



T2V006 Synthetic User Manual

Video Clips for
Testing and Optimisation of
Video Compression



www.testvid.com

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T2V006_Synthetic User manual v1.0e

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1. Overview of T2V006 Synthetic

2-D / 3-D	2D
Compressed/ Uncompressed	Uncompressed
Description of video	Synthetic scenes with precisely defined motion, colour, brightness etc.
Purpose	Measure the performance of an encoder with defined motion, colour, etc. The clips comprise a coordinated set where the complexity gradually increases, from slow simple motion of test-card objects and video to highly rapid motion, colour, feature, texture and shape changes of complex objects.
Number of clips	150 individual video clips (50 each at 1080p, 720p and 1080i resolutions)
Length of video	Total of 1 hour 15 minutes (25 minutes each at 1080p, 720p and 1080i resolutions)
Total size on disk	285 GBytes
Video format(s)	YUV 4:2:0 planar 8 bits per sample: <ul style="list-style-type: none">□ 1920x1080 progressive□ 1280x720 progressive□ 1920x1080 interlaced, bottom field first
Audio format(s)	MPEG-1 Layer II stereo 384kbps CBR 16-bit 48kHz and WAV linear PCM uncompressed stereo 1536kbps 48kHz

2. Introduction

T2Vid and **T3Vid** are high definition (HD) video clips designed for testing video encoders and decoders.

The **T3Vid** clips are stereoscopic 3-dimensional (matched left and right images); the **T2Vid** clips are 2-D.

Both the **T2Vid** and **T3Vid** clips come in two variants: those designed to test and stress video encoders (usually in uncompressed YUV format, some of which have associated sound); and compressed video designed to test the range of options available in a standards-compliant video decoder (in compressed format such as MPEG-4/AVC/H.264 or MPEG-2, both as elementary streams and in 'wrappers' such as MPEG-2 Transport Stream).

2.1 T2Vids and T3Vids for testing encoders

Each set of clips for testing encoders contains a diverse selection of clips designed to stress a video encoder in different ways. Typically this includes different movement types, different subjects, different lighting conditions, different camera movement - designed to encompass the majority of different types of difficult-to-encode items. In some cases the quality of filming is marginal - deliberately so, as this is often the hardest to encode. The majority of the filming was done hand-held, as is quite often the case with documentary and even film currently. However, in all cases there has been no video editing as such (unless otherwise stated for a specific clip) - all the separate video clips are direct decodes from the HD camera files, with no re-compression/re-encoding done. Where video editing has been done the re-encode is only at the transitions - the vast majority of these clips are also as per the original camera files.

These clips are provided as sets of video clips, typically 30 - 50 in a set, lasting from 15 - 20 minutes total. These include:

- ❑ 'standard' HD of real-world subjects (1920x1080, 1280x720; e.g. in New York, San Francisco, London, Munich)
- ❑ as above but D-cinema resolutions (2K and 4K)
- ❑ as above but 'low' resolutions such as NTSC, D1 PAL, CIF, mobile, web, etc.
- ❑ synthetically generated, which has features such as precisely defined motion - ideal for checking such items as encoder motion estimation

The formats/resolutions provided vary from by clip set; as an example all the HD sets are provided at 1920x1080 progressive, 1920x1080 interlaced and 1280x720 progressive formats, in uncompressed YUV format, 16:9 aspect ratio.

All filming was done native HD.

Most clip sets are provided in 8 bits per sample; some are available at 10-bit or 14-bits per sample.

The **T2Vid** clips are straightforward 2-D clips; the **T3Vid** clips comprise matched left and right video images. The **T3Vid** clips have the 'extra dimension' of varying 3-D depth: from shallow to deep 3-D effect, into or out of the picture, with additional artefacts and difficulties that can be encountered in 3-D.

2.1.1 Audio

Sound is provided for almost all clips: in some cases this is sound recorded which is directly associated with the clips, in other cases the sound comprises appropriate background or music.

In a few cases the associated audio is one of the main reasons for recording the clip so both should be viewed together (where this is the case the notes state this for the specific clip in the manual). However, note that in most cases the associated audio provided is just that which could easily be recorded at the same time as the video, typically comprising background sounds, and is often of low quality as the sound was not the primary consideration at the time of filming.

2.1.2 Software

In addition to the video and audio, utility software to process the YUV video is provided as listed in section 3.2 and information on YUV viewers.

2.2 T2Vids and T3Vids for testing decoders

These are designed to test standards-compliant video decoders, by providing a series of video clips where the same video source material is encoded at different bit-rates with different encoder options.

Normally each clip is provided more than one format: typically MPEG-2 and MPEG-4/AVC/H.264 elementary video formats, at both 1920x1080 and 1280x720, as well as the source video in YUV format. In addition, each clip is typically encoded into one or more 'wrapper' formats such as MPEG-2 Transport Stream, with the associated audio in an appropriate format.

The associated audio is also provided as separate elementary files.

Full information on the currently available sets of **T2Vid** and **T3Vid** clips series is at www.testvid.com.

2.3 TestVid logo

The **TestVid** logo (or a variant of it) is usually placed in the lower left corner of the video. It is a condition of the license agreement for **TVids** that this logo is not removed or obscured.

The logo has been carefully sized and placed to coincide with the borders of a 16x16 macroblock (where this is possible) and is static throughout each sequence, in order to have minimal effect on encoders and decoders.

2.4 Safety

The **TVids** are almost invariably supplied on a USB hard drive unit. This unit may be mains powered or powered directly from the USB port.

In all cases it is imperative that you carefully read and understand the safety information provided with the unit.

2.5 Backup

As the **TVids** are almost invariably supplied on a USB hard drive unit it is highly recommended that you make an immediate backup of the whole unit, as hard drives can of course fail. (This backup copy is in addition to the 25 copies allowed by the license agreement.)

The warranty on the hard drive is 180 days, but if it does fail it would of course take some days at least to provide a replacement unit.

3. T2V006 Synthetic Clip set description

3.1 Set content types

This set of video clips comprise a range of synthetic scenes where the majority of the subjects are synthetically generated, although 'real-world' video is also included in most clips.





The clips are a coordinated set where the complexity gradually increases, from slow simple motion of test-card objects and video to highly rapid motion, colour, feature, texture and shape changes of complex objects including 'difficult' subjects such as grain, particles, reflections, transparency...

