High-Definition Multimedia Interface

Specification Version 1.4a

Extraction of 3D Signaling Portion

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Preface

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Contact Information

The URL for the HDMI Founders web site is: http://www.HDMI.org.

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Purpose and organization of this document

The purpose of this document is to provide public access to the 3D portion of version 1.4a of the HDMI specification for those companies and organizations that require access to this portion of the specification but have not executed an HDMI Adopter Agreement.

The organization of this document is based directly on the organization and section numbers contained in version 1.4a of the HDMI Specification. Information has been extracted from version 1.4a of the HDMI Specification with no change to section numbers.

Resolution of Conflicts

This document strives for consistency with the HDMI Specification. However, in the event of any conflicting provisions between this document and the HDMI Specification, the provisions set forth in the HDMI Specification shall prevail.

Please Note: Use of the HDMI Vendor Specific Data Block and HDMI Vendor Specific InfoFrame as defined by the HDMI 1.4a Specification ensures interoperability. Non-compliant use of the HDMI Vendor Specific Data Block and HDMI Vendor Specific InfoFrame can create interoperability problems.

8 Control And Configuration

8.2.3 HDMI Vendor Specific InfoFrame

This is a CEA-861 Vendor Specific InfoFrame containing a 24-bit IEEE Registration Identifier of 0x000C03, a value belonging to HDMI Licensing, LLC. The content of this InfoFrame is defined by this specification.

The transmission of this InfoFrame is optional for the source device. But if a source device outputs a video signal which is defined in this section 8.2.3, the source shall transmit this packet. Whenever this packet is transmitted, an accurate HDMI Vendor Specific InfoFrame shall be transmitted at least once per two Video Fields.

It is optional for a Sink to interpret this packet. The data in the AVI InfoFrame packet remains valid even if the HDMI Vendor Specific InfoFrame is transmitted.

The packetization of this HDMI Vendor Specific InfoFrame is defined below.

Table 8-10 HDMI Vendor Specific InfoFrame Packet Header

Byte \ Bit #	7	6	5	4	3	2	1	0
HB0	Packet Type = 0x81							
HB1	Version = 0x01							
HB2	0	0	0	Length = Nv				

Table 8-11 HDMI Vendor Specific InfoFrame Packet Contents

Packet Byte #	7	6	5	4	3	2	1	0
PB0	Checksum							
PB1	24bit IEEE Registration Identifier (0x000C03) (least significant byte first)							
PB2								
PB3								
PB4	HDMI_Video_Format			Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)
(PB5)	(Refer to HDMI Specification Version1.4a)							
	3D_Structure				Reserved(0)			
(PB6)	3D_Ext_Data				Reserved(0)			
.. PB(Nv)	Reserved (0)							

- Length [5bits] This 5 bits field defines the length of HDMI vendor specific InfoFrame payload.
- HDMI_Video_Format [3bits] This value defines the structure of extended video formats exclusively defined within this HDMI specification.

Table 8-12 HDMI_Video_Format

Value [2…0]	description
000	No additional HDMI video format is presented in this packet.
001	(Refer to HDMI Specification Version1.4a) 1 byte of parameter value follows.
010	3D format indication present. 3D_Structure, and potentially 3D_Ext_Data, follows.
011 ~ 111	Reserved for future use

- 3D_Structure [4bits] This 4 bit field defines the transmission format of 3D video data. The value of “0000” means the Frame packing structure described in this section. The value of “1000” means the Side-by-Side (Half) structure described in this section. The value of “0110” means the Top-and-Bottom[1] structure described in this section. For other values, see Appendix H (Table H-2).

Table 8-13 3D_Structure

Value	Meaning
0000	Frame packing
0001 ~ 0101	Reserved for future use
0110	Top-and-Bottom
0111	Reserved for future use.
1000	Side-by-Side (Half)
1001 ~ 1111	Reserved for future use

For Side-by-Side (Half), the original left and right pictures are sub-sampled to half resolution on the horizontal axis. Sub-sampled pictures are arranged in Side-by-Side layout. See Figure 8-5.

For Top-and-Bottom, the original full left and right pictures are sub-sampled to half resolution on the vertical axis. Sub-sampled pictures are arranged in Top-and-Bottom layout. See Figure 8-6.

- 3D_Ext_Data [4bits] The meaning of this field depends on the 3D_Structure value. If 3D_Structure is 1000 (Side-by-Side (Half)), the 3D_Ext_Data field is added in the HDMI Vendor Specific InfoFrame and shall be 00XX (i.e. from 0000 to 0011, horizontal sub-sampling). For other values, see Appendix H.
  If 3D_Structure is 1001~1111, the 3D_Ext_Data field is also added and indicates additional information about the 3D format.
  If 3D_Structure is 0000~0111, the 3D_Ext_Data field shall not be present.

8.2.3.2 3D video format structure

The 3D video format is indicated using the VIC (Video Identification Code) in the AVI InfoFrame (indicating the video format of one of the 2D pictures, as defined in CEA-861-D or Table 8-4) in conjunction with the 3D_Structure field in the HDMI Vendor Specific InfoFrame (indicating the 3D structure).

Frame packing is one of the HDMI 3D video format structures indicated by the 3D_Structure field and is composed of two stereoscopic pictures: Left and Right, defined as shown in Figure 8-3.

[1] In this specification the term “Top-and-Bottom” is used to describe this 3D structure; it is equivalent to the term "Over-Under" that is often used in other literature.

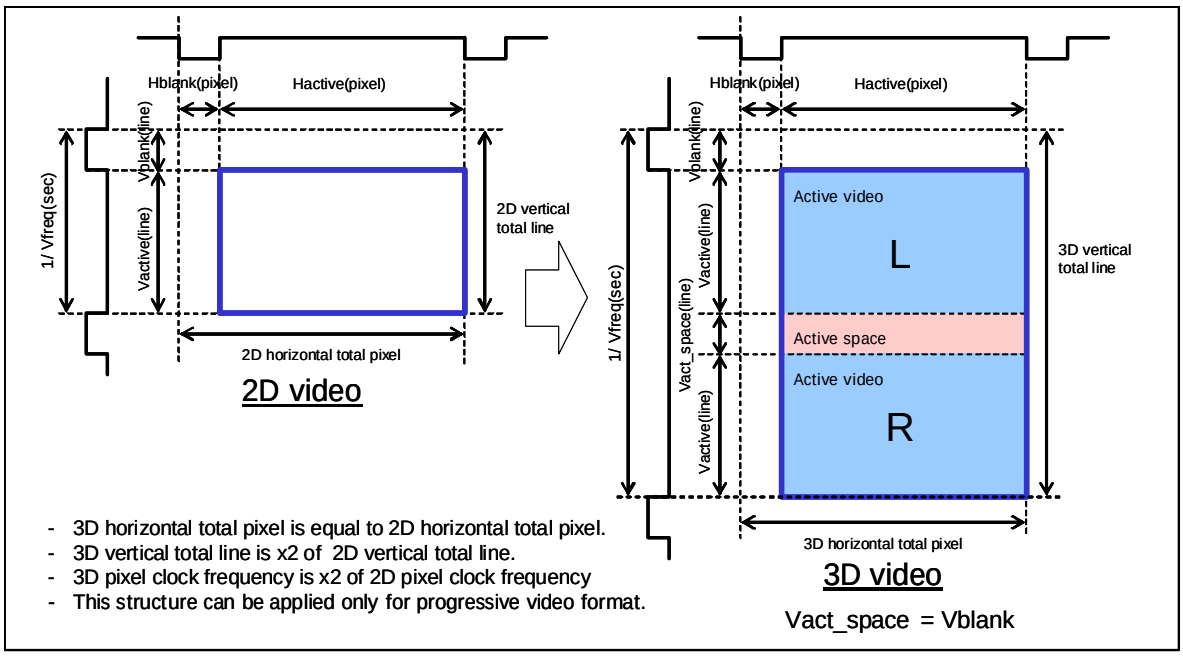


Figure 8-3 3D structure (Frame packing for progressive format)

In this figure, the area inserted between the two Active video regions is designated as “Active space”. This Active space area shall be encoded in the same manner as the adjoining Active video regions. During the Active space, an HDMI Source shall transmit a constant pixel value. HDMI Sinks shall ignore all data received during the Active space regardless of the value.

