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Video systems (625/50 progressive) – Video and accompanied data using the vertical blanking interval – Analogue interface

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

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VIDEO SYSTEMS (625/50 PROGRESSIVE) – VIDEO AND ACCOMPANIED DATA USING THE VERTICAL BLANKING INTERVAL – ANALOGUE INTERFACE

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The text of this standard is based on the following documents:

CDV	Report on voting
100/689/CDV	100/754/RVC

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

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

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

VIDEO SYSTEMS (625/50 PROGRESSIVE) – VIDEO AND ACCOMPANIED DATA USING THE VERTICAL BLANKING INTERVAL – ANALOGUE INTERFACE

1 Scope

This International Standard specifies the method of transfer of aspect ratio information code, copy control information code and other codes in the vertical blanking interval of the luminance signal.

This International Standard is applicable to the transfer of video related information with the video signal through the baseband analogue signal of 625-line/50-frame progressive scan video system between digital and analogue video equipments.

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.

ITU-R BT.1358: *Studio parameters of 625 and 525 line progressive scan television systems*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
letterbox
picture display format to display a picture with an aspect ratio greater than the screen, in such a way that empty (black) lines are added to conform to the screen

3.1.2
full format
picture display format with full screen size conforming to its scanning format

3.1.3
CGMS-A
copy generation management system on analogue video interface, for use in digital video recorders and digital video equipments

3.2 Symbols and abbreviated terms

0_h	falling sync edge
a	aspect ratio
F_S	clock frequency
LSB	Least Significant Bit
MSB	Most Significant Bit
NRZ	Non-Return-to-Zero
T_d	data bit period
T_s	sampling period

4 Defined signal

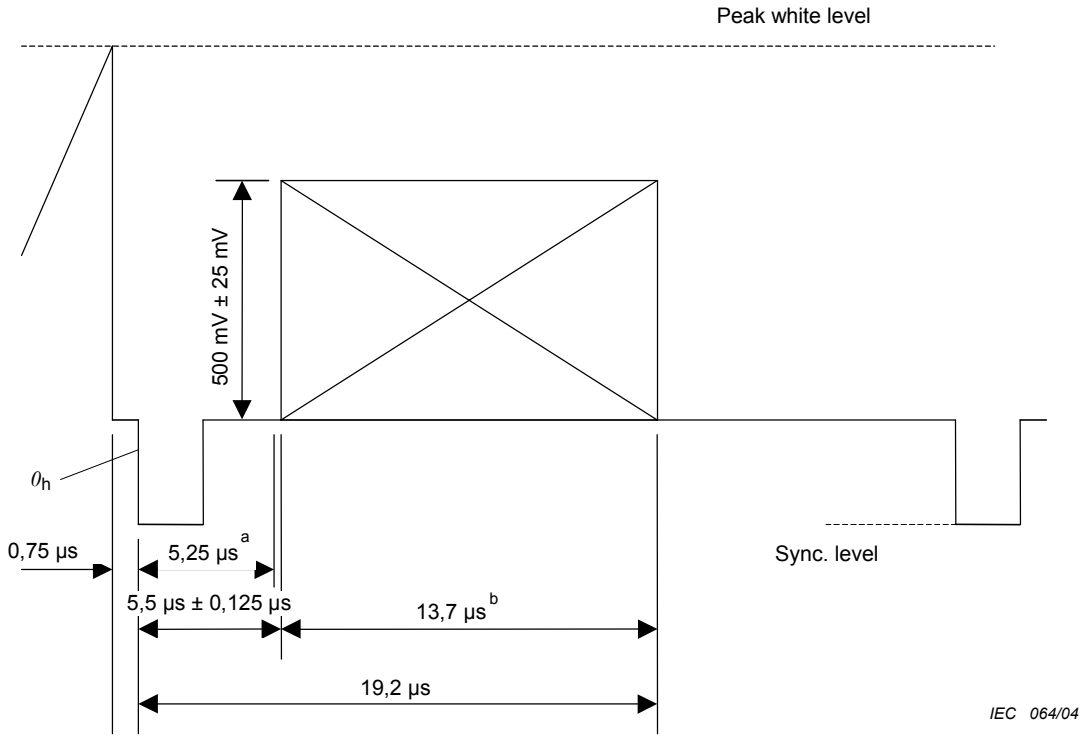
The signal defined in this standard is defined for use with systems complying with ITU-R BT.1358.

