

## **Summary**



### **Vclips VC101B Video Clips for Testing and Optimization of Video Compression**

**Decoder Series – VC101B, D-Space MP4 SP Hdr**

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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-101-A D-Space-MP4-SP-Hdr

<b>Decoder Test Set</b>	VC-101-A D-Space-MP4-SP-Hdr
<b>Purpose</b>	Test MPEG-4 Simple Profile decoders with all variants of bit fields within the MPEG-4 visual stream Header
<b>Content</b>	Single scene – Space moving into, out of and across picture 161 frames
<b>Standard</b>	ISO/IEC 14496-2:2001(E) ISO title: Information technology – Coding of audio-visual objects: Part 2: Visual 2 <sup>nd</sup> Edition 2001-12-01
<b>Number of clips</b>	30 sequences, numbered V10101 to V10130: <ul style="list-style-type: none"> <li>• QCIF    176x144    25</li> <li>• CIF     352x288    5</li> </ul> i.e. total 30 clips plus CIF-size YUV source video (number V10100)
<b>Total disk size</b>	4.3 MBytes (compressed video only)
<b>Video format</b>	Compressed ".m4v" video files as per MPEG-4 Part 2 Visual standard
<b>How supplied</b>	1 computer CD
<b>Software supplied</b>	YUV sequence viewer ".m4v" to YUV decoder in folder:    \Software                    on disk 1
<b>Documentation</b>	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 Simple Profile decoder which decode the 'Header' of the video bitstream.

The 'Header' comprises those sections of the video bitstream that are syntactically higher than the VOP (VideoObjectPlane).

This is done by individually enabling all the different permissible bit-field options within the Header 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 the Header of each clip (see below);
- ❑ a spreadsheet which lists all the clips and shows which Header fields are enabled and the values used (Microsoft Excel<sup>®</sup> 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 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:

V101nn\_A\_D-Space\_MP4\_SP\_Hdr\_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:

V101nn\_A\_D-Space\_MP4\_SP\_Hdr\_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 Details

### 4.1. General clip set details

<b>BASIC CLIP SET DETAILS</b>		Begin   End	Title
			<b>Space</b>
1.	Number(s)	V10101 to V10130	
2.	Filename(s)	V10101_A_D-Space_MP4_SP_Hdr_*.m4v to V10130_A_D-Space_MP4_SP_Hdr_*.m4v	
3.	Title	Space	
4.	Description	Synthetic sequence with Space shuttle, Earth and Moon	
5.	Main purposes / tests	Check different options in Header are correctly decoded	
6.	Size(s), horizontal x vertical	25 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	161	
9.	Source frame rate	25 fps	
10.	Clip duration (seconds)	6.4	
11.	File size on disc	Total for all files: 4.3 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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	<b>FEATURES</b>	<b>Qty / amount</b>	<b>Notes</b>
14.	<b>GLOBAL MOTION</b>		
15.	Fast pan	-	
16.	Pan	-	
17.	Tracking pan	-	
18.	Zoom in	-	
19.	Zoom out	-	
20.	Scroll	-	
21.	Rotate	-	
22.	Hand-held camera	-	

23.	<b>OBJECT MOTION</b>		
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.	<b>COLOURS &amp; CONTRAST</b>		
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.	<b>SCENE CONTENT</b>		
39.	Out-of-focus	-	
40.	Fine lines / moiré patterns	-	
41.	Reflections	-	
42.	Scene change	-	
43.	<b>SCENE SUBJECTS</b>		
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.	<b>LIGHT CONDITIONS</b>		
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
V10101	Simple Profile/Level 1 stream
V10102	Bitstream with default video_signal_type and colour_description parameters present
V10103	Bitstream with various video_signal_type and colour_description parameters present
V10104	Bitstream with alternative video_object_start_code and video_object_layer_start_code
V10105	Bitstream with alternative video_object_start_code and video_object_layer_start_code
V10106	Bitstream with random_accessible_vol = 1
V10107	Bitstream with object layer identifier parameters present
V10108	Bitstream with object layer identifier parameters present
V10109	Bitstream with extended aspect_ratio_info parameters present
V10110	Bitstream with extended aspect_ratio_info parameters present
V10111	Bitstream with vbv_parameters parameters present
V10112	Bitstream with vbv_parameters parameters present
V10113	Bitstream with vop_time_increment_resolution = 1
V10114	Bitstream with vop_time_increment_resolution = 65535
V10115	Bitstream with fixed_vop_rate specified
V10116	Bitstream with fixed_vop_rate specified
V10117	Bitstream using the resynchronisation error resilience tool, but with resync_marker_disable = 1.
V10118	Bitstream using the resynchronisation, data partitioning and RVLC error resilience tools
V10119	Bitstream using Group_of_VideoObjectPlane syntax with zero time_code.
V10120	Bitstream with many parameter variations (see table in section 5 for full details).
V10121	Simple Profile/Level 0 stream
V10122	Level 0 bitstream with fixed_vop_rate and maximum vop_time_increment_resolution specified
V10123	Level 0 bitstream using the resynchronisation and data partitioning error resilience tools
V10124	Level 0 bitstream using user data syntax in Group_of_VideoObjectPlane.
V10125	Simple Profile/Level 2 stream
V10126	Level 2 bitstream using Group_of_VideoObjectPlane syntax with maximum time_code at CIF resolution.
V10127	Level 2 bitstream using Group_of_VideoObjectPlane syntax with mid-range time_code at CIF resolution.
V10128	Level 2 bitstream using user data syntax in VisualObjectSequence at CIF resolution.
V10129	Level 2 bitstream using user data syntax in VisualObject at CIF resolution.
V10130	Level 2 bitstream with many parameter variations (see table in section 5 for full details).