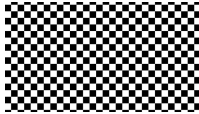
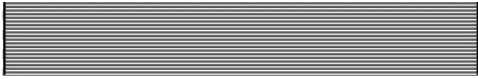
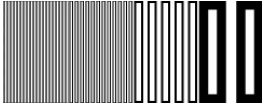
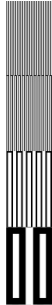
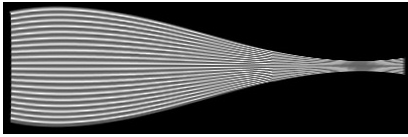
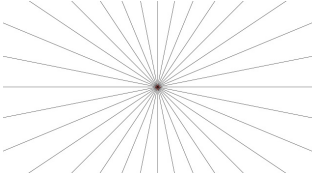

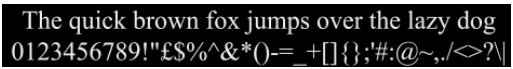
The progression of tests is:

- ❑ simple movement (e.g. left/right, up/down), for testing basic encoder functions such as motion vectors
- ❑ more complex movement, such as diagonal and rotational (again for testing such things as motion vectors/movement tracking) and more rapid movement
- ❑ motion vectors and tracking of more difficult shapes such as circles, ellipses and where the shape changes
- ❑ moving on to testing efficiency of encoding when there are complex fine-grain patterns/fractals and colour changes
- ❑ plus testing of some simulations of potentially synthetic but common sequences, such as 'sci-fi' themed and sepia / 'old film' look
- ❑ and sequences with fades, transitions, rapid brightness and colour changes
- ❑ then sequences which combine these in different degrees
- ❑ and finally combination sequences that test the efficiency of an encoder with very challenging sequences encompassing a large majority of the tests in rapid succession

3.1.1 Test card objects

There are 12 standard 'test card' type objects that are used extensively (note that the images below are not representative of the size at which they are used):

Standard SMPTE colour bars	
Gray-scale ramp	
Colour rainbow ramp (saturated colours)	
Colour rainbow ramp (pale colours)	

Checkerboard	
Narrow straight lines (nominally black/white)	
Block of straight lines of different thicknesses and spacing, arranged horizontally (nominally black/white)	
Block of straight lines of different thicknesses and spacing, arranged vertically (nominally black/white)	
'Fan' lines: narrow lines fanning out from very thin to broader (nominally black/white)	
Radial lines (32 thin lines radiating from one point; nominally black/white)	
Circles and ellipses	
Standard text containing all characters A-Z, numbers 0-9 and common punctuation characters	

Where these standard objects are denoted as 'nominally black/white', note that often the colours of these are changed (as per the other objects).

These test-card objects are not in a fixed test-card but are individually defined and move, rotate, change colour etc. independently.

3.1.2 'Real-world' video

In addition to the synthetic objects, real-world video is used in most of the clips. Where present, one of 5 specific clips have been used in a specific clip i.e.

- ❑ video no. 1 in clip 002;
- ❑ no. 2 in clip 003;

- ❑ no. 3 in clip 004;
- ❑ no. 4 in clip 005;
- ❑ no. 5 in clip 006;
- ❑ then video no. 1 used again in clip 007 (no. 2 used again in clip 008 etc.).

Some clips have more than one video (and some have none).

3.1.3 Other objects and generated features

In addition to the test-card objects and real-world video, many clips have additionally generated objects including:

- ❑ patterns
- ❑ moiré patterns
- ❑ textures
- ❑ reflections
- ❑ monochrome areas
- ❑ gradients
- ❑ opaque, transparent and translucent areas
- ❑ start shapes, other multi-sided objects (trapezoids, octagons, hexagons)
- ❑ scratches and dust-like objects
- ❑ particles
- ❑ noise and grain
- ❑ lightning
- ❑ fractals
- ❑ rain, snow, stars

all of which typically are dynamic, changing as indicated below.

3.1.4 Application of effects

All the effects described below have at various times been applied in various manners in the clips i.e.

- ❑ slow or fast
- ❑ uniformly or pseudo-random
- ❑ selectively on a few or on most objects

3.1.5 Motion and geometric effects

Translation	Movement left/right/up/down, slow/fast, uniform/pseudo-random
Rotation	Angular rotation of the object within the frame
Size/zoom	Increase/decrease in size of object (zoom in/out)
Aspect ratio	Alteration of the aspect ratio of the image within the frame, in X or Y
Warping	Transformation of the image where the shapes are distorted, e.g. trapezoidally, pin-cushion effect, swirl

Foreground/ background	Moving an object behind/in front of others (obscuration)
---------------------------	--

3.1.6 Colours, brightness, contrast, opacity effects

Colours	Alteration of colours (hue, saturation, intensity) over time
Brightness	Of objects or whole areas
Contrast	Increase / decrease of contrast
Highlights	Bright areas; lens flare; lightning effect
Opacity	Variance of opacity from 100% (completely opaque) to 0% (completely transparent)
Feathered-edges	Where the edges of an object gradually fade out / becomes transparent

3.1.7 Other effects

Focus change	Blur / sharpen
Noise, grain, scratches	Addition of random noise, grain and scratches
Texturisation	Addition of textures
Transitions/ fades	E.g. wipes, fades, blinds, iris transition
Scattering	Objects / part of objects go in different directions
Explosion	Object 'explodes'
Cartoon effect	Change to appear cartoon-like
Posterisation	Reducing the number of video levels
Edge-tracing	Edges of objects highlighted
Water effect	As if objects are made of or are under water

In many cases the video is harder to encode than might normally be expected, as the lighting conditions are not ideal or there is significant camera movement, or the focus varies. These features are deliberately used as they often cause the most difficulty to video encoders and represent the worst case that the encoder should encounter in 'normal / real' use.

The total time of the individual clips is 1 hour 15 minutes (25 minutes in each of the formats).

3.2 Individual clips provided

150 YUV clips are provided, comprising 50 individual clips each at the following resolutions:

- 1920x1080 progressive [original filming size of video elements]
- 1280x720 progressive

- ❑ 1920x1080 interlaced (see sections 3.2.1 and 3.3.3), comprising alternate fields with each field at 1920x540 resolution, bottom field first

Each of these clips are:

- ❑ planar YUV 4:2:0 (i.e. a frame of Y followed by a frame of U followed by a frame of V, where the U and V are both are half the resolution of the Y plane, both horizontally and vertically)
- ❑ 8-bits (one byte) per sample
- ❑ square pixels
- ❑ 16:9 picture aspect ratio
- ❑ no headers
- ❑ top picture row first
- ❑ Y planes are unsigned nominally 16-235 but may go 0-255
- ❑ U and V planes are centred at 128 and are nominally 16-240 but may go from 0-255

All of the clips were made at a nominal 25 frames/second, although the YUV may be re-played / encoded at any speed (such as 24 or 29.97 fps) - most of the clips in this series will look satisfactory at virtually any frame rate.

3.2.1 Generation of interlaced video

For this specific set, T2V006, almost all of the content was synthetically generated although a small part of almost all of the clips is comprised of 'real-world' video.

For the interlaced version of each clip (i.e. the 1080i clips) all the synthetic content was generated at a frame rate of 50 frames per second, then the alternate bottom-top fields were extracted from each alternate frame. (E.g. bottom field from frame 0, top field from frame 1, bottom field from frame 2, etc.)

The real-world video was filmed at 25 frames per second progressive and this is unchanged in this set, so the real-world video itself will not appear interlaced, although as this video overlaps with the synthetic elements which are interlaced, the edges of the real-world video will appear to be interlaced, and in fact in many cases the whole of the real-world video will appear interlaced as it is often covered by/opaque with the synthetic elements.

The interlaced versions of a small number of the clips (T2V006034 Grainy, T2V006047 Combo5, T2V006049 Wild1, T2V006050 Wild2) were generated using frame blending, as producing fully interpolated versions of each clip at 50 fps would take too long a period (a total of 60 days continuous on an 8-processor computer).