Frame packing may also be applied for interlaced video timing formats. Figure 8-4 shows the 3D structure for interlaced video timing formats.

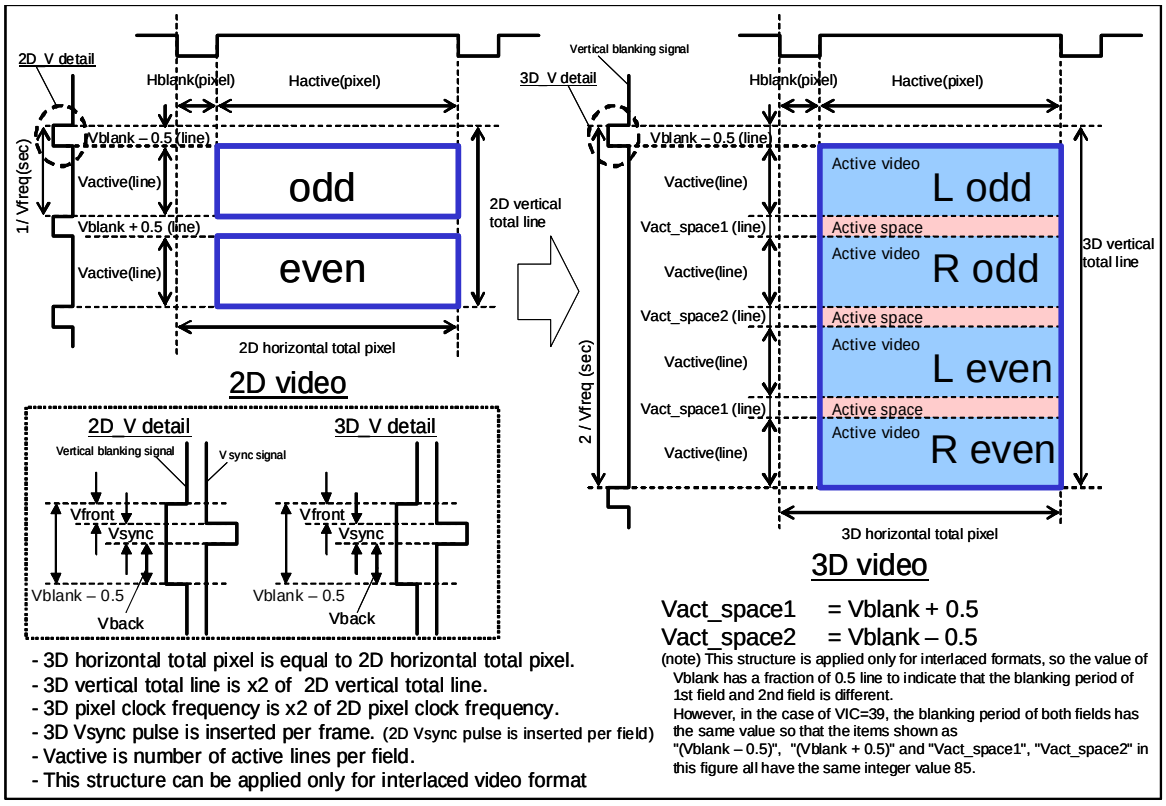


Figure 8-4 3D structure (Frame packing for interlaced format)

Side-by-Side (Half) is one of the HDMI 3D video format structures indicated by the 3D_Structure field and is composed of two stereoscopic pictures: Left and Right which are sub-sampled to half resolution on the horizontal axis, and defined as shown in Figure 8-5.

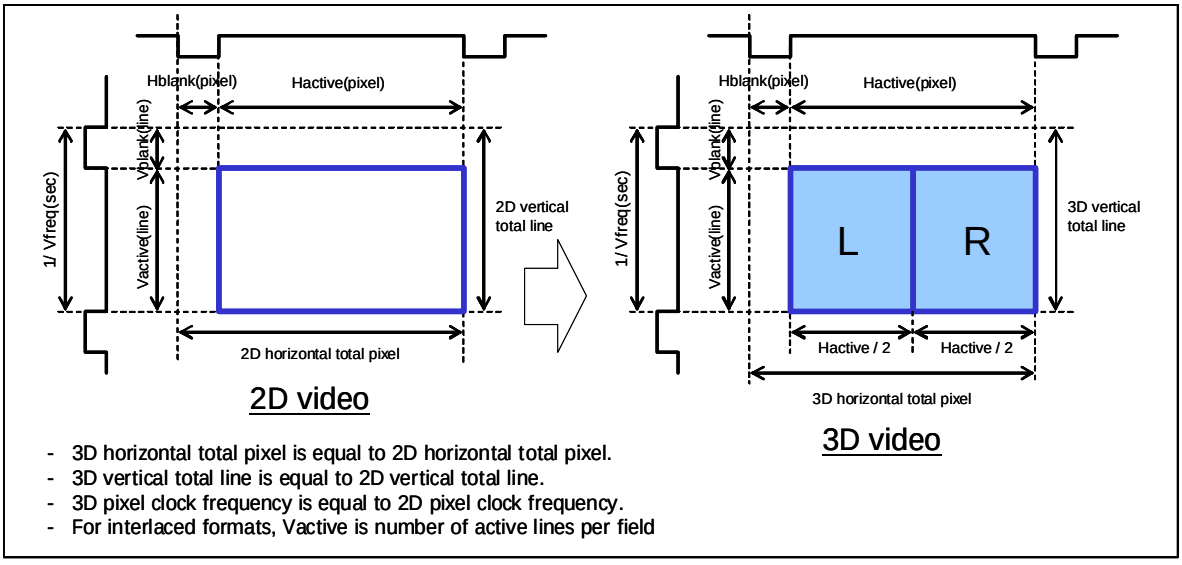


Figure 8-5 3D structure (Side-by-Side (Half))

Top-and-Bottom is one of the HDMI 3D video format structures indicated by the 3D_Structure field and is composed of two stereoscopic pictures: Left and Right, which are subsampled to half resolution on the vertical axis, and defined as shown in Figure 8-6.

