

Summary



Vclips VC111B Video Clips for Testing and Optimization of Video Compression

Decoder Series – VC111B, D-Space MP4 Err SP

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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.

1. Introduction

This set of video sequences is designed to test the response of an MPEG-4 Simple Profile decoder to errors:

- ❑ which commonly occur within a compressed bitstream (based upon Vqual's experience with customer bitstreams);
- ❑ caused when other individual fields of the Header or VOP are set incorrectly.

This is done by:

- ❑ setting individual bitstream fields to non-permissible values (i.e. not permitted in MPEG-4 Simple Profile at the given Level);
- ❑ setting bitstream fields to a non-permitted combination of values, when considering within a VOP, or from one VOP to the next, or from the Header to the VOP (for example incorrectly incrementing 'modulo_time_base');
- ❑ introducing bit-errors at various points, to check decoder recovery from and resilience to errors.

Some clips are also provided with combinations of the above errors.

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 error settings used for each sequence with the error location.

In addition, on the CD there is provided:

- ❑ 'Trace' information of the relevant part of each clip showing where the error is (see below);
- ❑ 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 bitstream of each clip, into the bitstream fields as listed in the MPEG-4 standard.

Two Trace files are provided for each clip:

- ❑ Parse bitstream
- ❑ Interpret

Both of these file types have the file extension '.html' and are can be viewed with a web browser.

(These Trace files were generated using the **MTS4EA** video compression analysis tool, available from **Tektronix** then converted to HTML)

To quickly find the error location in these files, select a link from the comment index at the top of the page.

Note that in most of these HTML files, only the first 5 VOPs are listed, as this is all that is necessary to understand the error.

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:

V111nn_D-Space_MP4_SP_Err_<err_name>_parse_bitstream.vpt
(where 'nn' is the last 2 digits of the clip number and <err_name> is the error name as listed in the table below in section **Error! Reference source not found.**)

Within each Trace file, the error is highlighted and a comment has been inserted. To find the error, use the comment index at the top of the trace file.

The Parse bitstream files are located in the folder: \Parse bitstream
on the disk.

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:

V111nn_D-Traffic_MP4_SP_Err_<err_name>_interpret.vpt

(where 'nn' is the last 2 digits of the clip number and <err_name> is the error name as listed in the table below in section **Error! Reference source not found.**).

Within each Trace file, the error is highlighted and a comment has been inserted. To find the error, use the comment index at the top of the trace file.

The Interpret files are located in the folder: \Interpret
on the disk.

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

BASIC CLIP SET DETAILS		Begin End	Title
			
1.	Number(s)	V11101 to V11142	
2.	Filename(s)	V11101_D-Space_MP4_SP_Err_* .m4v to V11142_D-Space_MP4_SP_Err_* .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	41 QCIF sequences (176x144) and 1 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	175	
9.	Source frame rate	25 fps	
10.	Clip duration (seconds)	14, including a 6-second pause after frame 30	
11.	File size on disc (MB)	Total for all files: 12MB	
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 upwards	
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	-	