3.3 Format of video on disk

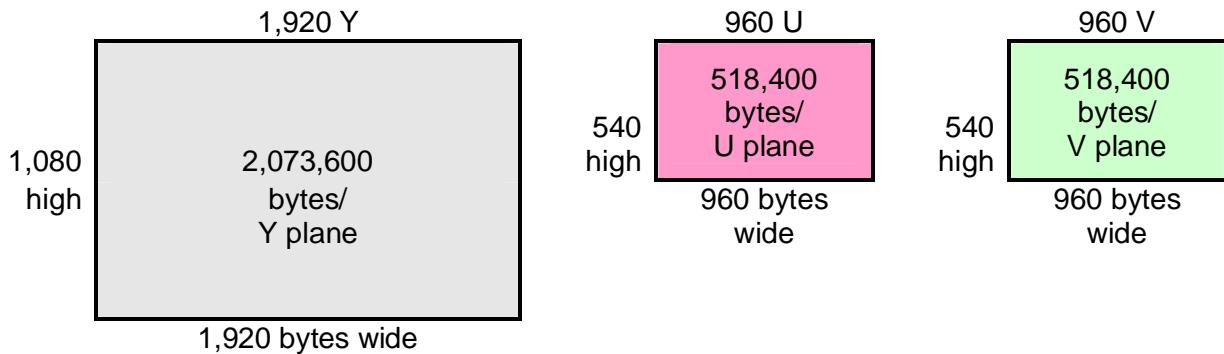
All the YUV video is stored in planar form, i.e. a plane of Y followed by a plane of U followed by a plane of V.

3.3.1 1080p

Byte 0 in the file is the Y data of the pixel at top left of the first frame.

One frame of Y, U and V:

Plane of Y followed by plane of U followed by plane of V



Valid video data ranges:

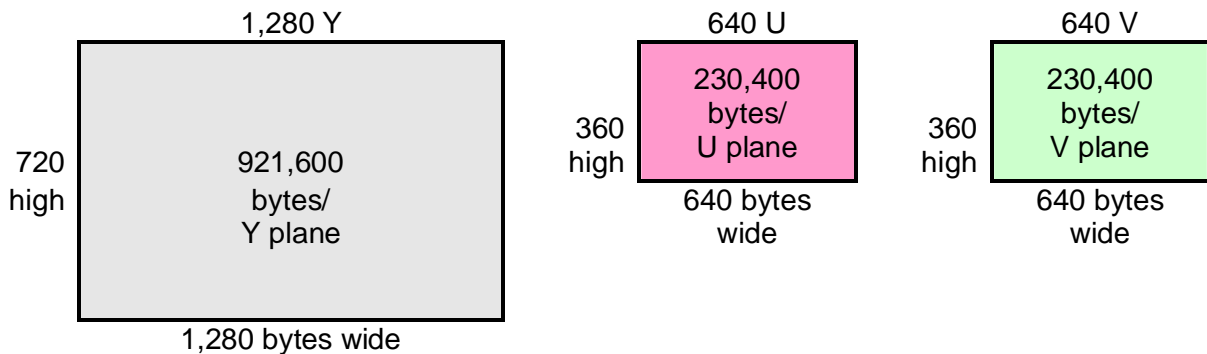
- ▣ Y: 16 - 235
- ▣ U and V: 16 - 240

3.3.2 720p

Byte 0 in the file is the Y data of the pixel at top left of the first frame.

One frame of Y, U and V:

Plane of Y followed by plane of U followed by plane of V



Valid video data ranges:

- ▣ Y: 16 - 235
- ▣ U and V: 16 - 240

3.3.3 1080i

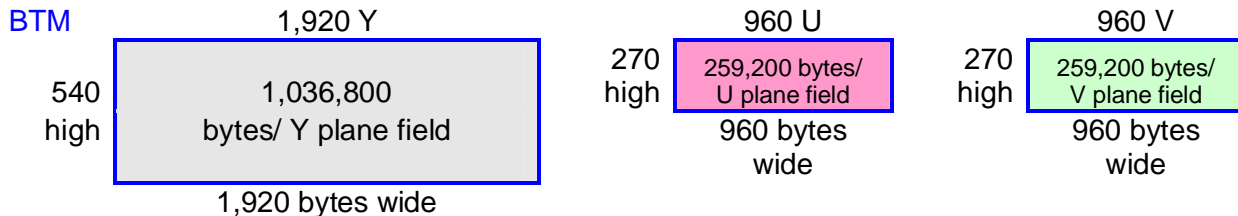
Byte 0 in the file is the Y data of the pixel at top left of the first frame.

Note: as supplied, the 1080i video is stored on disk with alternating fields of YUV, bottom field first. If the 1080i video is required in frame format, with the alternating fields on alternating lines, the supplied utility program `yuvfieldcombine` can be used to combine the fields. See sections 3.2.1 and 4.3.3 for more information.

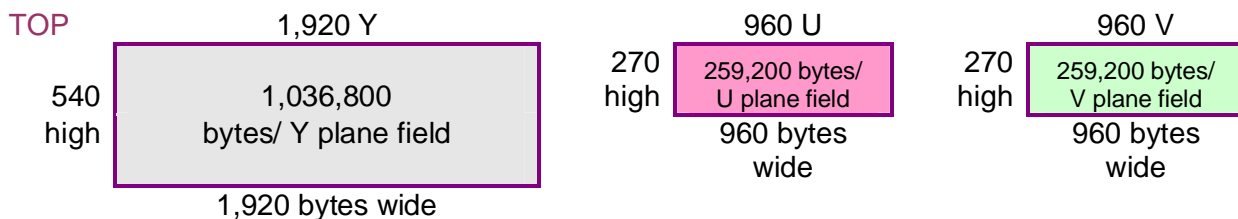
Each frame of Y, U and V is divided into alternating fields, bottom field first, with the YUV data as follows (each field being half the height of the frame):

BTM field			TOP field		
Y data BTM field	U data BTM field	V data BTM field	Y data BTM field	U data BTM field	V data BTM field

For each field: plane of Y followed by plane of U followed by plane of V



followed by top field:



Valid video data ranges:

- Y: 16 - 235
- U and V: 16 - 240

3.4 Audio

Audio is provided in the form of

- the background sounds recorded when the video used in each clip was recorded,
- mixed together with various music tracks (considered appropriate for a 'synthetic' video set)

The audio with each clip matches the video length.

The music provided as part of the audio supplied is copyright © 2008 Michael Dove and is supplied with permission.

NOTE that this although this music may be used freely with the Tvids provided (including on the web and for public performances) this music may not be used other than with the Tvids video clips without express written permission from TestVid or Michael Dove. However, the whole of the music track 'Consummate' that is used in parts and mixed with the background sounds is provided in the \Music

folder and permission to use this music track will likely be granted (depending upon intended use) upon signing of a license agreement and payment of a modest license fee: contact TestVid for details.

The audio clips are provided in two formats:

- MPEG-1 Layer II stereo 384kbps CBR 16-bit 48kHz and
- WAV linear PCM uncompressed stereo 1536kbps 16-bit 48kHz

Note that there are 21 unique audio sequences provided, i.e. the audio for:

- T2V006001
- T2V006002 to T2V006011
- T2V006041 to T2V006050

The audio provided with video clips T2V006002 to T2V006011 is repeated with video clips numbered 10, 20 and 30 after (e.g. the audio with clip T2V006002 is the same as with clips T2V006012, T2V006022, T2V006032), although for convenience each video clip has a uniquely numbered associated audio clip.

4. Software to view & process YUV video

4.1 Viewing/playing the YUV video

This section explains some of the technical requirements for playing the YUV video (computer and software requirements).