5 Construction of identification signal

5.1 Position

The identification signal bits shall be transmitted as a data burst in the first part of line 43.

The position of the beginning of the bits shall be 5,5 µs ± 0,125 µs from 0_h of the horizontal sync, as indicated in Figure 1. This figure is intended to illustrate the position of the signalling bits in line 43. In each frame, line 43 shall be occupied with this identification signal.



Key

a: Period from sync to the start point of the video effective area.

b: For optimum decoder performance, it is recommended that this period be free from other signals.

Figure 1 – Position of identification signal bits in line 43

5.2 Clock frequency

The clock frequency shall be: F_s = 10 MHz ± 1 kHz

The sampling period shall be: T_s = 100 ns

5.3 Signal amplitude

The signal amplitude with respect to maximum video signal amplitude of 700 mV shall be:

500 mV ± 25 mV

5.4 Modulation coding

Bi-phase coding shall be used in accordance with Figure 2.

Duration of one data bit: T_d

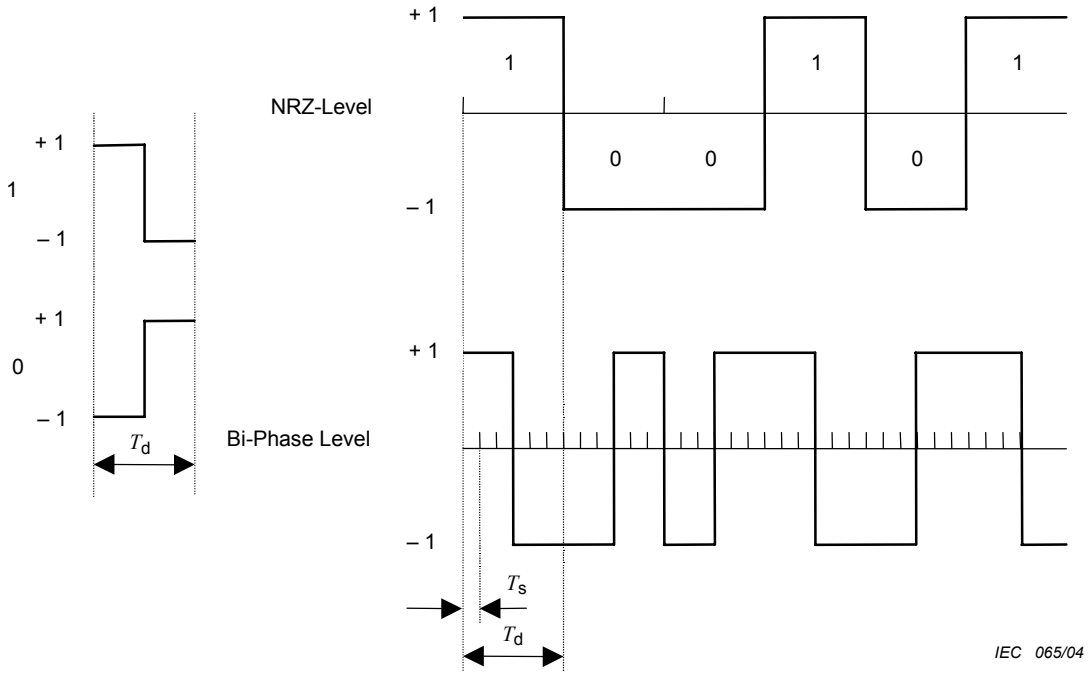


Figure 2 – Example of bi-phase-L coding

The data bits shall be inserted in bi-phase-L, in which one data bit period equals 2 × 3 clock periods, whereby

$$T_d = 6\ T_s$$

5.5 Preamble

The preamble contains a run-in and a start code. The preamble shall be in accordance with Table 1.

5.6 Data bits

There shall be 14 bits in total. 1 out of these 14 bits shall be allocated to the error detection code. There shall be 13 data-bits available for transmission of information.

