

Summary



Vclips VC107B Video Clips for Testing and Optimization of Video Compression

Decoder Series – VC107B, D-Space MP4 ASP VOP

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General Safety Summary

Use this product only as specified.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other product manuals for warnings and cautions related to their operation.

Summary: VC-107-A D-Space-MP4-ASP-VOP

Decoder Test Set	VC-107-A D-Space-MP4-ASP-VOP
Purpose	Test MPEG-4 Advanced Simple Profile decoders with all variants of bit fields within the MPEG-4 visual stream VOP
Content	Single scene – Space moving into, out of and across picture 173 frames
Standard	ISO/IEC 14496-2:2001(E) ISO title: Information technology – Coding of audio-visual objects: Part 2: Visual 2 nd Edition 2001-12-01
Number of clips	55 sequences, numbered V10701 to V10755: <ul style="list-style-type: none"> • 176x144 (50 streams) • 352x288 (5 streams) i.e. total 55 clips plus five YUV source videos
Total disk size	8.7 Mbytes (compressed video files only)
Video format	Compressed ".m4v" video files as per MPEG-4 Part 2 Visual standard
How supplied	1 computer CD
Software supplied	YUV sequence viewer ".m4v" to YUV decoder in folder: \Software on disk 1
Documentation	PDF of this manual in folder: \Documentation on disk 1

1. Introduction

This set of video sequences is designed to test the parts of an MPEG-4 Advanced Simple Profile decoder which decode the VOP part of the video bitstream, i.e. the VideoObjectPlane.

For the purposes of these tests the VOP is defined as comprising those sections of the standard which are referred to by the VideoObjectPlane() pseudo-function in section 6.2.5 of the MPEG-4 standard.

This is done by individually enabling all the different permissible bit-field options within the VOP in the clips specified. Some clips are also provided with multiple combinations and with all permissible bit-fields enabled.

A single video scene is provided: all the variations are done on this single video scene.

2. Information supplied

The following pages list:

- the basic details of the video sequence (source data, contents of the scene);
- the settings used for each sequence.

In addition, on the CD there is provided:

- 'Trace' information for some of the VOPs of each clip (the 'Trace' information is ~1Mbyte per VOP, so not all VOPs are detailed, but a relevant number are chosen - see below);
- where relevant, the 'Trace' information for the 'Header' of the sequence (the Header comprises all syntactic elements higher than the VOP);
- a spreadsheet which lists all the clips and shows which VOP fields (and Header fields) are enabled and the values used (Microsoft Excel[®] format);
- the original YUV source video used to encode the video sequences.

2.1. 'Trace' information provided

The 'Trace' files provide a parsing/decoding of the header and the first few VOPs of each clip, into the bitstream fields as listed in the standard.

Two Trace files are provided for each clip:

- Parse bitstream;
- Interpret.

Both of these file types have the file extension '.vpt', although they only contain standard ASCII text data and can be viewed with any text viewer.

(These Trace files were generated using the **MTS4EA** video compression analysis tool, available from **Tektronix**.)

2.1.1 Parse bitstream Trace file

The Parse bitstream Trace file lists all the bits of the bitstream, divided into the individual bitstream fields:

```
0000 0000 0000 0000 0000 0001 1011 0000 (0x00000000,7) : VISUAL_OBJECT_SEQUENCE_START_CODE
0000 0011 ---- ---- ---- ---- ---- (0x00000004,7) : PROFILE_AND_LEVEL_INDICATION
0000 0000 0000 0000 0000 0001 1011 0101 (0x00000005,7) : VISUAL_OBJECT_START_CODE
0--- ---- ---- ---- ---- ---- ---- (0x00000009,7) : IS_VISUAL_OBJECT_IDENTIFIER
0001 ---- ---- ---- ---- ---- ---- (0x00000009,6) : VISUAL_OBJECT_TYPE
0--- ---- ---- ---- ---- ---- ---- (0x00000009,2) : VIDEO_SIGNAL_TYPE
01-- ---- ---- ---- ---- ---- ---- (0x00000009,1) : STUFFING_BITS
0000 0000 0000 0000 0000 0001 0000 0000 (0x0000000A,7) : VIDEO_OBJECT_START_CODE
0000 0000 0000 0000 0000 0001 0010 0000 (0x0000000E,7) : VIDEO_OBJECT_LAYER_START_CODE
0--- ---- ---- ---- ---- ---- ---- (0x00000012,7) : RANDOM_ACCESSIBLE_VOL
0000 0001 ---- ---- ---- ---- ---- (0x00000012,6) : VIDEO_OBJECT_TYPE_INDICATION
0--- ---- ---- ---- ---- ---- ---- (0x00000013,6) : IS_OBJECT_LAYER_IDENTIFIER
0001 ---- ---- ---- ---- ---- ---- (0x00000013,5) : ASPECT_RATIO_INFO
0--- ---- ---- ---- ---- ---- ---- (0x00000013,1) : VOL_CONTROL_PARAMETERS
00-- ---- ---- ---- ---- ---- ---- (0x00000013,0) : VIDEO_OBJECT_LAYER_SHAPE
1--- ---- ---- ---- ---- ---- ---- (0x00000014,6) : MARKER_BIT
```