4.1.1 Computer requirements of viewing the YUV video

The **Tvids** YUV files are uncompressed and some of the clips within this set require a high performance computer in order to play the video in real-time at full frame rates. The sustained continuous data rates required from disk are:

- ❑ **1080p/i:** 78 MBytes/sec
- ❑ **720p:** 35 MBytes/sec

This means that the above rates must be achieved using disk arrays, solid state disks or with the video loaded into RAM disk.

Useful references as starting points for system recommendations are given on the websites for Aja (www.aja.com) and BlackMagic Design (www.blackmagic-design.com) although various companies provide information about how this can be achieved / the configuration of system required to achieve this. A list is given on the **TestVid** website under Support at:

<http://www.testvid.com/highperfpc.html>

TestVid accepts no responsibility or liability for use of any of the information on the pages listed.

4.1.2 YUV viewers/players

There are a number of software programs for viewing YUV files: a list is given on the **TestVid** website under Support at:

<http://www.testvid.com/yuvviewers.html>

Links are provided to the pages where the YUV viewers can be downloaded.

Note that these programs only show one YUV stream at a time.

TestVid accepts no responsibility or liability for download or use of any of the programs listed; the user should carefully examine the license agreement that applies to the software concerned.

4.1.3 Programs that do not display/import YUV files directly

A number of common programs - such as Final Cut Pro, Adobe Premiere Pro, Sony Vegas and others may not import YUV uncompressed files directly: the YUV files may need to be wrapped e.g. in an AVI or converted to another format

- ❑ wrap the YUV within an AVI file
- ❑ convert the YUV into a different format acceptable to the chosen program
- ❑ play the YUV video out in real-time on SDI and use an adaptor to display the two SDI inputs

Each of the above options is discussed below.

4.1.4 Wrap the YUV within an AVI file

There are a number of programs to do this; probably the easiest is to use a program called **FFMPEG**. This is used as a command line program: it can easily be found using a search engine.

Usage:

```
ffmpeg -r 25 -s 1920x1080 -i <infile.yuv> -vcodec copy <outfile.avi>
```

where

- ❑ `-r 25` sets the frame rate to 25 fps (FFMPEG default is 25 fps)
- ❑ `-s 1920x1080` sets the resolution of the input file
- ❑ `<infile.yuv>` is the input YUV filename
- ❑ `<outfile.avi>` is the output AVI filename

Note that the 1920x1080 interlaced files are separate fields, with each field 1920 horizontal and 540 vertical. Most likely, it will be better to combine these separate fields into frames 1920 horizontal and 1080 vertical, before putting into an AVI: use the provided **TestVid** program `yuvfieldcombine` to do this (see section 4.1 below). The batch file provided does this.

Note that in order to use these batch files:

- ❑ firstly, the **Tvids** sequences will need to be copied to a different disk as there is insufficient space on the supplied disk unit
- ❑ secondly, the correct paths will need to be set up in the batch files, to FFMPEG and by doing a 'Search and Replace' (Ctrl-H in Windows Notepad)
- ❑ FFMPEG will need to be downloaded

4.1.5 Convert YUV to another format

As the purpose of this set of **Tvids** sequences is to test encoders (and presumably purchased for this purpose), the user will have a means to encode the YUV sequences into a compressed format such as MPEG-2, H.264/MPEG-4/AVC, MVC or other, so can then view the compressed sequences.

4.2 Real-time play-out of the YUV video

The YUV files provided are suitable for direct use with video encoders, but in some circumstances it may be desirable to play-out the YUV in real-time on an SDI / ASI / DVI / HDMI link.

Essentially, the issue is to get the uncompressed **Tvids** YUV files from disk onto an SDI / ASI / DVI / HDMI interface via a specialised I/O board.

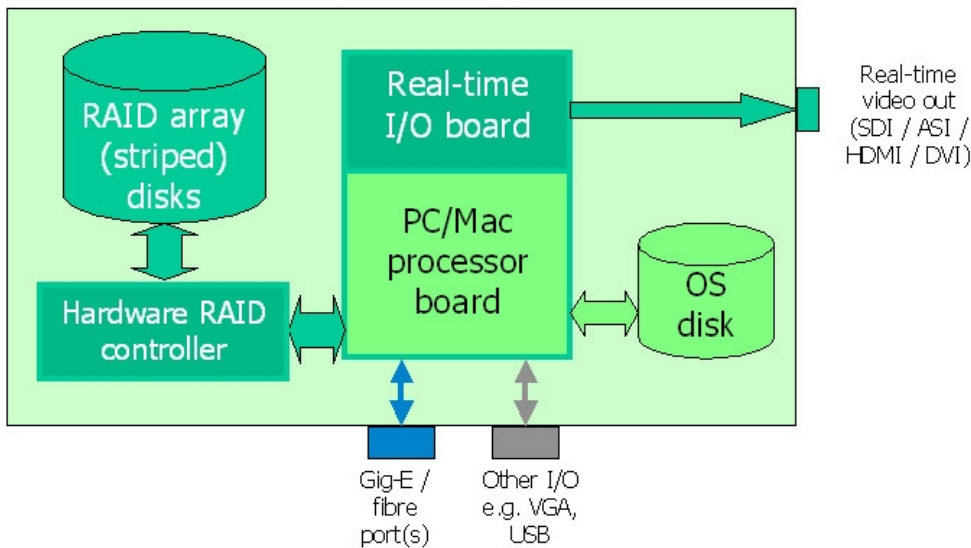
All video servers, many hardware encoders and a large proportion of other professional broadcast equipment have internal hard disks and Gig-E Ethernet interfaces. This allows the **Tvids** to be directly copied over the Ethernet network onto the hard disk, and play-out from there.

Where it is required to produce an SDI / ASI / DVI / HDMI stream as input to other equipment, this can be done relatively straightforwardly, using:

- ❑ a high performance PC / Mac
- ❑ with high speed RAID hard disks
- ❑ with an appropriate SDI etc. I/O board, e.g. from Aja, BlackMagic Design or Bluefish444
- ❑ and software to control moving the video from disk onto the I/O interface

A schematic of the required set-up is:

Real-time Play-out Using a PC/Mac



See the [TestVid](http://www.testvid.com) website:

<http://www.testvid.com/support.html>

More detailed information is provided, including a page on "broadcast applications" and the steps required are covered in some detail in the white paper, "Real-Time Play-out of YUV Video in a Broadcast Environment"

4.3 Software tools provided

The following software is provided:

Software tool	Purpose
yuvmake1088	Add extra lines at the top/bottom of a 1920x1080 YUV file to make it 1920x1088
yuvfieldcombine	Combine interlaced fields which are stored in alternating format (bottom field followed by top field, each half-height) into frames where alternate lines contain alternate fields
yuvletterbox	Alter provided video by making it appear 'letterboxed' (i.e. with black bands top and bottom of each frame) or 'pillarboxed' (with black bands left and right)

Note

1. The software tools are provided solely for the use of the purchaser of the license to use this set of video clips and may not be used with other video or provided to other persons/organisations.
2. The use of these software tools is only on the basis of complete acceptance of the license agreement as given in section below. The fact of using these software tools gives your explicit consent to abide by the terms of the license agreement.

4.3.1 License agreement relating to the software tools provided

This license agreement below applies to all software listed in this section 4.3.

The software program(s) is/are provided to the user without any license fee or royalty on an "as is" basis, solely as an incidental part of the clip set and do not form part of the contract.

