update flag
15	19	2	Field 1 update flag
20–23	26–29	3	Edge number units
28–31	36–39	4	Edge number tens
36–39	46–49	5	Multiplexed digit 1
44–47	56–59	6	Multiplexed digit 2
52–55	66–69	7	Line index
60–63	76–79	8	Page index

4.1.2 Field 2 update flag

For the transfer of film media to video, the field two update flag shall be a one if the film frame changed at the beginning of video field two. When this flag is a one, it identifies the video frame as a hybrid of two film frames.

4.2 Multiplexed data identification

The page-line index defines the contents of the multiplexed digits as shown in table 2. These data are multiplexed into binary groups 6 and 5 with the page-line index in binary groups 8 and 7.

4.3 Manufacturer's edge number

The manufacturer's edge number consists of a manufacturer's identification code, a film emulsion type code, a batch number, and an edge number. This number comprises 14 BCD encoded digits.

A manufacturer's edge number may be replaced by an edge code and this shall be indicated by setting the manufacturer's identification code to FF(hex).

The frame offset from the edge number location and the two least significant digits of the edge number are encoded on each frame. The remaining digits of the manufacturer's edge code are multiplexed.

4.4 Footage and footage frame offset

The footage count and an offset from the footage mark are multiplexed as BCD encoded digits.

4.5 Film roll number

The film roll number is multiplexed as hexadecimal encoded digits.

4.6 Transfer data

The transfer data byte conveys specific information about the film transfer. The interpretation of this data byte is shown in figure 1.

4.6.1 Status bit definition

The individual bits of a 4-bit binary coded nibble define the status of film transfer data.

4.6.1.1 Edge number valid

This bit is set to one if the manufacturer's edge number is valid.

4.6.1.2 Edge number contrary count direction

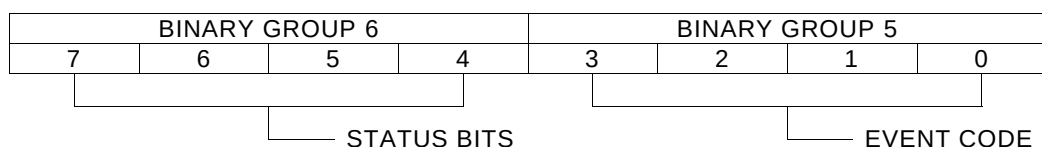
This bit is set to one if the edge number count direction is contrary to count direction of the time address.

4.6.2 Event code definition

A 4-bit hexadecimal coded nibble defines events which may occur during a film-to-video transfer. Only one event may be identified at a time. If two events occur simultaneously, the event with the higher number shall be encoded first unless defined otherwise by the application.

Table 2 – Multiplexed data identification

Manufacturer's edge code			
Page-line	Multiplexed data	Digit 2	Digit 1
OF	Film manufacturer code	10's	1's
OE	Emulsion type code	10's	1's
OD	Film batch	100,000's	10,000's
OC	Film batch	1000's	100's
OB	Film batch	10's	1's
OA	Film edge number	1000's	100's
Film roll number			
1F	Film roll number	1000's	100's
1E	Film roll number	10's	1's
Footage and footage frame offset			
1D	Film footage	100,000's	10,000's
1C	Film footage	1000's	100's
1B	Film footage	10's	1's
1A	Footage frame offset	10's	1's
Transfer status and event trigger			
2F	Status and event	See figure 1	



NOTES

1 Status bit	Description
7	1 = Edge number valid
6	1 = Edge number contrary count direction
5	Unassigned
4	Unassigned
2 Event code	Description
0	Unassigned
1	Speed lock achieved
2	Zero frame crossing
3	Physical film splice
4	Edge number discontinuity
5	Speed lock lost
6	Full stop
7	Edge number status change
8	GPI trigger
9	Unassigned
10 A	Unassigned
11 B	Unassigned
12 C	Unassigned
13 D	Unassigned
14 E	Unassigned
15 F	Clear multiplexed data

Figure 1 – Transfer data byte