

Summary

Tektronix

**Vclips VC102C
Video Clips for Testing and Optimization of
Video Compression**

Decoder Series – VC102C, D-Traffic MP4 SP H

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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 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[®] 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:

V102nn_D-Traffic_MP4_SP_Header_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:

V102nn_D-Traffic_MP4_SP_Header_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

BASIC CLIP SET DETAILS		Begin End	Title
1.	Number(s)	V10201 to V10236	
2.	Filename(s)	V10201_D-Traffic_MP4_SP_Header.m4v to V10236_D-Traffic_MP4_SP_Header.m4v	
3.	Title	Traffic	
4.	Description	Vehicles into picture, out of picture, across picture	
5.	Main purposes / tests	Check different options in Header are correctly decoded	
6.	Size(s), horizontal x vertical	33 CIF sequences (352x288); 3 QCIF sequences (176x144)	
7.	Video format	.m4v MPEG-4 Part 2 Visual (source material YUV 4:2:0 Planar, 8 bits per pixel)	
8.	Number of frames	501	
9.	Source frame rate	25 fps	
10.	Clip duration (seconds : frames)	20 : 00	
11.	File size on disc (MB)	Total for all files: 12MB	
12.	Original video format	720x576 DV, interlaced	

13.	Keywords	KW-vehicles, KW-movement_in, KW-movement_out, KW-cross_movement, KW-high_contrast, KW-bright_colours, KW-leaves, 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	Lots, some fast	
25.	Movement into picture	Lots, some fast	
26.	Movement across picture	Lots, some fast	
27.	Diagonal movement	-	

28.	Subjects behind foreground objects	Some	
29.	Low movement	-	
30.	COLOURS & CONTRAST		
31.	Light picture	Areas	
32.	Dark picture	Areas	
33.	Bright colours	Areas	
34.	Dull colours	Areas	
35.	Fine detail pattern	Some	
36.	High contrast areas	Several	
37.	Large monochromatic area	Some	
38.	SCENE CONTENT		
39.	Out-of-focus	-	
40.	Fine lines / moiré patterns	Some	
41.	Reflections	Some	
42.	Scene change	-	
43.	SCENE SUBJECTS		
44.	People	-	
45.	Faces	-	
46.	Vehicles	Lots	
47.	Buildings	-	
48.	Trees	Some	Background
49.	Text	-	
50.	Talking head	-	
51.	Water	-	
52.	Leaves	Some	Background
53.	Sky	-	
54.	Clouds	-	
55.	Round objects	-	
56.	LIGHT CONDITIONS		
57.	Bright sunlight	Some	
58.	Shaded areas	Some	
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
V10201	Simple Profile/Level 3 stream
V10202	Bitstream with default video_signal_type and colour_description parameters present
V10203	Bitstream with various video_signal_type and colour_description parameters present
V10204	Bitstream with alternative video_object_start_code and video_object_layer_start_code
V10205	Bitstream with alternative video_object_start_code and video_object_layer_start_code
V10206	Bitstream with alternative video_object_start_code and video_object_layer_start_code
V10207	Bitstream with random_accessible_vol = 1
V10208	Bitstream with object layer identifier parameters present
V10209	Bitstream with object layer identifier parameters present
V10210	Bitstream with extended aspect_ratio_info parameters present
V10211	Bitstream with extended aspect_ratio_info parameters present
V10212	Bitstream with vol_control parameters present
V10213	Bitstream with vbv_parameters parameters present
V10214	Bitstream with vbv_parameters parameters present
V10215	Bitstream with vop_time_increment_resolution = 1
V10216	Bitstream with vop_time_increment_resolution = 65535
V10217	Bitstream with fixed_vop_rate specified
V10218	Bitstream with fixed_vop_rate specified
V10219	Bitstream with fixed_vop_rate and maximum vop_time_increment_resolution specified
V10220	Bitstream with QCIF image size
V10221	Simple Profile/Level 1 bitstream with QCIF image size
V10222	Simple Profile/Level 2 bitstream with QCIF image size
V10223	Simple Profile/Level 2 bitstream with CIF image size
V10224	Bitstream using the resynchronisation error resilience tool, but with resync_marker_disable = 1.
V10225	Bitstream using the resynchronisation error resilience tool
V10226	Bitstream using the resynchronisation and data partitioning error resilience tools
V10227	Bitstream using the resynchronisation, data partitioning and RVLC error resilience tools
V10228	Bitstream using Group_of_VideoObjectPlane syntax with zero time_code.
V10229	Bitstream using Group_of_VideoObjectPlane syntax with maximum time_code.
V10230	Bitstream using Group_of_VideoObjectPlane syntax with mid-range time_code.
V10231	Bitstream using user data syntax in VisualObjectSequence.

Clip Name	Description
V10232	Bitstream using user data syntax in VisualObject.
V10233	Bitstream using user data syntax in Group_of_VideoObjectPlane.
V10234	Bitstream with many parameter variations (see table in section 5 for full details).
V10235	Bitstream without VideoObjectSequence entry point syntax.
V10236	Bitstream with many parameter variations (see table in section 5 for full details).