TestVid disclaims any and all warranties, whether express, implied, or statutory, including any implied warranties or merchantability or of fitness for a particular purpose.

The user makes use of this/these program(s) at their own risk. In no event shall **TestVid** be liable for any incidental, punitive, or consequential damages of any kind whatsoever arising from the use of this/these program(s).

This disclaimer of warranty extends to the user of this/these program(s) and user's customers, employees, agents, transferees, successors and assigns.

The software program(s) is/are provided solely to the purchaser of the relevant set of **TVids** and may not be sent to or copied to any other person or organisation or used with any other video

4.3.2 yuvmake1088

This is a command line program for adding 8 additional lines to 1080 vertical resolution video, to make it 1088 vertically i.e. an integer multiple of 16.

All the lines added are greyscale, set to one grey colour.

Usage:

```
yuvmake1088 <inputfile.yuv> <p> <n> <c>
```

where

- ❑ <inputfile.yuv> is the input filename which is 1080 lines vertically (must have extension .yuv)
- ❑ <p> = progressive or interlaced input file, set to 'p' or 'i'
- ❑ <n> = the number of the 8 lines to add at the top of each frame (0, 2, 3, 6 or 8). '0' means add zero lines at the top i.e. at 8 lines at the bottom; '8' means add 8 lines at the top and zero at the bottom; '4' means add 4 at top and bottom, etc.
- ❑ <c> = greyscale colour to add, number 16-235. 16=black; 235=white. Numbers less than 16 will be set to 16; greater than 235 will be set to 235.

The filename for the output file, with the extra 8 lines added, will be

```
inputfile_1088.yuv          (the '_1088' is added by yuvmake1088)
```

The output file is put in the same folder as the input file.

4.3.3 yuvfieldcombine

This is a command line program for combining interlaced fields which are stored in alternating format (bottom field followed by top field, each half-height) into frames where alternate lines contain alternate fields.

It is assumed that the video data is stored bottom field first.

Usage:

```
yuvfieldcombine <inputfile.yuv> <xsize> <ysize> <nnn>
```

where

- ❑ <inputfile.yuv> is the input filename (must have extension .yuv)
- ❑ <xsize> = horizontal resolution of the input file (must be multiple of 2)
- ❑ <ysize> = vertical resolution of **frame** of the input file, e.g. set to 1080 for 1920x1080i; set to 480 to 720x480i (must be multiple of 4)
- ❑ <nnn> = number of video frames to process. Set to 0 to process all frames. If <nnn> is greater than the number of frames then all frames will be processed

The filename for the output file, with the fields combined will be

```
inputfile_FLDCMB.yuv      (the '_FLDCMB' is added by yuvfieldcombine)
```

The output file is put in the same folder as the input file.

4.3.4 yuvletterbox

This is a command line program for creating a black band at the top & bottom of each frame (or left & right), by over-writing the video data in these bands. The luminance of the 'black' band may be set; the size of the bands top and bottom (left/right) may be set. The *TVids* logo is moved to remain visible in the bottom left corner of the video data.

For interlaced video it is assumed that the video data is stored bottom field first.

1080p/i (1920x1080) and 720p (1280x720) videos are 16:9 picture aspect ratio (1.777:1).

Common picture aspect ratios with areas of letterbox / pillarbox are:

Picture aspect ratio	1080p/i (1920x1080)	720p (1280x720)
Default	Number of black lines top & bottom	
1.777:1 (16:9)	0, 0	0, 0
Letterbox	Number of black lines top & bottom	
1.85:1	21, 21	14, 14
2.35:1	131, 132	87, 88
Pillarbox	Number of black lines left & right	
1.33:1 (4:3)	240, 240	160, 160
14:9 (1.56:1)	117, 118	78, 79

Usage:

```
yuvletterbox <inputfile.yuv> <xsize> <ysize> <nnn>      (cont'd)
                <f> <blk> <l> <t1> <br>
```

where

- <inputfile.yuv> is the input filename (must have extension .yuv)
- <xsize> = horizontal resolution of the input file (must be multiple of 2)
- <ysize> = vertical resolution of **frame** of the input file, e.g. set to 1080 for 1920x1080i (must be multiple of 4)
- <nnn> = number of video frames to process. Set to 0 to process all frames. If <nnn> is greater than the number of frames then all frames will be processed
- <f> = format, i.e. progressive or interlaced input file, set to 'p' or 'i'
- <blk> = 'black' colour to add, number 16-235. 16=black; 235=white. Numbers less than 16 will be set to 16; greater than 235 will be set to 235.
- <l> = letterbox or pillarbox, set to 'l' or 'p'. If set to 'l' (for letterbox) then the values for <t1> and
 are used respectively for the top and bottom of the video; if set to 'p' (for pillarbox) then the values for <t1> and
 are used respectively for the left and right of the video
- <t1> = the number of the lines (columns) to over-write at the top (left) of each frame with the <blk> value. Valid values are 0 to 400

- `
` = the number of the lines (columns) to over-write at the bottom (right) of each frame with the `<blk>` value. Valid values are 0 to 400

As an example:

```
yuvletterbox inputfile.yuv 1920 1080 0 p 16 l 21 21
```

will produce a letterboxed version of the `inputfile.yuv` file, 1920x1080, all frames, progressive, black colour 16, with 21 black lines top and bottom (making a visible picture aspect ratio of 1:85:1)

The filename for the output file, with the letterboxed/pillarboxed content will be

```
inputfile_LBOX.yuv    if <l> = 'l', or (the '_LBOX' is added by yuvletterbox)
```


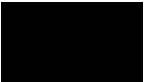














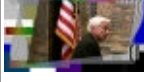







```
inputfile_PBOX.yuv    if <l> = 'p', or (the '_PBOX' is added by yuvletterbox)
```

The output file is put in the same folder as the input file.







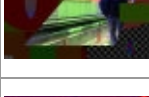

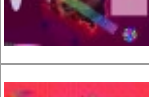


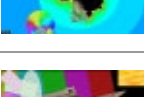

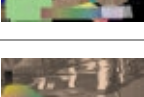
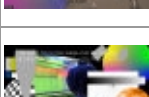
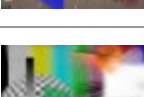










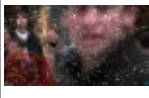



5. List of clips

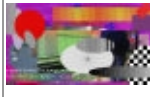



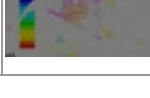
5.1 Clips summary

□ Total time of clips at each resolution (at 25 fps): **25 mins 00 secs 00 frames**