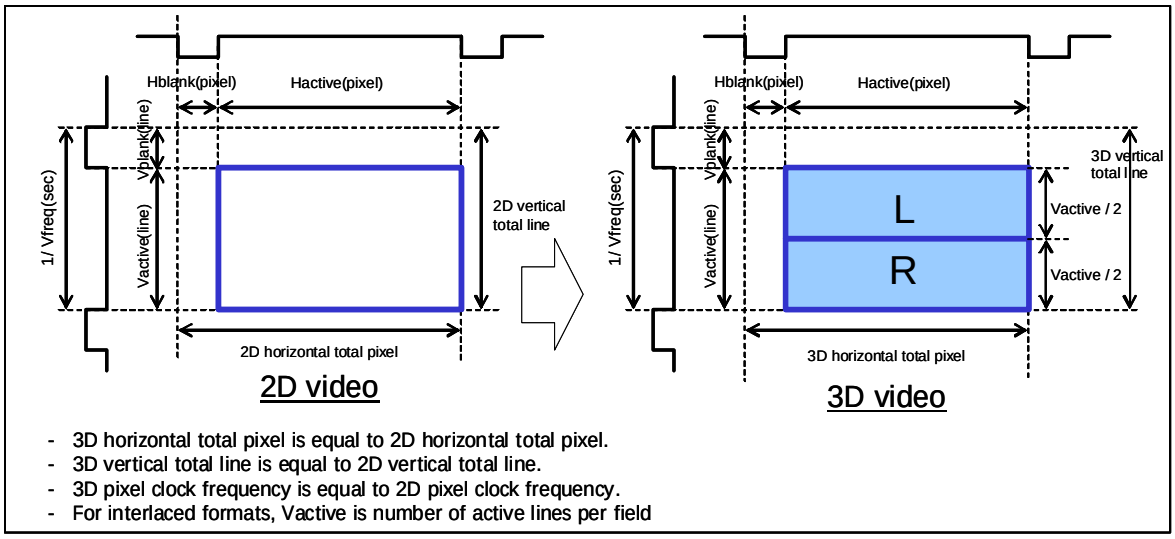


Figure 8-6 3D structure (Top-and-Bottom)

Table 8-15 shows the detailed timing of the 3D video formats for some VICs. Figure 8-7 shows the meaning of several parameters in Table 8-15.

If an HDMI Source has the 3D Video Format capability, then the HDMI Source shall support transmission for at least one of the formats listed in Table 8-15.

Table 8-15 3D transmission video formats

3D _Structure	VIC	description	Hactive	Hblank			
					Hfront	Hsync	Hback
0000 (Frame packing)	32	1080p, 23.98 / 24Hz	1920	830	638	44	148
	4	720p, 59.94 / 60Hz	1280	370	110	40	220
	19	720p, 50Hz	1280	700	440	40	220
1000 (Side-by-Side (Half))	5	1080i, 59.94 / 60 Hz	1920	280	88	44	148
	20	1080i, 50 Hz	1920	720	528	44	148
0110 (Top-and-Bottom)	32	1080p, 23.98 / 24Hz	1920	830	638	44	148
	4	720p, 59.94 / 60Hz	1280	370	110	40	220
	19	720p, 50Hz	1280	700	440	40	220

(Continued)

Vactive	Vact_ space	Vblank				Pixel freq (MHz)	V freq (Hz)
			Vfront	Vsync	Vback		
1080	45	45	4	5	36	148.35 / 148.50	23.976 / 24.000
720	30	30	5	5	20	148.35 / 148.50	59.940 / 60.000
720	30	30	5	5	20	148.50	50.000
540	n.a.	22(field1) 23(field2)	2 2.5	5 5	15 15.5	74.176 / 74.25	59.940 / 60.000
540	n.a.	22(field1) 23(field2)	2 2.5	5 5	15 15.5	74.25	50.000
1080	n.a.	45	4	5	36	74.176 / 74.25	23.976 / 24.000
720	n.a.	30	5	5	20	74.176 / 74.25	59.940 / 60.000
720	n.a.	30	5	5	20	74.25	50.000

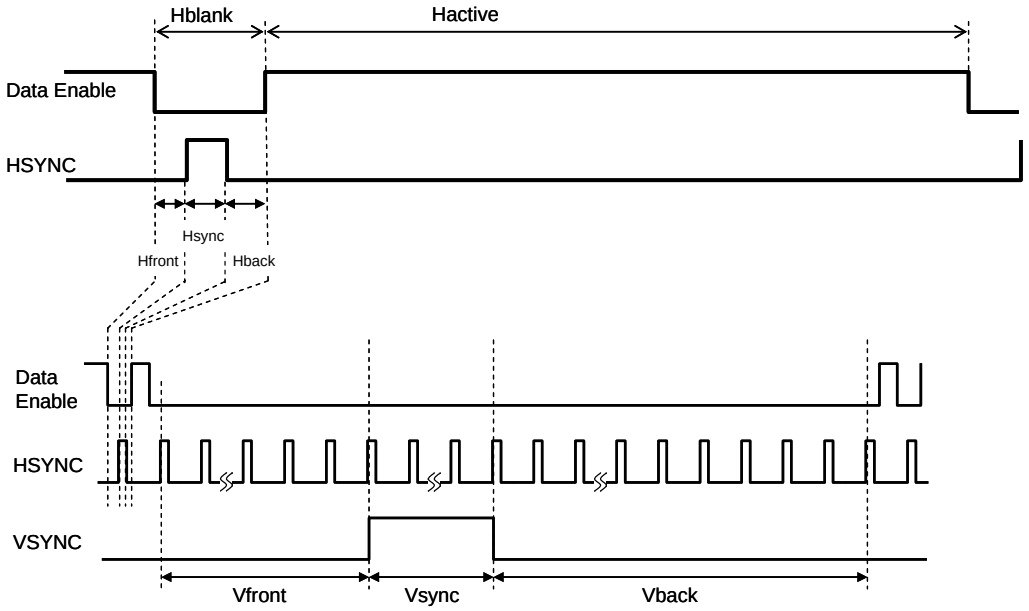


Figure 8-7 Detailed timing parameters

Note that the Frame packing 3D structure, the Side-by-Side (Half) 3D structure, and the Top-and-Bottom 3D structure may also be used optionally with VIC codes other than those mentioned in Table 8-15.

Primary 3D Video Format Timings

- 1280x720p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 23.98/24Hz (Frame Packing)
- 1280x720p @ 29.97/30Hz (Frame Packing)
- 1920x1080i @ 59.94/60Hz (Frame Packing, Side-by-Side(Half))
- 1920x1080i @ 50Hz (Frame Packing, Side-by-Side(Half))
- 1920x1080p @ 23.98/24Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080p @ 29.97/30Hz (Frame Packing, Top-and-Bottom)
- 1920x1080p @ 59.94/60Hz (Top-and-Bottom)
- 1920x1080p @ 50Hz (Top-and-Bottom)

Secondary 3D Video Format Timings

- 640x480p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080i @ 59.94/60Hz (Top-and-Bottom)

- 720x480p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x480i @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080i @ 50Hz (Top-and-Bottom)
- 720x576p @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x576i @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x240p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 2880x480i @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 2880x240p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1440x480p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half))
- 720(1440)x288p @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 2880x576i @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 2880x288p @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1440x576p @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080p @ 50Hz (Frame Packing, Side-by-Side(Half))
- 1920x1080p @ 25Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080p @ 29.97/30Hz (Side-by-Side(Half))
- 2880x480p @ 59.94/60Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 2880x576p @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080i (1250 total) @ 50Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x480i@ 119.88/120Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720x480p @ 119.88/120Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080i @ 119.88/120Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 119.88/120Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x480i@ 239.76/240Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720x480p @ 239.76/240Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x576i @ 100Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720x576p @ 100Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1920x1080i @ 100Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 100Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720(1440)x576i @ 200Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 720x576p @ 200Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 23.98/24Hz (Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 25Hz (Frame Packing, Side-by-Side(Half), Top-and-Bottom)
- 1280x720p @ 29.97/30Hz (Side-by-Side(Half), Top-and-Bottom)

- 1920x1080p @ 119.88/120Hz (Side-by-Side(Half), Top-and-Bottom)
- 1920x1080p @ 100Hz (Side-by-Side(Half), Top-and-Bottom)

An HDMI Source shall not send any 3D video format to a Sink that does not indicate support for that format.

Additional 3D video formats may be specified in a future version. See Appendix H.

8.3 E-EDID Data Structure

8.3.2 HDMI Vendor-Specific Data Block (HDMI VSDB)

The first CEA Extension shall include an HDMI Vendor Specific Data Block (HDMI VSDB) shown in Table 8-16.This is a CEA-861-D Vendor Specific Data Block (see CEA-861-D section 7.5.4 for details) containing a 24-bit IEEE Registration Identifier of 0x000C03, a value belonging to HDMI Licensing, LLC.

