

## **Summary**



### **Vclips VC005A Video Clips for Testing and Optimization of Video Compression**

**Encoder Series – VC005A, E-Synthetic**

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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-005-A E-Synthetic

<b>Encoder Test Series</b>	VC-005-A E-Synthetic
<b>Purpose</b>	Test encoders with precisely defined motion, colours, shapes (e.g. to check motion estimation) where expected result of encoding is already known.
<b>Content</b>	Synthetic scenes with defined frame-to-frame motion, with movement across the picture, zoom, pan, colours, moiré patterns, text and monochromatic areas.
<b>Number of clips</b>	<p>40 scenes all provided at</p> <ul style="list-style-type: none"> <li>• D1      704x576      (numbered V05nn1)</li> <li>• CIF     352x288      (numbered V05nn2)</li> <li>• QCIF    176x144      (numbered V05nn3)</li> </ul> <p>i.e. total 120 clips</p>
<b>Total disk size</b>	8.8 GBytes
<b>Video format</b>	YUV 4:2:0 planar, 8 bits per pixel
<b>How supplied</b>	2 computer DVDs plus 1 CD
<b>Software supplied</b>	YUV sequence viewer 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 contains synthetic video images. It is designed to test and stress a video encoder by providing a diverse set of video clips all of which have precisely defined and known parameters of movement and content. Items covered include:

- ❑ movement in different directions, pre-determined amounts frame-to-frame;
- ❑ subject types text, patterns;
- ❑ colours - bright to dark, high/low contrast, monochromatic areas;
- ❑ details such as fine lines, moiré patterns;
- ❑ challenging 'subjects', such as wholly black or mono-coloured scenes; noise (monochromatic and coloured); scene changes.

The colours, movements and subjects have all been specifically chosen either to be challenging to an encoder, or to allow the function of an encoder to be precisely checked (for example, to check that the motion estimation is working correctly).

## 2. Description of Clip Set/YUV format

40 video scenes are provided: each of these is provided at D1 (720x576), CIF (352x288) and QCIF (176x144) resolutions (that is 120 clips in all).

All clips are provided in YUV 4:2:0 format with no header

- ❑ planar YUV 4:2:0 sub-sampled i.e. 4 bytes of Y data for each byte of U data and each byte of V data;
- ❑ no headers of any kind (no file or frame headers);
- ❑ one byte per sample;
- ❑ progressive scan (not interlaced);
- ❑ row raster order (top picture row first);
- ❑ Y plane values are 0-255 unsigned;
- ❑ U and V plane values are unsigned with a DC offset of 128.

## 3. Software supplied

The following software is supplied:

- ❑ 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.

## **4. Information supplied**

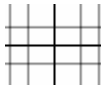


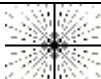
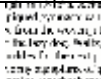
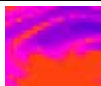



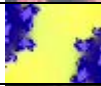



The following pages describe in considerable detail each video sequence (source data, contents of the scene).

## 5. Synthetic motion clips

Clips V0509x to V0540x are designed to provide video having interframe motion with known parameters. Each video sequence is derived by applying a motion transform to an underlying static testcard.

### 5.1. Testcard definitions

The following testcards are defined and referred to later in the clip specifications.

Title	Source description	Purpose	Thumbnail
<b>Grid</b>	Black grid on white background with 16 pixels pitch	Simple motion estimation tests.	
<b>Checkerboard</b>	Checkerboard pattern with 16 pixels pitch	Simple motion estimation tests.	
<b>Radial bars</b>	Solid bars, radiating from centre, alternating black and white, 8 per quadrant	Rotation estimation tests.	
<b>Radial lines</b>	Lines, radiating from centre, 8 per quadrant	Rotation estimation tests.	
<b>Text</b>	Text in serif typeface at 16pt height	Regular high-contrast pattern.	
<b>Fractal1</b>	Barnsley 3 fractal set	Saturated colour with fine detail and colour graduations.	
<b>Fractal2</b>	Barnsley 3 fractal set	Saturated colour with fine detail and colour graduations.	
<b>Fractal3</b>	“Man’o’war” fractal	Saturated colour with fine detail and colour graduations.	
<b>Fractal4</b>	Julia set fractal	Saturated colour with fine detail and colour texture.	
<b>Fractal5</b>	Julia set fractal	Saturated colour with fine detail and colour texture.	
<b>Natural1</b>	Still frame of Piccadilly Circus (London, UK)	Real world image. Near field, buildings, vehicles.	
<b>Natural2</b>	Still frame of Canary Wharf (London, UK)	Real world image. Far field, geometric structures.	
<b>Natural3</b>	Still frame of street scene (London, UK)	Real world image. Near field, large foreground object.	

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## 5.2. Motion model

Interframe motion is modelled using a co-ordinate transform. The model parameters provide for:

- translation
- zoom (scaling)
- rotation

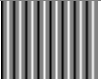

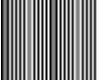



















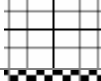



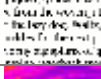

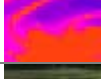











In all motion clips, the origin for zoom and rotation is the image centre point. Each motion clip is created with a specific set of motion parameters. The parameters are fixed for the duration of each clip, so that the interframe motion between any pair of consecutive frames obeys the specified parameters.