Clip number(s)	Title	Main purposes	Duration (mins:secs:frames) at 25fps	Begin	End
T2V006001, T2V006101, T2V006201	Bars_countdown	Monitor set up; text	00:30:00		
T2V006002, T2V006102, T2V006202	LeftRightSlow	Slow motion tracking, left-right	00:30:00		
T2V006003, T2V006103, T2V006203	UpDownSlow	Slow motion tracking, up-down	00:30:00		
T2V006004, T2V006104, T2V006204	LtRtUpDnSlow	Slow motion tracking, left-right and up-down concurrently, with obscuration	00:30:00		
T2V006005, T2V006105, T2V006205	LtRtUpDnFast	Rapid motion tracking, left-right and up-down concurrently, with obscuration	00:30:00		
T2V006006, T2V006106, T2V006206	DiagonalSlow	Diagonal slow motion tracking, with obscuration	00:30:00		
T2V006007, T2V006107, T2V006207	DiagonalFast	Diagonal fast motion tracking, with obscuration	00:30:00		
T2V006008, T2V006108, T2V006208	RotateLeftSlow	Tracking of slowly rotating objects & video (counter-clockwise)	00:30:00		
T2V006009, T2V006109, T2V006209	RotateRightSlow	Tracking of slowly rotating objects & video (clockwise)	00:30:00		
T2V006010, T2V006110, T2V006210	RotateAllSlow	Tracking of slowly rotating objects & video (both directions; with obscuration)	00:30:00		
T2V006011, T2V006111, T2V006211	RotateAllFast	Tracking of rapidly rotating objects & video (both directions, with obscuration)	00:30:00		
T2V006012, T2V006112, T2V006212	ZoomInSlow	Encoding efficiency when object & video sizes increasing (slowly)	00:30:00		

T2V006013, T2V006113, T2V006213	ZoomOutSlow	Encoding efficiency when object & video sizes decreasing (slowly)	00:30:00		
T2V006014, T2V006114, T2V006214	ZoomAllSlow	Encoding efficiency when object & video sizes increasing & decreasing (slowly)	00:30:00		
T2V006015, T2V006115, T2V006215	ZoomAllFast	Encoding efficiency when object & video sizes rapidly increase & decrease	00:30:00		
T2V006016, T2V006116, T2V006216	MoveRotateSlow	Objects and video moving and rotating slowly in any direction (with obscuration)	00:30:00		
T2V006017, T2V006117, T2V006217	MoveRotateFast	Objects and video moving and rotating rapidly in any direction (with obscuration)	00:30:00		
T2V006018, T2V006118, T2V006218	Circles	Tracking and coding efficiency of circular objects & video	00:30:00		
T2V006019, T2V006119, T2V006219	WarpingEllipses	Motion vector tracking of elliptical objects which change shape/aspect ratio	00:30:00		
T2V006020, T2V006120, T2V006220	Ellipses2Rectangles	Motion vector reliability where objects with rounded edges become straight-sided	00:30:00		
T2V006021, T2V006121, T2V006221	WarpingQuads	Motion vector reliability where straight-sided objects distort/slant	00:30:00		
T2V006022, T2V006122, T2V006222	WarpingShapes	Tracking and motion vectors when objects frequently change shape	00:30:00		
T2V006023, T2V006123, T2V006223	PuppetShapes	Tracking and efficiency of 'animal-like' movement	00:30:00		
T2V006024, T2V006124, T2V006224	Waves	Encoding efficiency of wave-like movement	00:30:00		
T2V006025, T2V006125, T2V006225	ThingsAffected	Tracking and efficiency of current & new objects moving/appearing	00:30:00		
T2V006026, T2V006126, T2V006226	EverythingAffected	Encoding efficiency of various transitions and rapid movement/changes	00:30:00		
T2V006027, T2V006127, T2V006227	SciFi	Encoding efficiency with 'sci-fi' scenes	00:30:00		

T2V006028, T2V006128, T2V006228	BrightColours	Encoding efficiency and motion tracking of brightly coloured & monochrome objects	00:30:00		
T2V006029, T2V006129, T2V006229	PaleColours	Encoding efficiency and motion tracking of pastel-coloured & monochrome objects	00:30:00		
T2V006030, T2V006130, T2V006230	ColourBrightness	Encoding efficiency where the colours and brightness of objects changes	00:30:00		
T2V006031, T2V006131, T2V006231	Dark2Light	Motion vectors within a scene which varies from dark to light	00:30:00		
T2V006032, T2V006132, T2V006232	Pattern1	Tracking patterned objects	00:30:00		
T2V006033, T2V006133, T2V006233	Pattern2	Tracking motion vectors/objects with a highly patterned background	00:30:00		
T2V006034, T2V006134, T2V006234	Grainy	Encoding efficiency of very grainy video	00:30:00		
T2V006035, T2V006135, T2V006225	ScratchySepia	Encoding efficiency of 'vintage video'	00:30:00		
T2V006036, T2V006136, T2V006236	Sharp2Blurry	Check of motion tracking when sharply-defined objects become blurred	00:30:00		
T2V006037, T2V006137, T2V006237	WarpingBlurriness	Check of motion vectors of blurred objects which change shape with sharp objects also	00:30:00		
T2V006038, T2V006138, T2V006238	Reflections	Checking correctness of motion vector tracking with two copies of nearly identical objects/video	00:30:00		
T2V006039, T2V006139, T2V006239	FadesWipes	Efficiency of dealing with standard and non-standard transitions	00:30:00		
T2V006040, T2V006140, T2V006240	AppearDisappear	Efficiency with multiple objects appearing/disappearing, e.g. in particular multiple reference images in H.264	00:30:00		
T2V006041, T2V006141, T2V006241	Fractals	Efficiency of encoding repeating patterns of linearly & logarithmically varying size	00:30:00		
T2V006042, T2V006142, T2V006242	Particles	Encoding efficiency with thousands of small objects moving in different directions	00:30:00		

T2V006043, T2V006143, T2V006243	Combo1	Mixture of Circles, Waves, ColourBrightness, Sharp2Blurry	00:30:00		
T2V006044, T2V006144, T2V006244	Combo2	Mixture of WarpingEllipses, ThingsAffected, Dark2Light, WarpingBlurriness	00:30:00		
T2V006045, T2V006145, T2V006245	Combo3	Mixture of Ellipses2Rectangles, EverythingAffected, Pattern1, Reflections	00:30:00		
T2V006046, T2V006146, T2V006246	Combo4	Mixture of WarpingQuads, SciFi, Pattern2, FadesWipes	00:30:00		
T2V006047, T2V006147, T2V006247	Combo5	Mixture of WarpingShapes, BrightColours, Grainy, AppearDisappear	00:30:00		
T2V006048, T2V006148, T2V006248	Combo6	Mixture of PuppetShapes, PaleColours, ScratchySepia, Fractals	00:30:00		
T2V006049, T2V006149, T2V006249	Wild1	Tough encoder test 1, with many things changing and fading/in out	00:30:00		
T2V006050, T2V006150, T2V006250	Wild2	Tough encoder test 2, with many things appearing/changing	00:30:00		

5.2 Clip features

5.2.1 PDF file searching for specific clip features

The PDF of the user manual may be searched to find clips that match the given CF-words ('CF'= Clip Feature).

5.2.2 Excel file sorting for specific clip features

In addition to the PDF of this manual, an Excel file is provided which lists all the clips and the clip features in columns. This spreadsheet is in Excel .xls format (compatible with Excel versions from 97-2000 and later).

There are two tabs in the spreadsheet:

- the first tab has the clip set title: this has all the items listed in the manual for the clip
- the second tab "Clip features" just lists the individual clips, with the list of their clip features and individual columns for each individual clip feature.