Sinks shall contain an HDMI VSDB minimally containing a 2-byte Source Physical Address field following the 24-bit identifier. An HDMI VSDB may have zero or more extension fields as shown in Table 8-16. The minimum value of N (length) is 5 and the maximum value of N is 31. A Sink that supports any function indicated by an extension field shall use an HDMI VSDB with a length sufficient to cover all supported fields.

The Source shall have the ability to handle an HDMI VSDB of any length. In future specifications, new fields may be defined. These additional fields will be defined such that a zero value indicates the same characteristics as is indicated if the field was not present. Sources should use the length field to determine which extension fields are present, and shall process the HDMI VSDB with no regard to non-zero values in fields defined as Reserved in this specification.

Table 8-16 HDMI-LLC Vendor-Specific Data Block (HDMI VSDB)

Byte #	7	6	5	4	3	2	1	0
0	Vendor-specific tag code (=3)				Length (=N)			
1	24-bit IEEE Registration Identifier (0x000C03) (least significant byte first)							
2								
3								
4	A				B			
5	C				D			
6	Supports_AI	DC_48bit	DC_36bit	DC_30bit	DC_Y444	Rsvd (0)	Rsvd (0)	DVI_Dual
7	Max_TMDS_Clock							
8	Latency_Fields_Present	I_Latency_Fields_Present	HDMI_Video_present	Rsvd (0)	CNC3	CNC2	CNC1	CNC0
(9)	Video_Latency							
(10)	Audio_Latency							
(11)	Interlaced_Video_Latency							
(12)	Interlaced_Audio_Latency							
(13)	3D_present	3D_Multi_present		Image_Size		Rsvd (0)	Rsvd (0)	Rsvd (0)
(14)	HDMI_XX_LEN				HDMI_3D_LEN			
(15)	(if HDMI_XX_LEN > 0) (Refer to HDMI Specification Version1.4a)							
…	…							
	(if 3D_Multi_present = 01 or 10) 3D_Structure_ALL_15…8							
	3D_Structure_ALL_7…0							
	(if 3D_Multi_present = 10) 3D_MASK_15…8							
	3D_MASK_7…0							
	2D_VIC_order_1				3D_Structure_1			
	3D_Detail_1 ***				Reserved(0) ***			

extension fields ↓

	…
	2D_VIC_order_L | 3D_Structure_L
( )*…N	*Reserved (0)***

* *The position of these bytes will depend upon the values of Latency_Fields_Present, I_Latency_Fields_Present and HDMI_Video_present.*

** *No additional bytes are necessary but if present, they shall be zero.*

*** *The bytes with 3D_Detail_X and Reserved(0) are present only for some values of 3D_Structure_X. See below for details*

- HDMI_Video_present [1bit] If set (=1) then additional video format capabilities are described by using the fields starting after the Latency area. This consists of 4 parts with the order described below:
  - 1 byte containing the 3D_present flag and other flags
  - 1 byte with length fields HDMI_XX_LEN and HDMI_3D_LEN
  - zero or more bytes
    (length of this field is indicated by HDMI_XX_LEN).
  - zero or more bytes for information about 3D formats supported
    (length of this field is indicated by HDMI_3D_LEN)
    which are optionally composed of 3D_Structure_ALL_15...0,
    3D_MASK_15...0, 2D_VIC_order_X, 3D_Structure_X and 3D_Detail_X field.
- 3D_present [1bit] This bit indicates 3D support by the HDMI Sink, including the mandatory formats. If set (=1), an HDMI Sink supports the 3D video formats that are mandatory formats, plus any additional formats indicated by combining the indications in both:
  - 3D_Structure_ALL_15…0 (if 3D_Multi_present = 01), or
    3D_Structure_ALL_15…0 and 3D_MASK_15…0 (if 3D_Multi_present = 10);
  and
  - 2D_VIC_order_X, 3D_Structure_X and 3D_Detail_X
    (if these fields are present according to the HDMI_3D_LEN calculation).
- 3D_Multi_present [2bit]
  If 3D_Multi_present = 00
  3D_Structure_ALL_15…0 and 3D_MASK_15…0 fields are not present.
  If 3D_Multi_present = 01,
  3D_Structure_ALL_15…0 is present and assigns 3D formats to all of the VICs listed in the first 16 entries in the EDID. 3D_MASK_15…0 is not present.
  If 3D_Multi_present = 10,
  3D_Structure_ALL_15…0 and 3D_MASK_15…0 are present and assign 3D formats to some of the VICs listed in the first 16 entries in the EDID.
  If 3D_Multi_present = 11
  Reserved for future use.
  Note: 3D_Structure_ALL_15…0 and 3D_MASK_15…0 are not present.
- Image_Size [2bit] indicates additional properties of the values in the Image Size area in the EDID. (Image Size area means ‘Max Horizontal Image Size’ and ‘Max Vertical Image Size’ fields that are assigned on address 0x15 and 0x16 in VESA E-EDID specification.)

Table 8-18 Image_Size

Image_Size [1]	Image_Size [0]	Description
0	0	No additional information
0	1	Values in the Image Size area indicate correct aspect ratio but the sizes are not guaranteed to be correct.
1	0	Values in the Image Size area indicate correct sizes which are rounded to the nearest 1 centimeter (cm).
1	1	Values in the Image Size area indicate correct sizes in divided by 5 format, which are rounded to the nearest 5 centimeter (cm). This mode is used only if the real horizontal size is larger than 255cm. (Example; in the case of 150 inch 16:9 panel, the real horizontal size is 332.1cm and the value 0x42 is applied in the 'Max Horizontal Image Size' area. (332.1 div 5 = 66.4 → 66 = 0x42) And the value 0x25 is applied in the 'Max Vertical Image Size' area (186.8 div 5 = 37.36 → 37 = 0x25))

- HDMI_XX_LEN [3bits] indicates the total length of subsequent bytes. (Refer to HDMI Specification Version1.4a)
- HDMI_3D_LEN [5bits] indicates the total length of following 3D video format capabilities including 3D_Structure_ALL_15...0, 3D_MASK_15...0, 2D_VIC_order_X, 3D_Structure_X and 3D_Detail_X fields..
- 3D_Structure_ALL_15…0 [2 bytes] For each bit in this field which is set (=1), an HDMI Sink supports the corresponding 3D_Structure according to Table 8-19 for all of the VICs listed in the first 16 entries in the EDID. By using this field, the 3D capabilities of an HDMI Sink can be concisely described. For other values, see Appendix H.

Table 8-19 3D_Structure_ALL

Bit	Meaning
3D_Structure_ALL_0	Sink supports "Frame packing" 3D formats.
3D_Structure_ALL_1…5	Reserved (0)
3D_Structure_ALL_6	Sink supports "Top-and-Bottom" 3D formats
3D_Structure_ALL_7	Reserved (0)
3D_Structure_ALL_8	Sink supports "Side-by-Side(Half) with horizontal sub-sampling" 3D formats
3D_Structure_ALL_9…15	Reserved (0)

- 3D_MASK_15…0 [2 bytes] Where a bit is set (=1), for the corresponding VIC within the first 16 entries in the EDID, the Sink indicates 3D support as designated by the 3D_Structure_ALL_15…0 field.
  Where a bit is not set (=0), for the corresponding VIC, the Sink does not indicate 3D support using this field (whereas it may indicate 3D support by the 2D_VIC_order_X, 3D_Structure_X and 3D_Detail_X fields, if present).

  3D_MASK_0 = first VIC
  3D_MASK_1 = second VIC
  : : :
  3D_MASK_15 = 16th VIC

Note: The Sink shall not set the corresponding bit to 1 for cases in which the corresponding 3D video signal exceeds the clock rate at the Max_TMDS_Clock * 5MHz.