The above information is split into 3 sections:

- ❑ the section of '0's and '1's on the left gives the bits in the bitstream, in the order they occur;
- ❑ the data in brackets (0x00000004,7) is the hex address byte address in the bitstream and the starting bit position in the bitstream, where 7 is the most-significant bit (occurring first in the byte) and 0 is the least-significant bit (occurring last in the byte);
- ❑ the name given is the standard name for the bitstream field.

Each of the Parse bitstream Trace files has a name of the form:

V107nn_A_D-Space_MP4_ASP_VOP_xxx_parse_bitstream.vpt

(where 'nn' is the last 2 digits of the clip number)

2.1.2 Interpret Trace file

The Interpret Trace file reads the values in the bitstream fields and interprets them i.e. explains what the value given means:

```
(0x00000000,7) [VOS] {MP4} visual_object_sequence_start_code = 0xb0 (0xB0)
MPEG-4 Simple/Level 3
(0x00000005,7) [VO ] {MP4} visual_object_start_code = 0x1b5 (0x1B5)
(0x00000009,7) [VO ] {MP4} is_visual_object_identifier = 0
(0x00000009,6) [VO ] {MP4} visual_object_type = 0x1
(0x00000009,2) [VO ] {MP4} video_signal_type = 0
(0x00000009,1) [VOP] {MP4} Stuffing bits = 0x1 (number of bits is 2)
(0x0000000A,7) [VOS] {MP4} video_object_start_code = 0x100 (range: 0x100 - 0x11F)
(0x0000000E,7) [VOL] {MP4} video_object_layer_start_code = 0x120 (range: 0x120 - 0x12F)
(0x00000012,7) [VOL] {MP4} random_accessible_vol = 0
(0x00000012,6) [VOL] {MP4} video_object_type_indication = Simple Object Type
(0x00000013,6) [VO ] {MP4} is_object_layer_identifier = 0: video_object_layer_verid='0001'
(Version 1) assumed
(0x00000013,5) [VOL] {MP4} aspect_ratio_info = '0001' = 1:1 (Square)
[VOL] {MP4} vol_control_parameters are off
(0x00000013,0) [VOL] {MP4} video_object_layer_shape = 0 (Rectangular)
(0x00000014,5) [VOL] {MP4} vop_time_increment_resolution = 0x19 (dec. 25)
[inf] {MP4} number of bits for vop_time_increment = 5
(0x00000016,4) [VOL] {MP4} fixed_vop_rate = 0 : VOP rate can be variable
[VOL] {MP4} video_object_layer_width = 352; video_object_layer_height = 288
```

The above information is split into 3 sections:

- ❑ section on the left in brackets (0x00000004,7) is the hex address byte address in the bitstream and the starting bit position in the bitstream, where 7 is the most-significant bit (occurring first in the byte) and 0 is the least-significant bit (occurring last in the byte);
- ❑ the title (such as [VOL] is the general syntax level of the bitstream element (e.g. VOL = VideoObjectLayer) and {MP4} denotes this applies to MPEG-4 only (as opposed to other standards such as H.263);
- ❑ section on the right gives the interpreted value of the bitstream data, i.e. what the bitstream data means.

Each of the Interpret Trace files has a name of the form:

V107nn_A_D-Space_MP4_ASP_VOP_xxx_interpret.vpt

(where 'nn' is the last 2 digits of the clip number)

3. Software supplied

The following software is supplied:

- ❑ ".m4v" to YUV decoder;
- ❑ YUV sequence viewer.