Probably the "Clip features" tab is easiest to use to find specific clips with specific features, although every column may be sorted for specific features, by clicking on the drop-down arrow adjacent to each column heading (the examples below are from the T2V001 USA East clip set)

1	A	B	C	D	E	F	G
2	Number(s)	Title	Filename(s)	Horizontal x vertical size	Progressive / Interlaced	Video format	Bits per sample
3	T2V001001, T2V001101, T2V001201	Bars_countdown	T2V001001_Bars_countdown_1920x1080p.yuv	1920x1080; 1280x720	'p' file suffix = progressive; 'i' YUV planar 4:8 (for each of 'HD color		
4	T2V001002, T2V001102, T2V001202	Stars_n_Stripes	T2V001002_Stars_n_Stripes_1920x1080p.yuv	1920x1080; 1280x720	'p' file suffix = progressive; 'i' YUV planar 4:8 (for each of 'US flag		
5	T2V001003, T2V001103, T2V001203	Times_Square	T2V001003_Times_Square_1920x1080p.yuv	T2 1920x1080; 1280x720	'p' file suffix = progressive; 'i' YUV planar 4:8 (for each of 'Some		
6	T2V001004, T2V001104, T2V001204	Chrysler_building	T2V001004_Chrysler_building_1920x1080p.yuv	1920x1080; 1280x720	'p' file suffix = progressive; 'i' YUV planar 4:8 (for each of 'Slow zo		
7	T2V001005, T2V001105, T2V001205	Display	T2V001005_Display_1920x1080p.yuv	T2V0011 1920x1080; 1280x720	'p' file suffix = progressive; 'i' YUV planar 4:8 (for each of 'Large o		

Click arrow to get drop-down list of items in this column (example below for 'SS.01 People')

AC	AD	AE	AF	AG
C.10	LC.11	SS.01	SS.02	SS.03
-	Some	(All) (Top 10 .) (Custom...)	One	-
-	-	-	-	-
-	-	Few	-	-
-	-	Many	-	-
-	-	One	-	-
-	-	People	-	-

Select 'One' to show only clips with 'One' under 'SS.01 People'

Note that this first tab on the spreadsheet is roughly 100 columns wide (from column A to column CZ), so it may be helpful to use the 'Freeze Panes' feature (on the 'Window' menu in Excel 2000 and 2003) or split windows to keep the clip number visible.

The "Clip features" tab appears and can be sorted as indicated below:

1	A	B	C	D	E	F	G
1	Clip number / name	Clip features	CF-animal	CF-angl	CF-bandin	CF-black_bac	CF-bright_da
2	T2V001001_Bars_countdown	CF-text, CF-dark_areas, CF-patterns, CF-black_background, CF-round_objects, CF-transitions, CF-large_monochromatic				y	
3	T2V001002_Stars_n_Stripes	CF-bright_colours, CF-large_monochromatic, CF-movement_across					
4	T2V001003_Times_Square	CF-panning, CF-complex_scene					
5	T2V001004_Chrysler_building	CF-zoom_in, CF-fine_details, CF-low_contrast, CF-dull_daylight					
6	T2V001005_Display	CF-high_contrast, CF-rapid_changes					
7	T2V001006_Smiling	CF-faces, CF-people					
8	T2V001007_Traffic_duty	CF-faces, CF-text, CF-people					
9	T2V001008_Empire_State	CF-patterns, CF-scroll, CF-faces, CF-hand_held					
10	T2V001009_FDNY	CF-out_of_focus, CF-vehicles					
11	T2V001010_Checked_caps	CF-people, CF-movement_out, CF-patterns					
12	T2V001011_Gold_statue	CF-water, CF-patterns, CF-large_monochromatic					
13	T2V001012_Eyewitness_news	CF-moving text					

Selecting a drop-down menu and clicking on 'y' reduces the list to those that have that CF value:

Clip number / name	Clip features
4 T2V001003 Times_Square	CF-panning, CF-complex_scene
34 T2V001033 People_crossing	CF-complex_scene, CF-vehicles, CF-people
36 T2V001035 Pan_left	CF-panning, CF-complex_scene, CF-tracking
45 T2V001044 Times_Sq_night	CF-night, CF-complex_scene, CF-dark_areas, CF-transitions, CF-scene_change, CF-graininess
48 T2V001047 Broadway	CF-night, CF-text, CF-complex_scene

5.2.3 List of 'CF' ('clip features') words used

- | | | |
|------------------------|----------------------|-------------------------------|
| CF-bright_sunlight | CF-bright_daylight | CF-dull_daylight |
| CF-indoors_bright | CF-sunrise_sunset | CF-twilight |
| CF-night | CF-indoors_dark | CF-shaded |
| CF-light_picture | CF-dark_areas | CF-brightness_change |
| CF-high_contrast | CF-low_contrast | CF-black_background |
| CF-bright_colours | CF-dull_colours | CF-highlights |
| CF-large_monochromatic | CF-monochromatic | CF-white_background |
| CF-scene_change | CF-transition | CF-subjects_behind_foreground |
| CF-movement_in | CF-movement_out | CF-movement_across |
| CF-rapid_movement | CF-random_movement | CF-low_movement |
| CF-movement_up/down | CF-diagonal_movement | CF-coordinated_movement |
| CF-hand_held | CF-angled | CF-from_above |
| CF-zoom_in | CF-panning | CF-tracking |
| CF-zoom_out | CF-scroll | CF-tracking_following |
| CF-out_of_focus | CF-rotation | |
| CF-people | CF-faces | CF-crowd |
| CF-talking_head | CF-round | CF-vehicles |
| CF-text | CF-buildings | CF-leaves |
| CF-water | CF-reflections | CF-trees |
| CF-patterns | CF-fine_details | CF-lines |
| CF-moiré | CF-clouds | CF-sky |
| CF-complex_scene | CF-graininess | CF-animals |
| CF-banding | CF-speeded_up | |
| CF-sound_talking | | |

6. Detailed information on individual clips

The following pages provide detailed information on the clips in this set.

6.1 Detailed description of each clip

This section contains detailed descriptions of each video clip, and the associated audio.

70 features are listed for each clip: the purpose of providing these descriptions is to make it easier to select specific clips for specific features.

Therefore even if a characteristic does occur in a particular clip, this is not necessarily listed where it is not a prominent feature and/or where it is believed that the clip would not be selected for this particular feature.

Clearly to some extent these descriptions and selections are subjective, and the user is likely to come to their own conclusions as to which are most relevant to their particular codec / situation: the descriptions provided are intended to be an appropriate starting point.

Bars_countdown



GN.01	Filenames	T2V006001_Bars_countdown_1920x1080p.yuv T2V006101_Bars_countdown_1280x720p.yuv T2V006201_Bars_countdown_1920x1080i.yuv
GN.02	Horizontal x vertical size(s)	1920x1080 : 1280x720
GN.03	Progressive / Interlaced	'p' file suffix = progressive; 'i' file suffix = interlaced
GN.04	Video format	YUV planar 4:2:0
GN.05	Bits per sample	8 (for each of Y, U, V)
GN.06	Video description	HD colour bars and countdown with title slate, black segment and audio tone & pips
GN.07	Principal purposes	Monitor set up; text
GN.08	Duration (mins:secs:frames) at 25 fps	00:30:00
GN.09	No. of frames (1080i 1 less)	750
GN.10	Original video format	1080p25; 720p25
GN.11	File size(s) on disk (MB)	2,333 : 1,037 : 2,330
GN.12	CF words	CF-text, CF-dark_picture, CF-patterns, CF-black_background, CF-round_objects, CF-transitions, CF-large_monochromatic
GN.13	Associated audio types	MPEG1 Layer II 48kHz 16bit stereo 384kbps Constant Bit Rate 16bit uncompressed 48kHz stereo WAV
GN.14	Associated audio filenames	T2a006x01_Bars_countdown_act_MP1LII.mpa T2a006y01_Bars_countdown_act_unc.wav
GN.15	Associated audio description	1kHz audio tone and pips on countdown
GN.16	Audio duration	Same as video (video played at 25fps)