Table 1 – Identification signal bits transmission scheme

Identification signal bits transmission					
Insertion: line 43	Coding: Bi-phase modulation coding		Clock: 10 MHz (T_s = 100 ns)		
Run-in	**Start code**	**Group 1 aspect ratio**	**Group 2 reserved**	**Group 3 subtitles**	**Group 4 others**
29 elements based on 10 MHz	24 elements based on 10 MHz	24 elements based on 10 MHz	24 elements based on 10 MHz	18 elements based on 10 MHz	18 elements based on 10 MHz
		bit numbering 0 1 2 3 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000	bit numbering 4 5 6 7 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000	bit numbering 8 9 10 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000	bit numbering 11 12 13 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000
MSB transmitted first	MSB transmitted first	LSB transmitted first	LSB transmitted first	LSB transmitted first	LSB transmitted first
0 × 1F1C 71C7 1 1111 0001 1100 0111 0001 1100 0111 MSB LSB	0 × 1E 3C1F 0001 1110 0011 1100 0001 1111 MSB LSB	0123 bit number 0001 full format 4:3 1000 box 14:9 centre 0100 box 14:9 top 1101 box 16:9 centre 0010 box 16:9 top 1011 box > 16:9 centre 0111 full format 4:3 (shoot and protect 14:9 centre) 1110 full format 16:9 (anamorphic) b_3 = odd parity bit	b_4 = reserved set to "0" b_5 = reserved set to "0" b_6 = reserved set to "0" b_7 = reserved set to "0"	b_8 = reserved set to “0” 9 10 bit number 0 0 no open subtitles 1 0 subtitles in active image area 0 1 subtitles out of active image area 1 1 reserved	11 bit number 0 no surround sound information 1 surround sound mode 12 bit number 0 no copyright asserted or status unknown 1 copy right asserted 13 bit number 0 copying not restricted 1 copying restricted
NOTE One information bit consists of 6 elements based on 10 MHz clock. $T_d = 6T_s$ (see 3.2 and 5.4).					

6 Information content of data bits

The 13 data bits shall be grouped in 4 groups in accordance with Table 1.

Group 1 shall contain 4 bits in which the first 3 bits carry data and the last bit shall denote the odd parity bit over the first three data bits. Group 2 shall contain 4 data bits, Group 3 shall contain 3 data bits and Group 4 shall contain 3 data bits.

The data bits shall be labelled b_0 up to and including b_2 combined with b_4 up to and including b_{13}. b_3 shall be the odd parity bit as shown in Table 1 and 2. The index also indicates the order of transmission: b_0 shall be the first transmitted bit.

6.1 Data group 1, Aspect ratio

b_0, b_1, b_2: shall denote the aspect ratio label, the letterbox format and position according to Table 2.

b_3: shall denote the odd parity of b_0, b_1, b_2, b_3 according to Table 2.

Table 2 – Aspect ratio label, letterbox and position code

$b_0b_1b_2$	b_3	Aspect ratio label	Full format or letterbox	Position	No. of active lines (Note 1)
0 0 0	1	4:3	full format	not applicable	576
1 0 0	0	14:9	letterbox	centre	504
0 1 0	0	14:9	letterbox	top	504
1 1 0	1	16:9	letterbox	centre	430
0 0 1	0	16:9	letterbox	top	430
1 0 1	1	> 16:9	letterbox	centre	not defined
0 1 1	1	14:9	full format (Note 2)	centre	576
1 1 1	0	16:9	full format (anamorphic)	not applicable	576

NOTE 1 The number of active lines is only an indication for the exact aspect ratio a = 1,33, a = 1,57 and a = 1,78.

NOTE 2 The actual transmitted aspect ratio is 4:3, but a 14:9 centre window should contain all the relevant picture content to encourage a wide screen display on a 16:9 television set.

The aspect ratio label indicates a range of possible aspect ratios. All aspect ratios falling in these ranges shall be labelled by the same code. Table 3 indicates the aspect ratio ranges.

Table 3 – Aspect ratio ranges

Aspect ratio label	Aspect ratio range	Active lines
4:3	$a \leq 1,46$	527 to 576
14:9	$1,46 < a \leq 1,66$	463 to 526
16:9	$1,66 < a \leq 1,90$	405 to 462
> 16:9	$a > 1,90$	< 405

6.2 Data group 2, reserved

b_4, b_5, b_6, b_7: reserved, set to "0."

6.3 Data group 3, subtitles

6.3.1 Reserved

b_8: reserved, set to "0."

6.3.2 Subtitling mode

b_9, b_{10}: shall denote the mode of subtitling in accordance with Table 4.

Table 4 – Subtitling mode

b_9 b_{10}	subtitles in/out of active image area
0 0	no open subtitles
1 0	subtitles in active image area
0 1	subtitles out of active image area
1 1	reserved
NOTE The "out of active image area" subtitling, which extends into the active image area shall be treated as "out of active image area".	

