



T2V004 LowRes User Manual

Video Clips for
Testing and Optimisation of
Video Compression



www.testvid.com

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To find particular video clips that contain specific features/subjects that you wish to test for, it is recommended that you use the PDF version of this manual as this allows fast electronic searching for specific clip features using the "CF-words" (see section 5.2 for more information).

T2V004_LowRes User manual v1.0c

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1. Overview of T2V004 LowRes

2-D / 3-D	2D		
Compressed/ Uncompressed	Uncompressed		
Description of video	Scenes from Europe (London, Barcelona, Bruges, Munich) and USA (New York, San Francisco, Las Vegas)		
Purpose	Test an encoder to deal with lower resolution video (D1PAL and below; web-sized), in all aspects of global and local motion, slow/medium/fast motion, with panning, scrolling, zooming, smooth and erratic, high/low contrast, with limited colours/vivid colours and many common subject types		
Number of clips	840 individual video clips: 70 each at resolutions given below		
Length of video	Total of over 9 hours 52 minutes, comprising over 49 minutes each at resolutions given below		
Resolution and format of clips	Format name	Resolution	Interlaced / progressive
(see section 3.2.2 for more information)	D1PAL	720x576	interlaced, bottom field first
	NTSC	720x480	interlaced, bottom field first
	VGA	640x480	progressive
	QVGA	320x240	progressive
	QQVGA	160x120	progressive
	QtrQQVGA	80x60	progressive
	CIF	352x288	progressive
	QCIF	176x144	progressive
	MobMid	480x234	progressive
	MobLow	220x176	progressive
	BanLdr	728x90	progressive
	BanSky	160x600	progressive
Total size on disk	179 GBytes		
Video data format	YUV 4:2:0 planar 8 bits per sample		
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 40 - 60 in a set, lasting from 15 - 40 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 4 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. T2V004 LowRes Clip set description

3.1 Set content types

This set of video clips comprise a range of subjects, motion, colours, light levels designed to test and stress video encoders by providing a varied set of conditions:

- ❑ subject types such as people, traffic, buildings, sky, water, trees, text..
- ❑ movement types such as panning, zooming in/out, tracking, hand-held camera
- ❑ subject motion such as into, out of or across the picture, in front of and partially behind objects
- ❑ lighting conditions, from bright sunlight, dull daylight, shaded areas, indoors..
- ❑ varying camera properties such as depth of field, in/out-of-focus..
- ❑ hard to encode items such as reflections, fine lines, patterns, round objects..
- ❑ and with sound associated with some clips

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 over 9 hours 52 minutes (over 49 minutes in each of the formats).

3.2 Individual clips provided

A total of 840 YUV clips are provided, comprising 70 individual clips each at the resolutions given in section 3.2.2 below. All the clips were originally filmed at 1920x1080 resolution: this set of clips have been downsized from this resolution.

3.2.1 Clip downsizing, cropping, pixel aspect ratio

The clips of this set have been downsized from the 1920x1080 using a proprietary scaling algorithm (superior to bicubic interpolation).

In order maintain a 1:1 pixel aspect ratio, after scaling the clips in this set have been cropped in either horizontal or vertical dimension. The cropping of the resulting frame has been done in the dimension which gives the minimum downsizing. For example:

	Horizontal size after scaling	Vertical size after scaling	Horizontal crop	Vertical crop
NTSC 720x480i	854	480	134	0
BanLdr 728x90	728	410	0	320

The cropping is done equally from each side / top & bottom.

Note that for some video clips this may mean that the main subject is not maintained in the video (e.g. in particular BanLdr and BanSky formats)

3.2.2 Clip sizes

The clips of this set have been produced from 1920x1080 original size video, downsized to the resolutions given below.