3.1. YUV sequence viewer

This program is called: YUVSequenceViewer.exe

and is located on disk 1 in the folder: \Software

To run it, double-click on it – it does not need to be installed.

Once it has been run once, it associates files with an extension of .yuv

so that after this double-clicking on a file with this extension will automatically open the YUV file in the sequence viewer.

YUVSequenceViewer tries to work out the size of the video frames from the filename (if it is given in the filename): if there are no clues from the filename then the user must enter the size of the frames.

On the 'Tool' menu there is an option to subtract two YUV sequences, to look for differences between two files. A zero difference results in a constant grey image.

To make these differences more visible, select the menu 'View' then 'Options' then enter a number into the 'Subtraction scale' box: the larger the number, the more the differences are multiplied.

3.2. ".m4v" to YUV decoder

This program is called: `decoder.exe`
and is located on disk 1 in the folder: `\Software`

It is a command-line only tool (to be called from within a DOS / Command Prompt box).

The syntax for use is:


```
decoder <input file> <output file> <width> <height>
```

Where the file names include spaces, the filenames must be included within quotes, e.g.

```
decoder "input 1" "C:\Temp\output 1" 176 144
```

4. Basic Clip Set Details

4.1. General clip set details

BASIC CLIP SET DETAILS		Begin	End	Title
				Space
1.	Number(s)	V10701 to V10755		
2.	Filename(s)	V10701_A_D-Space_MP4_ASP_VOP_*.m4v to V10755_A_D-Space_MP4_ASP_VOP_*.m4v		
3.	Title	Space		
4.	Description	Synthetic sequence with Space shuttle, Earth and Moon		
5.	Main purposes / tests	Check decoder response to different errors in the Header and VOP		
6.	Size(s), horizontal x vertical	50 QCIF sequences (176x144) and 5 CIF sequence (352x288)		
7.	Video format	.m4v MPEG-4 Part 2 Visual (source material YUV 4:2:0 Planar, 8 bits per pixel)		
8.	Number of frames	173		
9.	Source frame rate	25 fps		
10.	Clip duration (seconds)	6.92		
11.	File size on disc (MB)	Total for all files: 8.7 MB		
12.	Original video format	720x576 DV, interlaced		

13.	Keywords	KW-vehicles, KW-cross_movement, KW-dark, KW-text KW-high_contrast, KW-bright_colours, KW-monochromatic_area
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	FEATURES	Qty / amount	Notes
14.	GLOBAL MOTION		
15.	Fast pan	-	
16.	Pan	-	
17.	Tracking pan	-	
18.	Zoom in	-	
19.	Zoom out	-	
20.	Scroll	-	
21.	Rotate	-	
22.	Hand-held camera	-	

23.	OBJECT MOTION		
24.	Movement out of picture	-	
25.	Movement into picture	Some	
26.	Movement across picture	Lots, mainly	

		downwards	
27.	Diagonal movement	-	
28.	Subjects behind foreground objects	-	
29.	Low movement	-	
30.	COLOURS & CONTRAST		
31.	Light picture	Areas	
32.	Dark picture	Areas	
33.	Bright colours	Areas	
34.	Dull colours	-	
35.	Fine detail pattern	Some	
36.	High contrast areas	Several	
37.	Large monochromatic area	Some	Black background
38.	SCENE CONTENT		
39.	Out-of-focus	-	
40.	Fine lines / moiré patterns	-	
41.	Reflections	-	
42.	Scene change	-	
43.	SCENE SUBJECTS		
44.	People	-	
45.	Faces	-	
46.	Vehicles	Space shuttle	
47.	Buildings	-	
48.	Trees	-	
49.	Text	-	
50.	Talking head	-	
51.	Water	-	
52.	Leaves	-	
53.	Sky	-	
54.	Clouds	-	
55.	Round objects	Earth, Moon	
56.	LIGHT CONDITIONS		
57.	Bright sunlight	-	
58.	Shaded areas	-	
59.	Bright daylight	Some	
60.	Dull daylight	-	
61.	Twilight	-	
62.	Night	-	
63.	Backlighting	-	
64.	Substantial brightness change	-	