Figure 3 indicates the meaning of the terms "in active image area" and "out of active image area."

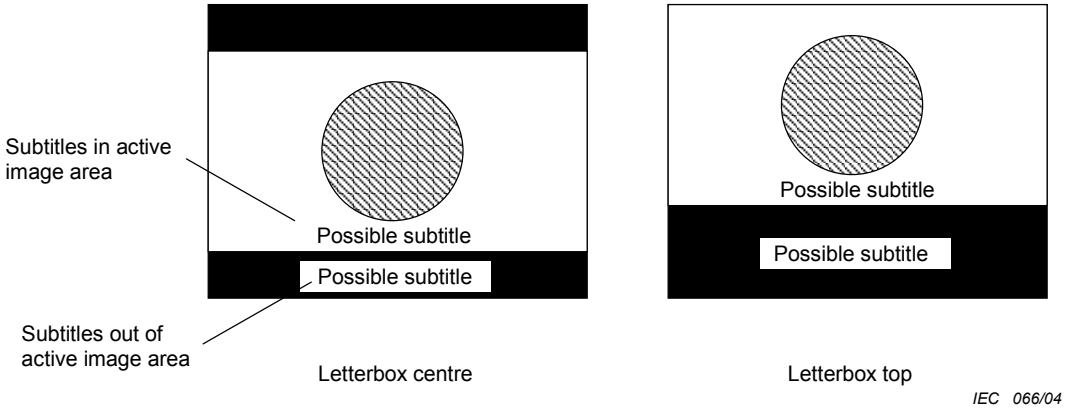


Figure 3 – Examples of letter box signals with subtitling

6.4 Data group 4, surround sound and CGMS-A

6.4.1 Surround sound bit

b_{11}: shall denote the surround sound bit in accordance with Table 5.

Table 5 – Surround sound bit

b_{11}	Surround sound bit
0	no surround sound information
1	surround sound mode

6.4.2 CGMS-A information

b_{12}, b_{13}: shall denote the CGMS-A information bit in accordance with Table 6.

Table 6 – CGMS-A information

b_{12}	Copyright bit
0	no copyright asserted or status unknown
1	copyright asserted
b_{13}	generation bit
0	copying not restricted
1	copying restricted

Annex A
(informative)

Rules of operation

A.1 Receiver display formats

To ensure automatic selection of the most appropriate display mode, the receiver with a 16:9 display should comply with the minimum requirements given in Table A.1.

Table A.1 – Aspect ratio minimum requirements

$b_0b_1b_2$	Aspect ratio label	Minimum requirements
0 0 0	4:3	case 1
1 0 0	14:9	case 2
0 1 0	14:9	case 2
1 1 0	16:9	case 3
0 0 1	16:9	case 3
1 0 1	> 16:9	case 4

Case 1: 4:3 Full format: The 4:3 aspect ratio picture should be displayed centred with black bars at the left and right hand side of the display.

Case 2: Letterbox signalled as 14:9: the 14:9 aspect ratio picture should be displayed using one of the following two methods:

a) the 14:9 aspect ratio picture should be displayed centred with small bars at the left and right hand sides of the display;

b) the 14:9 picture may be displayed filling the full width of the visible screen by incorporating a small horizontal geometrical error, typically 8 %.

Case 3: Letterbox signalled as 16:9: the 16:9 aspect ratio picture should be displayed using the full width of the screen.

Case 4: Letterbox signalled as > 16:9: the > 16:9 aspect ratio picture should be displayed using one of the following two methods:

a) as under case 3;

b) the > 16:9 picture may be displayed using the full height of the screen, by further zooming in.

It should be noted that the viewer should be free to override the automatically selected display condition.

The speed of the automatic change of aspect ratio is limited mainly by the response time of the deflection circuit.

A.2 Procedure in absence of identification signal

In the absence of signalling bits, the receiver should go to its default mode.

Annex B
(informative)

Recommendation - Response time on a change in the received identification signal

The maximum response time on a change in the received status bits signalling information is recommended to be: 120 ms.

Annex C
(informative)

Guideline - CGMS-A information

The setting of data bit b_{13} to "0" does not mean that there are no constraints on the use of the programme material if copied (as is the case in the absence of signalling bits).
$[b_{12}b_{13}]$ = [00] is identical to the absence of signalling bits (see Clause A.2).

Bibliography

ETSI EN 300 294: Television systems - *625-line television Wide Screen Signalling (WSS)*

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