For each YUV clip the following naming convention is used:

T2V004nncc_<Clipname>_<xsize>_<ysize><f>.yuv

where

nn	Number 00 to 11 denoting format:
	00 D1PAL 720x576 interlaced, bottom field first
	01 NTSC 720x480 interlaced, bottom field first
	02 VGA 640x480 progressive
	03 QVGA 320x240 progressive
	04 QQVGA 160x120 progressive
	05 QtrQQVGA 80x60 progressive
	06 CIF 352x288 progressive
	07 QCIF 176x144 progressive
	08 MobMid 480x234 progressive (mobile mid-res *)
	09 MobLow 220x176 progressive (mobile low-res *)
	10 BanLdr 728x90 progressive (banner 'leaderboard' **)
	11 BanSky 160x600 progressive (banner 'skyscraper' **)
cc	Number of clip content, 01-70
<Clipname>	Name of clip content
<xsize>	Horizontal resolution in pixels
<ysize>	Vertical resolution of frame in pixels. Note that for Interlaced video (D1PAL and NTSC) each field is half this height
<f>	'p' or 'i', denoting Progressive or Interlace

Examples:

- T2V0040002_Big_Ben_720x576i.yuv
 is: the 'Big Ben' scene, D1PAL, 720x576, interlaced
- T2V0040802_Big_Ben_480x234p.yuv
 is the same 'Big Ben' scene, but in this case 'MobMid' resolution i.e. 480x234, progressive

* The sizes of the MobMid (mobile mid-resolution) and MobLow (mobile low resolution) are common screen sizes for hand-held devices

** The sizes and names for BanLdr (banner 'leaderboard') and BanSky (banner 'skyscraper' or 'wide skyscraper') are recommended sizes for web-based video advertisements, as proposed by the Interactive Advertising Bureau Ad Sizes Working Group and as endorsed by Google, IMU (Interactive Marketing Unit) and UAP (part of Universal Ad Package)

Note that the software utility program

yuvcropsizes.exe

can be used to crop the provided video to smaller sizes to generate almost any size video required from the video provided. See section 4.1 below.

3.2.3 Clip formats

Each of these clips are:

- ❑ planar YUV 4:2:0 (i.e. for progressive video, a frame of Y followed by a frame of U then a frame of V, where the U and V are both are half the resolution of the Y plane, horizontally and vertically; for interlaced video, the bottom field of Y plane followed by a plane of U then a plane of V, where the U and V are both are half the resolution of the Y plane. See sections 3.2.4 and 4.3.3)
- ❑ 8-bits (one byte) per sample
- ❑ progressive scan where indicated by 'p' suffix in the filename and interlaced where indicated by 'i' suffix in the filename
- ❑ square pixels
- ❑ picture aspect ratio appropriate to the horizontal and vertical resolutions
- ❑ 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 filmed at 25 frames per second, although the YUV may be re-played / encoded at any speed (such as 24 or 29.97 fps).

3.2.4 Generation of interlaced video

All the clips were originally filmed progressive. In order to generate the correct fields representing the video data at the time between the progressive fields, in-house software has been used. Normally this has been done by calculating pixel-by-pixel motion vectors from one frame to the next in order to generate the intermediate time frame. For the many of the clips this process works well: sometimes it does not due to excessive movement or other factors.

Where there are minor artefacts in the generated frames of the video these are noted in box GN.10 of the clip description (in order to ensure that these are not interpreted as encoder errors).

For video clips where the motion vector calculations produce a large number of artefacts, the intermediate fields have been generated by blending the preceding and following frames together. Where this is the case the interlaced clip has been denoted below with 'Frame blend' in box GN.10.

Most (not all) of the generated interlaced clips are one frame shorter than the progressive clips upon which they are based (this is a by-product of the generation process), as indicated in box GN.10.