- 2D_VIC_order_X [4bits] X means the index value from 1 to L. The value of this field is a pointer to a particular VIC in the EDID based on the order in which the VICs are stored in the EDID. The value 0000 corresponds to the first VIC in the EDID, and the remaining values point to the rest of the first 15 VIC entries in the EDID in corresponding order.
  2D_VIC_order_X = 0000 corresponds to the first VIC in the EDID
  2D_VIC_order_X = 0001 corresponds to the second VIC in the EDID
  : : :
  2D_VIC_order_X = 1111 corresponds to the 16th VIC in the EDID
- 3D_Structure_X [4bits] X means the index value from 1 to L. This field indicates the 3D capability for the corresponding VIC code indicated by 2D_VIC_order_X. The value is defined in Table 8-13.
- 3D_Detail_X [4bits] X means the index value from 1 to L. This field indicates additional detailed information for the related 3D_Structure_X field.
  If 3D_Structure_X is 0000~0111, this field and also the 4-bit reserved field in the same byte, shall not be present, so the X-th entry consists only of 2D_VIC_order_X and 3D_Structure_X (1 byte).
  If 3D_Structure_X is 1000~1111 (including Side-by-Side (Half)), this field and also the 4-bit reserved field in the same byte, shall be present, so the X-th entry consists of 2D_VIC_order_X, 3D_Structure_X and 3D_Detail_X (2 bytes).
  If 3D_Structure_X is 1000, the value of this field 3D_Detail_X shall be 0001 (horizontal sub-sampling). For other values, see Appendix H.

If 3D_present is set (=1), an HDMI Sink shall support 3D video formats per the following requirements.

- An HDMI Sink which supports at least one 59.94 / 60Hz 2D video format shall support all of ;
  - 1920x1080p @ 23.98 / 24Hz Frame packing
  - 1280x720p @ 59.94 / 60Hz Frame packing
  - 1920x1080i @ 59.94 / 60Hz Side-by-Side (Half)
  - 1920x1080p @ 23.98 / 24Hz Top-and-Bottom
  - 1280x720p @ 59.94 / 60Hz Top-and-Bottom
- An HDMI Sink which supports at least one 50Hz 2D video format shall support all of ;
  - 1920x1080p @ 23.98 / 24Hz Frame packing
  - 1280x720p @ 50Hz Frame packing
  - 1920x1080i @ 50Hz Side-by-Side (Half)
  - 1920x1080p @ 23.98 / 24Hz Top-and-Bottom
  - 1280x720p @ 50Hz Top-and-Bottom

Setting 3D_present (=1) in the HDMI VSDB indicates support for the mandatory formats above and no further 3D video indication in the HDMI VSDB is required for the mandatory formats.

Additional 3D video formats may be specified in a future version. See Appendix H.

Appendix H 3D video formats extensions

Note: The following is a preliminary draft subject to change without notice. Adopter may use this in its own discretion.

H. 1 HDMI Vendor Specific InfoFrame extension

In some cases, the HDMI Vendor Specific InfoFrame packet described in section 8.2.3 is extended as follows. When HDMI_Video_Format is set to 010, the 3D_Meta_present bit may be set (=1). If the 3D_Meta_present bit is set (=1), it indicates the presence of detailed information as defined in subsection "3D_Meta fields" below.

Table H-1 HDMI Vendor Specific InfoFrame Packet Contents

Packet Byte #	7	6	5	4	3	2	1	0
PB0	Checksum							
PB1	24bit IEEE Registration Identifier (0x000C03) (least significant byte first)							
PB2								
PB3								
PB4	HDMI_Video_Format			Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)
(PB5)	(Refer to HDMI Specification Version1.4a)							
	3D_Structure				3D_Meta_present	Rsvd (0)	Rsvd (0)	Rsvd (0)
(PB6)	3D_Ext_Data				Reserved(0)			
(PB7)	3D_Metadata_type			3D_Metadata_Length (= N)				
(PB8)	3D_Metadata_1							
…	…							
(PB [7+N])	3D_Metadata_N							
PB[8+N] ~ [Nv]	Reserved (0)							

3D_Structure field

In addition to the Frame packing value “0000”, Side-by-Side (Half) value “1000” and Top-and-Bottom value “0110” specified in Section 8.2.3, additional values for 3D_Structure are defined below in Table H-2.

- 3D_Structure [4bits] This 4 bit field defines the transmission format of 3D video data.

Table H-2 3D_Structure

3D_Structure	Meaning
0000	Frame packing
0001	Field alternative
0010	Line alternative
0011	Side-by-Side (Full)
0100	L + depth
0101	L + depth + graphics + graphics-depth
0110	Top-and-Bottom
0111	Reserved for future use.
1000	Side-by-Side (Half) (See Table H-3)
1001 ~ 1110	Reserved for future use.
1111	Not in use

3D_Ext_Data field

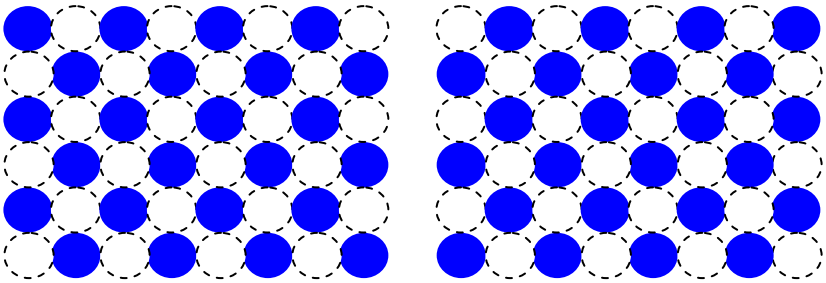
In addition to the value "00XX" (horizontal subsamling) specified in Section 8.2.3, additional values for 3D_Ext_Data are defined below in Table H-3.

- 3D_Ext_Data [4bits] The meaning of this field depends on the 3D_Structure value. If 3D_Structure is 1000 (Side-by-Side (Half)), the 3D_Ext_Data field and also the 4-bit reserved field in the same byte is added in the HDMI Vendor Specific InfoFrame and indicates additional information about the 3D format.

Table H-3 3D_Ext_Data –- Additional video format information for 3D_Structure = 1000

3D_Ext_Data	Meaning	
00XX (0000, 0001, 0010, 0011)	Horizontal sub-sampling	
0100	Quincunx matrix	Odd/Left picture, Odd/Right picture
0101		Odd/Left picture, Even/Right picture
0110		Even/Left picture, Odd/Right picture
0111		Even/Left picture, Even/Right picture
1000 ~ 1111	Reserved	

With respect to the quincunx matrix case, the sub-sampling position interchanges on every line of the original full left and right pictures as shown in Figure H-1.



Odd position Even position

Figure H-1 Quincunx sub-sampling method and its position on the original full picture

3D_Meta field

- 3D_Meta_present [1bit] if set (=1) then a few additional bytes of 3D metadata (i.e. 3D_Metadata_type, 3D_Metadata_Length and 3D_Metadata_1…N) follow in the HDMI Vendor Specific InfoFrame.
- 3D_Metadata_type [3bits] These 3 bits define an optional metadata type that accompanies the stereoscopic video for correct rendering in the display. The semantics of the bytes 3D_Metadata1…N depend on the type of data as indicated in Table H-4.