Clip features	Details	LC.11	Large brightness change	Some	
LIGHT CONDITIONS		SCENE SUBJECTS			
LC.01	Bright sunlight	-	SS.01	People	-
LC.02	Bright daylight	-	SS.02	Faces	-
LC.03	Dull daylight	-	SS.03	Vehicles	-
LC.04	Shaded areas	-	SS.04	Buildings	-
LC.05	Indoors bright	-	SS.05	Trees	-
LC.06	Indoors dark	-	SS.06	Text	Some
LC.07	Twilight	-	SS.07	Talking head	-
LC.08	Sunrise/sunset	-	SS.08	Water	-
LC.09	Night	-	SS.09	Leaves/grass	-
LC.10	Backlighting	-	SS.10	Sky	-

SS.11	Clouds	-
SS.12	Patterns	Some
SS.13	Round objects	One

SCENE PROPERTIES

SP.01	Depth of field	-
SP.02	Out-of-focus	-
SP.03	Fine lines / moiré patterns	-
SP.04	Reflections	-
SP.05	Scene change	4
SP.06	Fades	-
SP.07	Transitions	4
SP.08	Slow/fast motion	-

COLOURS & CONTRAST

CC.01	Light picture	Most
CC.02	Dark picture	Black
CC.03	Bright colours	Some
CC.04	Dull colours	-
CC.05	Fine detail/moiré patterns	-
CC.06	High contrast areas	Some
CC.07	Large monochromatic areas	Some
CC.08	Graininess	-
CC.09	Black background	10 seconds
CC.10	White background	-

GLOBAL MOTION

GM.01	Fast track/pan	-
GM.02	Tracking in/out	-
GM.03	Tracking	-
GM.04	Panning	-
GM.05	Tracking (following)	-
GM.06	Fast scroll	-
GM.07	Scroll	-
GM.08	Angled	-
GM.09	Zoom in	-
GM.10	Zoom out	-
GM.11	Hand-held camera	-

SUBJECT MOTION

SM.01	Movement out of picture	-
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SM.02	Movement into picture	-
SM.03	Movement across picture	-
SM.04	Movement up/down	-
SM.05	Diagonal movement	-
SM.06	Subjects behind foreground objects	-
SM.07	Low movement	Yes

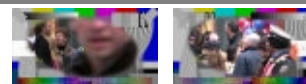
SOUND CONTENT

SC.01	Talking	-
SC.02	Movement	-
SC.03	Vehicles	-
SC.04	Wind	-
SC.05	Music	-
SC.06	Background	-
SC.07	Other	1kHz tone

SOUND CHARACTERISTICS

SH.01	Mono/ stereo	Stereo
SH.02	Average volume	Mid
SH.03	Level changes	-
SH.04	Clear/ distorted	-

LeftRightSlow



GN.01	Filenames	T2V006002_LeftRightSlow_1920x1080p.yuv T2V006102_LeftRightSlow_1280x720p.yuv T2V006202_LeftRightSlow_1920x1080i.yuv
GN.02	Horizontal x vertical size(s)	1920x1080; 1280x720
GN.03	Progressive / Interlaced	'p' file suffix = progressive; 'i' file suffix = interlaced
GN.04	Video format	YUV planar 4:2:0
GN.05	Bits per sample	8 (for each of Y, U, V)
GN.06	Video description	Test card objects & video moving slowly left/right (only)
GN.07	Principal purposes	Slow motion tracking, left-wards
GN.08	Duration (mins:secs:frames) at 25 fps	00:30:00
GN.09	No. of frames	750
GN.10	1080i generation / artefacts	None (n/a)
GN.11	Original video format	1080p : 720p : 1080i
GN.12	File size(s) on disk (MB)	2,333 : 1,037 : 2,333
GN.13	CF words	CF-moiré , CF-patterns , CF-people, CF-complex_scene, CF-movement_across, CF-subjects_behind_foreground, CF-bright_colours
GN.14	Associated audio types	MPEG1 Layer II 48kHz 16bit stereo 384kbps Constant Bit Rate 16bit uncompressed 48kHz stereo WAV
GN.15	Associated audio filenames	T2a006x02_LeftRightSlow_act_MP1LII.mpa T2a006y02_LeftRightSlow_act_unc.wav
GN.16	Associated audio description	Music mixed with sound recorded with video
GN.17	Audio duration	Same as video (video played at 25fps)

	Clip features	Details	LC.11	Large brightness change	Some
LIGHT CONDITIONS			SCENE SUBJECTS		
LC.01	Bright sunlight	-	SS.01	People	Many
LC.02	Bright daylight	-	SS.02	Faces	Many
LC.03	Dull daylight	Some	SS.03	Vehicles	Cars
LC.04	Shaded areas	-	SS.04	Buildings	-
LC.05	Indoors bright	-	SS.05	Trees	-
LC.06	Indoors dark	-	SS.06	Text	Moving
LC.07	Twilight	-	SS.07	Talking head	-
LC.08	Sunrise/sunset	-	SS.08	Water	-
LC.09	Night	-	SS.09	Leaves/grass	-
LC.10	Backlighting	-	SS.10	Sky	-
			SS.11	Clouds	-

SS.12	Patterns	Many
SS.13	Round objects	One

SCENE PROPERTIES

SP.01	Depth of field	Shallow
SP.02	Out-of-focus	Some
SP.03	Fine lines / moiré patterns	Lots
SP.04	Reflections	-
SP.05	Scene change	-
SP.06	Fades	-
SP.07	Transitions	-
SP.08	Slow/fast motion	Lots slow & fast

COLOURS & CONTRAST

CC.01	Light picture	Areas
CC.02	Dark picture	-
CC.03	Bright colours	Area
CC.04	Dull colours	-
CC.05	Fine detail/moiré patterns	Lots
CC.06	High contrast areas	Several
CC.07	Large monochromatic areas	Several
CC.08	Graininess	-
CC.09	Black background	-
CC.10	White background	Little

GLOBAL MOTION

GM.01	Fast track/pan	-
GM.02	Tracking in/out	-
GM.03	Tracking	-
GM.04	Panning	-
GM.05	Tracking (following)	-
GM.06	Fast scroll	-
GM.07	Scroll	-
GM.08	Angled	-
GM.09	Zoom in	-
GM.10	Zoom out	-
GM.11	Hand-held camera	-

SUBJECT MOTION

SM.01	Movement out of picture	-
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SM.02	Movement into picture	-
SM.03	Movement across picture	Lots, slow & fast
SM.04	Movement up/down	-
SM.05	Diagonal movement	-
SM.06	Subjects behind foreground objects	Many
SM.07	Low movement	-

SOUND CONTENT

SC.01	Talking	-
SC.02	Movement	-
SC.03	Vehicles	Traffic
SC.04	Wind	-
SC.05	Music	Mid-volume
SC.06	Background	-
SC.07	Other	-

SOUND CHARACTERISTICS

SH.01	Mono/ stereo	Stereo
SH.02	Average volume	Mid
SH.03	Level changes	-
SH.04	Clear/ distorted	-