3.3 Format of video on disk

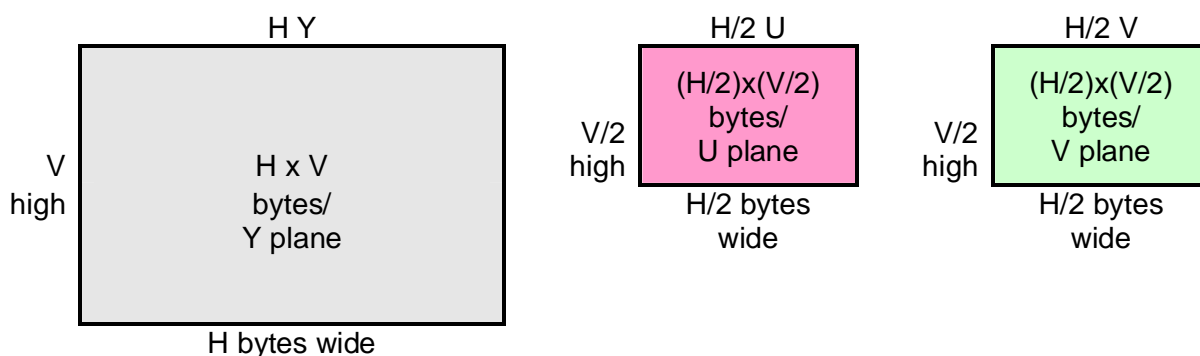
All the YUV video is stored in planar form, i.e. a plane of Y followed by a plane of U followed by a plane of V.

3.3.1 Progressive (all clips other than D1 PAL and NTSC)

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



where H = horizontal size of one frame

V = vertical size of one frame

E.g. for CIF video

$H = 352$

$V = 288$

Y plane is 101,376 bytes; U and V planes are 25,344 bytes each

Valid video data ranges:

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

3.3.2 Interlaced (D1 PAL and NTSC)

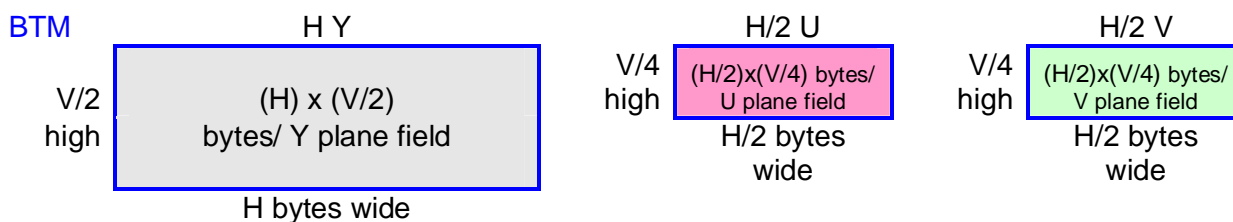
Byte 0 in the file is the Y data of the pixel at top left of the first frame.

Note: as supplied, the interlaced video (D1 PAL and NTSC) is stored on disk with alternating fields of YUV, bottom field first. If the interlaced 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 3.2.4 and 4.3.3 for more information.

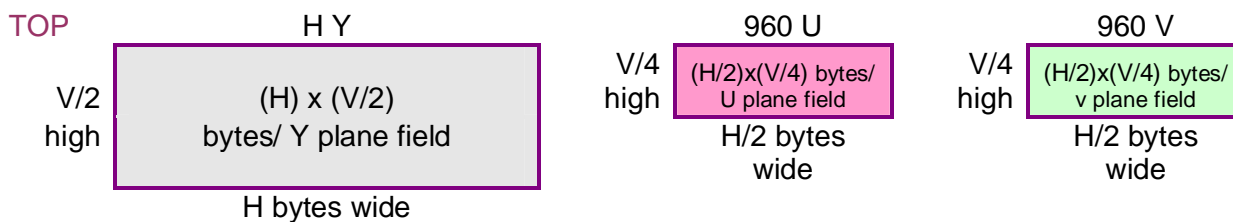
Each frame of Y, U and V is divided into alternating fields, bottom field first, with the YUV data as follows (each field being half the height of the frame):

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:



where H = horizontal size of one frame
V = vertical size of one frame

I.e. for D1 PAL video H = 720
V = 576
Y plane field is 207,360 bytes; U and V planes are 51,840 bytes each

NTSC video H = 720
V = 480
Y plane field is 172,800 bytes; U and V planes are 43,200 bytes each

Valid video data ranges:

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

3.4 Audio

Audio clips are provided for every video clip, matching the video length. In the vast majority of cases this was the actual audio recorded with the video.