Table H-4 3D_Metadata_type

Value	Meaning
000	The following 3D_Metadata_1…N contains the parallax information as defined in ISO23002-3 sections 6.1.2.2 and 6.2.2.2
001 ~ 111	Reserved for future use

- 3D_Metadata_Length [5bits] These 5 bits show the length of following 3D_Metadata_1…N byte. In case of 3D_Metadata_type = 000, then 3D_Metadata_Length = 8 according to ISO23002-3 section 6.1.2.2.
- 3D_Metadata_1…N [N bytes] These bytes depend on 3D_Metadata_type value.
  In case of 3D_Metadata_type = 000, 3D_Metadata_1…8 is filled with following values:
  3D_Metadata_1 = parallax_zero[15…8]
  3D_Metadata_2 = parallax_zero[7…0]
  3D_Metadata_3 = parallax_scale [15…8]
  3D_Metadata_4 = parallax_scale [7…0]
  3D_Metadata_5 = dref [15…8]
  3D_Metadata_6 = dref [7…0]
  3D_Metadata_7 = wref[15…8]
  3D_Metadata_8 = wref[7…0]
  Regarding the parallax parameter, refer to ISO23002-3 section 6.2.2.2.

H. 2 3D video formats structure extension

Various 3D video formats may optionally be transmitted. The 3D video format is indicated by using the VIC field in the AVI InfoFrame in conjunction with any of the extended 3D_Structure values defined in Table H-2 in the HDMI Vendor Specific InfoFrame.

Field alternative, indicated by the 3D_Structure field =0001, is defined as shown in Figure H-2.
Line alternative, indicated by the 3D_Structure field =0010, is defined as shown in Figure H-3.
Side-by-Side (Full), indicated by the 3D_Structure field =0011, is defined as shown in Figure H-4.
L+Depth, indicated by the 3D_Structure field =0100, is defined as shown in Figure H-5.
L+Depth+Gfx+Gfx-depth, indicated by the 3D_Structure field =0100, is defined as shown in Figure H-6.

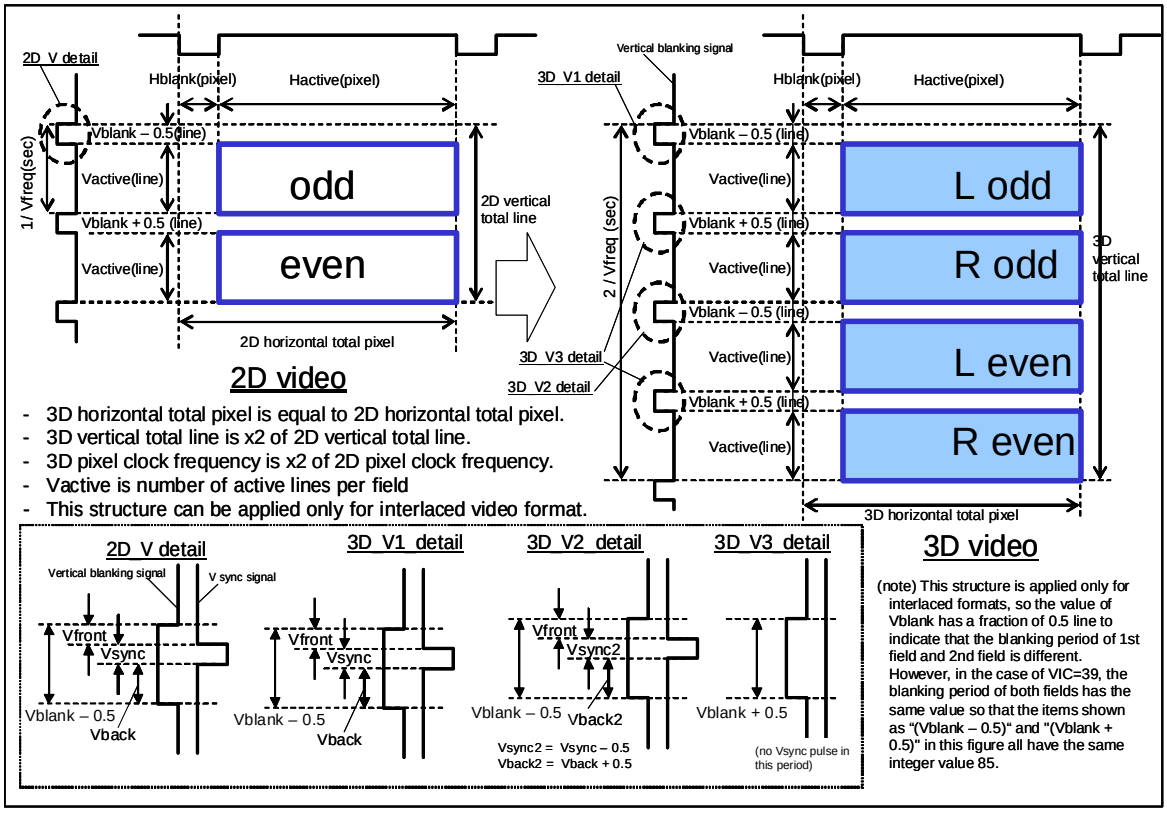


Figure H-2 3D structure (Field alternative)

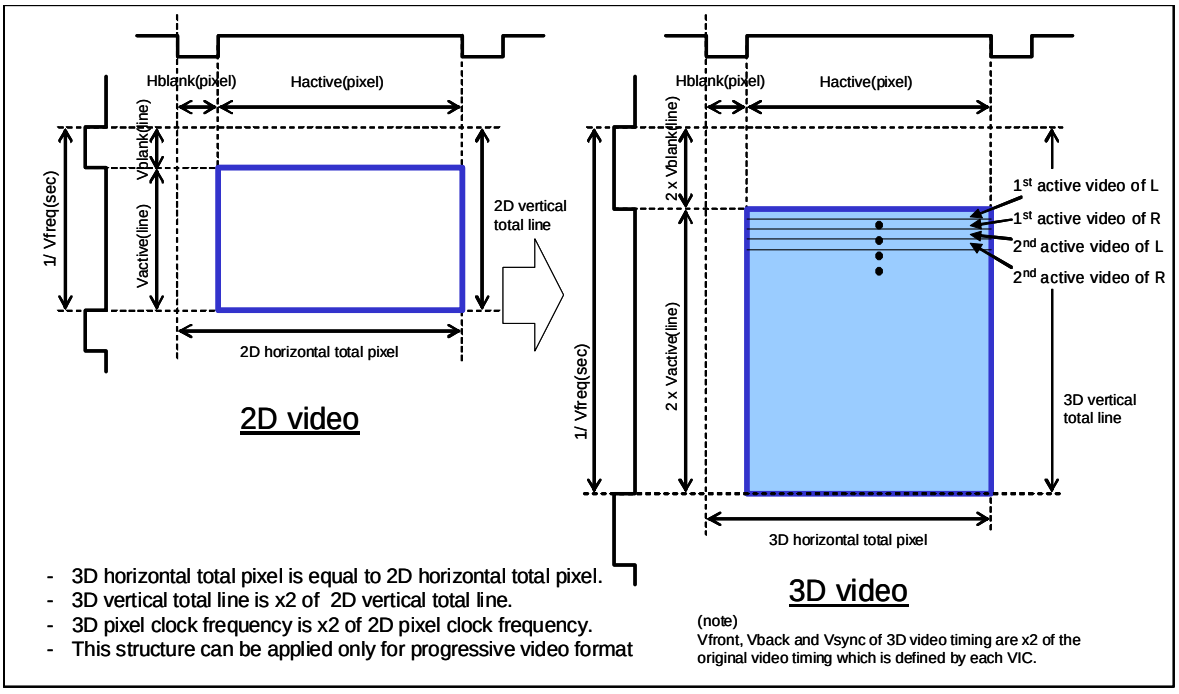


Figure H-3 3D structure (Line alternative)