4.2. Summary of clips

Clip Name	Description
V10701	Advanced Simple Profile/Level 1 stream
V10702	Bitstream with f-codes in the range 2-4
V10703	Bitstream with f-codes in the range 4-6.
V10704	Bitstream with f-codes in the range 4-7.
V10705	Bitstream with f-codes in the range 2-4 and resync_markers.
V10706	Bitstream with f-codes in the range 4-7 and resync_markers.
V10707	Bitstream with vop_rounding_type set to 1.
V10708	Bitstream with intra_dc_vlc_thr set to 1.
V10709	Bitstream with intra_dc_vlc_thr set to 4.
V10710	Bitstream with intra_dc_vlc_thr set to 7.
V10711	Bitstream with explicit vop_quant settings: 4, 8, 24 for I-, P- and B-VOPs respectively.
V10712	Bitstream with explicit vop_quant settings: 1, 31, 31 for I-, P- and B-VOPs respectively.
V10713	Bitstream with explicit vop_quant settings: 31, 1, 1 for I-, P- and B-VOPs respectively.
V10714	Bitstream with quant_type set to 1 (first quantisation method) in VideoObjectLayer.
V10715	Bitstream with quant_type set to 1 (first quantisation method) and explicit settings for vop_quant: 24, 4, 8 for I-, P- and B-VOPs respectively
V10716	Bitstream using the resynchronisation error resilience tool.
V10717	Bitstream using the resynchronisation error resilience tool, but with resync_marker_disable = 1.
V10718	Bitstream using the data partitioning error resilience tool.
V10719	Bitstream using a combination of the data partitioning and R VLC error resilience tools.
V10720	Bitstream using the resynchronisation error resilience tool with video packet length of 512 bits.
V10721	Bitstream using the resynchronisation error resilience tool with video packet length of 1024 bits.
V10722	Bitstream with quarter_sample set to 1 in VideoObjectLayer.
V10723	Bitstream with no 4MV mode macroblocks.
V10724	Bitstream encoded with I-VOPs only.
V10725	Bitstream encoded with group-of-pictures (GOP) pattern containing an I-VOP followed by 14 P-VOPs with 2 B-VOPs between each.
V10726	Bitstream encoded with group-of-pictures (GOP) pattern containing an I-VOP followed by 4 P-VOPs with 5 B-VOPs between each.
V10727	Bitstream with no skipped macroblocks.
V10728	Bitstream using the global motion compensation (GMC) tool with stationary model at half-pel precision.
V10729	Bitstream using the global motion compensation (GMC) tool with translation model at half-pel precision.
V10730	Bitstream using the global motion compensation (GMC) tool with first affine model at half-pel precision.
Clip Name	Description
V10731	Bitstream using the global motion compensation (GMC) tool with second affine model at half-pel precision.

V10732	Bitstream using the global motion compensation (GMC) tool with second affine model at quarter-pel precision.
V10733	Bitstream using the global motion compensation (GMC) tool with second affine model at 1/8-pel precision.
V10734	Bitstream using the global motion compensation (GMC) tool with second affine model at 1/16-pel precision.
V10735	Bitstream with many parameter variations (see table in section 5 for full details).
V10736	Bitstream with many parameter variations (see table in section 5 for full details).
V10737	Advanced Simple Profile Level 2 bitstream.
V10738	ASP @ L2 bitstream with many parameter variations (see table in section 5 for full details).
V10739	ASP @ L2 bitstream with many parameter variations (see table in section 5 for full details).
V10740	ASP @ L2 bitstream with many parameter variations (see table in section 5 for full details).
V10741	ASP @ L2 bitstream with many parameter variations (see table in section 5 for full details).
V10742	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10743	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10744	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10745	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10746	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10747	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10748	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10749	ASP @ L0 bitstream with many parameter variations (see table in section 5 for full details).
V10750	ASP @ L2 bitstream with vop_rounding_type set to 1.
V10751	ASP @ L2 bitstream with intra_dc_vlc_thr set to 1.
V10752	ASP @ L2 bitstream with intra_dc_vlc_thr set to 4.
V10753	ASP @ L2 bitstream with intra_dc_vlc_thr set to 7.
V10754	ASP @ L2 bitstream with explicit vop_quant settings: 1, 31, 31 for I-, P- and B-VOPs respectively.
V10755	ASP @ L2 bitstream with explicit vop_quant settings: 31, 1, 1 for I-, P- and B-VOPs respectively.