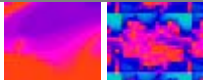





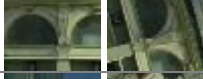




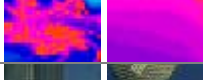
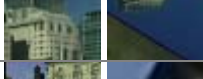




**Translation** is specified as a displacement vector in pixel units. A positive displacement in the  $x$ -direction means that the image moves to the left. A positive displacement in the  $y$ -direction means that the image moves upwards.

**Zoom** is specified as a scaling or magnification factor. A factor of 1 implies no zoom, a factor greater than 1 implies a zoom away from the image, a factor less than one implies a zoom towards the image.

**Rotation** is specified as an angle in degrees. A positive rotation means that the image rotates anti-clockwise. A negative rotation means that the image rotates clockwise.

## 6. Brief clip details

Clip Number(s)	Title	Description	Duration (frames)	D1 file size (MB)	Begin-End
V05011,2,3	Static lines	20 x 15 frame static testcards with various line patterns	300	174	 
V05021,2,3	Static bars	20 x 15 frame static testcards with various solid bar patterns	300	174	 
V05031,2,3	Static colours	20 x 15 frame static testcards with various colour patterns	300	174	 
V05041,2,3	Static text	20 x 15 frame static testcards with various text patterns	300	174	 
V05051,2,3	Noise	Noise at various amplitudes, luma and chroma	240	139	 
V05061,2,3	Teleprint	Teleprinter style text animation, one new character per frame	300	174	 
V05071,2,3	Moiré circles	Moiré interference patterns caused by overlapping concentric circles	300	174	 
V05081,2,3	Moiré fans	Moiré interference patterns caused by overlapping radial bars	300	174	 
V05091,2,3	Translate 1	Translation with vector (0, 1) on grid testcard	300	174	 
V05101,2,3	Translate 2	Translation with vector (1, 0) on grid testcard	300	174	 
V05111,2,3	Translate 3	Translation with vector (0, -1) on grid testcard	300	174	 
V05121,2,3	Translate 4	Translation with vector (-1, 0) on grid testcard	300	174	 
V05131,2,3	Translate 5	Translation with vector (2, 3) on checkerboard testcard	300	174	 
V05141,2,3	Translate 6	Translation with vector (-5, -7) on text testcard	300	174	 
V05151,2,3	Translate 7	Translation with vector (16, -32) on fractal1 testcard	300	174	 
V05161,2,3	Translate 8	Translation with vector (-99, 100) on natural1 testcard	300	174	 
V05171,2,3	Zoom 1	Zoom with factor 0.990 on checkerboard testcard	300	174	 
V05181,2,3	Zoom 2	Zoom with factor 0.992 on text testcard	300	174	 
V05191,2,3	Zoom 3	Zoom with factor 0.994 on natural2 testcard	300	174	 
V05201,2,3	Zoom 4	Zoom with factor 0.998 on natural3 testcard	300	174	 

Clip Number(s)	Title	Description	Duration (frames)	D1 file size (MB)	Begin-End
V05211,2,3	Zoom 5	Zoom with factor 1.002 on fractal3 testcard	300	174	
V05221,2,3	Zoom 6	Zoom with factor 1.004 on natural1 testcard	300	174	
V05231,2,3	Zoom 7	Zoom with factor 1.008 on fractal1 testcard	300	174	
V05241,2,3	Zoom 8	Zoom with factor 1.010 on fractal2 testcard	300	174	
V05251,2,3	Rotate 1	Rotation with angle 0.25° on radial bars testcard	300	174	
V05261,2,3	Rotate 2	Rotation with angle 0.50° on radial lines testcard	300	174	
V05271,2,3	Rotate 3	Rotation with angle 1.00° on fractal4 testcard	300	174	
V05281,2,3	Rotate 4	Rotation with angle 2.00° on fractal5 testcard	300	174	
V05291,2,3	Rotate 5	Rotation with angle -0.25° on natural1 testcard	300	174	
V05301,2,3	Rotate 6	Rotation with angle -0.50° on natural2 testcard	300	174	
V05311,2,3	Rotate 7	Rotation with angle -1.00° on radial bars testcard	300	174	
V05321,2,3	Rotate 8	Rotation with angle -2.00° on radial lines testcard	300	174	
V05331,2,3	Complex 1	Combined translation (2,3) and zoom 0.990 on checkerboard testcard	300	174	
V05341,2,3	Complex 2	Combined zoom 0.990 and rotation 0.50° on fractal1 testcard	300	174	
V05351,2,3	Complex 3	Combined translation (2,3) and rotation 0.50° on natural2 testcard	300	174	
V05361,2,3	Complex 4	Combined translation (2,3), zoom 0.990, and rotation 0.50° on natural3 testcard	300	174	
V05371,2,3	Complex 5	Four quadrants, four different translations on grid testcard	300	174	
V05381,2,3	Complex 6	Four quadrants, four different zooms on fractal2 testcard	300	174	
V05391,2,3	Complex 7	Four quadrants, four different rotations on checkerboard testcard	300	174	
V05401,2,3	Complex 8	Four quadrants, two translations, one zoom, and one rotate on natural1 testcard	300	174	