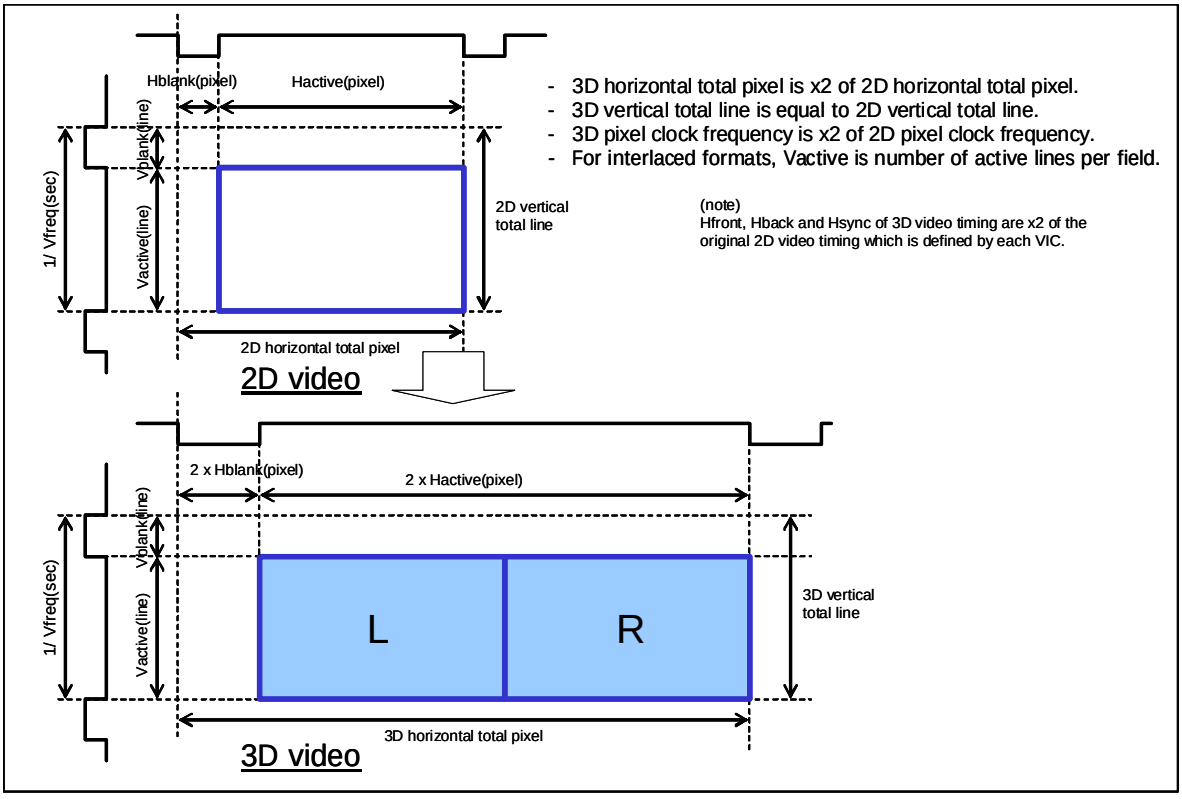


Figure H-4 3D structure (Side-by-Side (Full))

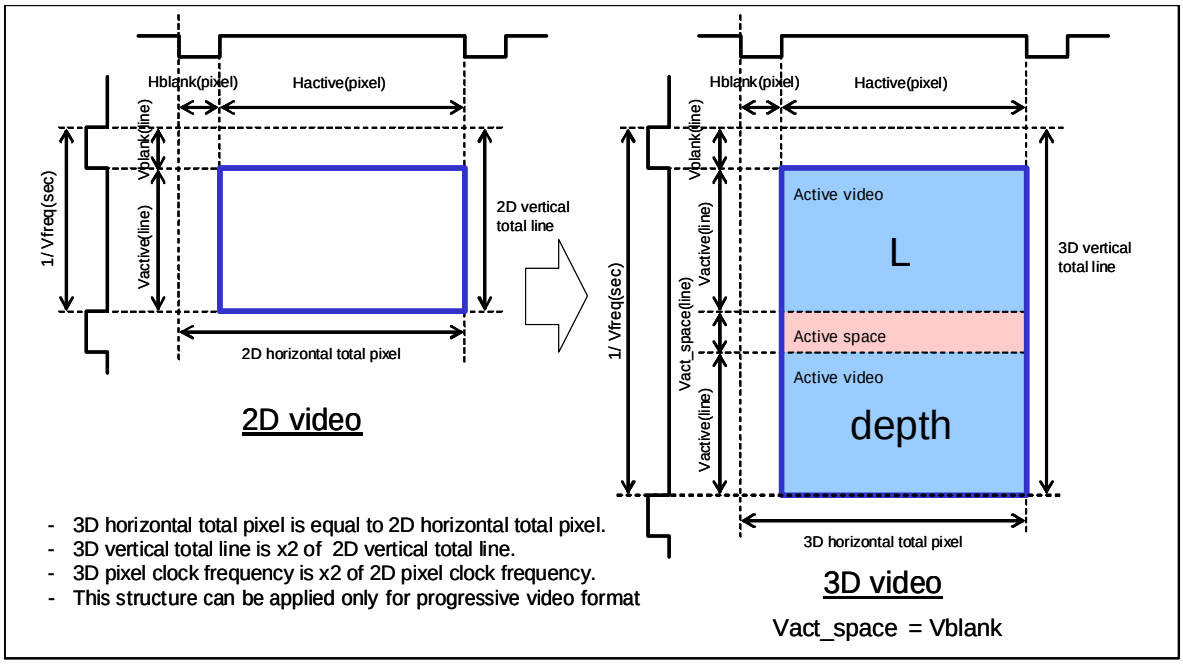


Figure H-5 3D structure (L + depth)

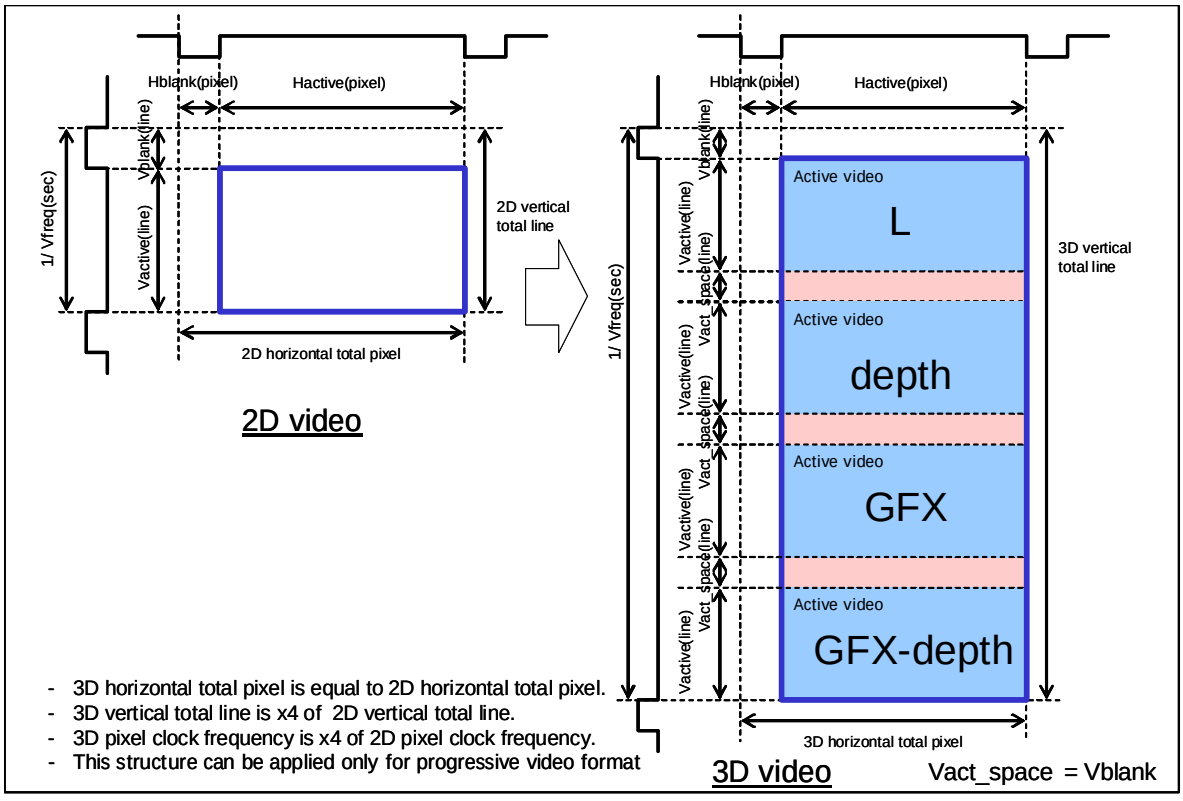


Figure H-6 3D structure (L + depth + Graphics + Graphics-depth)

The following table shows examples of 3D video formats. Other VICs can be used for 3D video formats.

Table H-5 3D transmission video size (example)

3D_structure	Corresponding figure	VIC	description	Hactive		Hblank		
						Hfront	Hsync	Hback
0001 (Field alternative)	Figure H-2	5	1080i, 60Hz	1920	280	88	44	148
		20	1080i, 50Hz	1920	720	528	44	148
0010 (Line alternative)	Figure H-3	16	1080p, 60Hz	1920	280	88	44	148
		31	1080p, 50Hz	1920	720	528	44	148
0011 (Side-by-Side(Full))	Figure H-4	16	1080p, 60Hz	1920	280	88	44	148
		31	1080p, 50Hz	1920	720	528	44	148
0100 (L+depth)	Figure H-5	19	720p, 50Hz	1280	700	440	40	220
0101 (L+depth +Gfx + Gfx-depth)	Figure H-6	19	720p, 50Hz	1280	700	440	40	220

(Continued)

3D _Structure.	Vactive	Vact_space	Vblank				Pixel freq [MHz] (note 1)	V freq (Hz) (note 1)
				Vfront	Vsync	Vback		
0001	540	n.a	22.5	2	5	15	148.50	60
	540	n.a.	22.5	2	5	15	148.50	50
0010	1080	n.a.	45	4	5	36	297.00	60
	1080	n.a.	45	4	5	36	297.00	50
0011	1080	n.a.	45	4	5	36	297.00	60
	1080	n.a.	45	4	5	36	297.00	50
0100	720	30	30	5	5	20	148.50	50
0101	720	30	30	5	5	20	297.00	50

1. V freq=60Hz and the corresponding Pixel freq include the variation of 1000/1001. The video timing for pixel and line is the same as 60Hz.

H. 3 HDMI Vendor-Specific Data Block (HDMI VSDB) extension

For some formats, additional codings are defined for certain fields in the HDMI Vendor Specific Data Block.

Table H-6 HDMI-LLC Vendor-Specific Data Block (HDMI VSDB)

Byte #	7	6	5	4	3	2	1	0
0	Vendor-specific tag code (=3)			Length (=N)				
1	24-bit IEEE Registration Identifier (0x000C03) (least significant byte first)							
2								
3								
4	A				B			
5	C				D			
6	Supports_AI	DC_48bit	DC_36bit	DC_30bit	DC_Y444	Rsvd (0)	Rsvd (0)	DVI_Dual
7	Max_TMDS_Clock							
8	Latency_Fields_Present	I_Latency_Fields_Present	HDMI_Video_present	Rsvd (0)	(Refer to HDMI Specification Version1.4a)			
(9)	Video_Latency							
(10)	Audio_Latency							
(11)	Interlaced_Video_Latency							
(12)	Interlaced_Audio_Latency							
(13)	3D_present	3D_Multi_present	Image_Size			Rsvd (0)	Rsvd (0)	Rsvd (0)
(14)	HDMI_XX_LEN		HDMI_3D_LEN					
(15)	(if HDMI_XX_LEN > 0) (Refer to HDMI Specification Version1.4a)							
…	…							
	(if 3D_Multi_present = 01 or 10) 3D_Structure_ALL_15…8							
	3D_Structure_ALL_7…0							

extension fields ↓

	(if 3D_Multi_present = 10) 3D_MASK_15…8	
	3D_MASK_7…0	
	2D_VIC_order_1	3D_Structure_1
	3D_Detail_1 ***	Reserved(0) ***
	…	
	2D_VIC_order_L	3D_Structure_L
( )*…N	*Reserved (0)***	

* *The position of these bytes will depend upon the values of Latency_Fields_Present, I_Latency_Fields_Present and HDMI_Video_present.*

** *No additional bytes are necessary but if present, they shall be zero.*

*** *The bytes with 3D_Detail_X and Reserved(0) are present only for some values of 3D_Structure_X. See below for details.*

- 3D_Structure_ALL_15…0 [2 bytes] For each bit in this field which is set (=1), an HDMI Sink supports the corresponding 3D_Structure according to Table H-7 for all of the VICs listed in the first 16 entries in the EDID.
  By using this field, the 3D capabilities of an HDMI Sink can be concisely described.

Table H-7 3D_Structure_ALL

Bit	Meaning
3D_Structure_ALL_0	Sink supports “Frame packing” 3D formats.
3D_Structure_ALL_1	Sink supports “Field alternative” 3D formats (for interlaced video timing).
3D_Structure_ALL_2	Sink supports “Line alternative” 3D formats (for progressive video timing)
3D_Structure_ALL_3	Sink supports “Side-by-Side(Full)” 3D formats
3D_Structure_ALL_4	Sink supports “L + depth” 3D formats (for progressive video timing)
3D_Structure_ALL_5	Sink supports “L + depth + graphics + graphics-depth” 3D formats (for progressive video timing)
3D_Structure_ALL_6	Sink supports “Top-and-Bottom” 3D formats
3D_Structure_ALL_7	Reserved (0)
3D_Structure_ALL_8	Sink supports “Side-by-Side(Half) with horizontal sub-sampling” 3D formats
3D_Structure_ALL_9…14	Reserved (0)
3D_Structure_ALL_15	Sink supports “Side-by-Side(Half) with all quincunx sub-sampling” 3D formats

- 3D_Structure_X [4bits] X means the index value from 1 to L. This field indicates the 3D capability for the corresponding VIC code indicated by 2D_VIC_order_X. The value is defined in Table H-2.

- 3D_Detail_X [4bits] X means the index value from 1 to L. This field indicates additional detailed information for the related 3D_Structure_X field.
  The values for 3D_Detail_X when 3D_Structure_X = 1000 are defined in Table H-8. In this case, 3D_Detail_X indicates the supported sub-sampling position(s). 3D_Detail_X = 0001 means that the Sink can handle Horizontal sub-sampling and 0110 means that the Sink can handle all four sub-sampling positions for Quincunx matrix.

Table H-8 3D_Detail_X for Side-by-Side (Half)

3D_Detail_X	Meaning of supported sub-sampling position.	
0000	Support all of the horizontal sub-sampling and four quincunx matrix	
0001	Horizontal sub-sampling	
0010 ~ 0101		Not in use [1]
0110	Quincunx matrix	Support all four combination of sub sampling position
0111		Odd/Left picture, Odd/Right picture
1000		Odd/Left picture, Even/Right picture
1001		Even/Left picture, Odd/Right picture
1010		Even/Left picture, Even/Right picture
1011 ~ 1111	Reserved	

[1] The former 1.4 Specification used these values for indicating support for Horizontal sub-sampling.