Where the audio provided was not recorded with the video, similar/appropriate audio is provided, matched in time-length. This is denoted by `'_sim_'` in the audio filename (instead of `'_act_'`, denoting actual audio recorded at the time).

Clearly the main point of the *Tvids* is video testing, so the audio supplied is intended to be used to check timing/correlation during the encode process rather than to be particularly useful as standalone audio. Consequently, this audio has not been cleaned up or normalised and nor was much time spent in ensuring good audio recording during filming.

All 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

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, so the data rate required when playing the highest resolution video i.e. the PAL or NTSC video within this set is 16 Mbytes per second: this sustained rate should be achievable using standard 7200rpm disks in a reasonable computer.

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 30 -s 720x480 -i <infile.yuv> -vcodec copy <outfile.avi>
```

where

- ❑ `-r 30` sets the frame rate to 25 fps (FFMPEG default is 25 fps)

- ❑ `-s 720x480` sets the resolution of the input file (in this case, NTSC)
- ❑ `<infile.yuv>` is the input YUV filename
- ❑ `<outfile.avi>` is the output AVI filename

Note that the PAL and NTSC interlaced files are separate fields, with each field 720 horizontal and 288 / 240 vertical. Most likely, it will be better to combine these separate fields into frames 720 horizontal and 288 / 240 vertical, before putting into an AVI: use the provided [TestVid](#) program `yuvfieldcombine` to do this (see section **Error! Reference source not found.** 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.

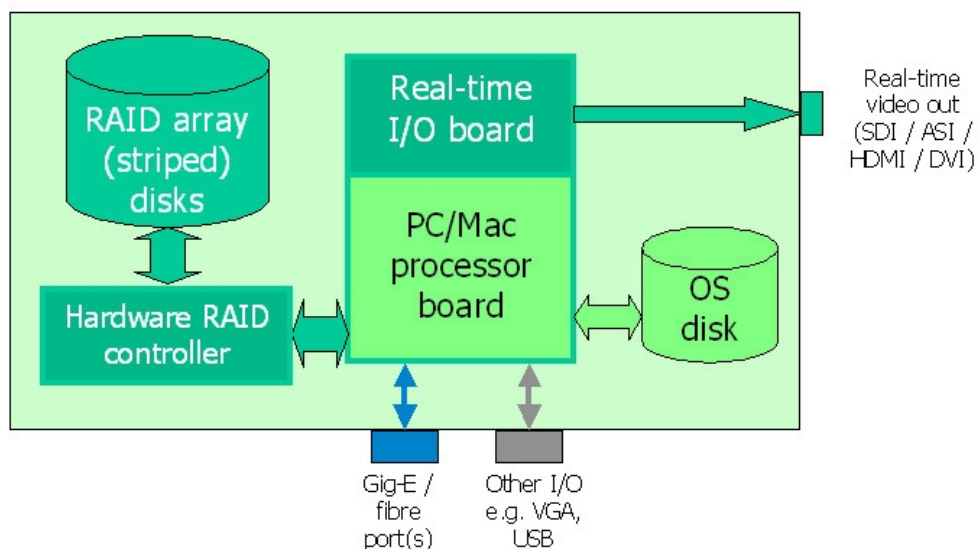
All video servers, many hardware encoders and a large proportion of other professional broadcast equipment have internal hard disks and Gig-E Ethernet interfaces. This allows the [Tvids](#) to be directly copied over the Ethernet network onto the hard disk, and play-out from there.

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 yuvcropsize

This is a command line program for reducing the size of any of the provided video by removing lines from the top and/or columns from the right of each video frame.

Usage:

```
yuvcropsize <inputfile.yuv> <p> <xsize> <ysize> <xcrop> <ycrop> <fff>
```

where

- <inputfile.yuv> is the input filename (must have extension .yuv)
- <p> = progressive or interlaced input file, set to 'p' or 'i'
- <xsize> = horizontal resolution of the input file
- <ysize> = vertical resolution of frame of the input file (for interlaced, this is the frame vertical resolution, not the field vertical resolution e.g. this value would be 576 for D1PAL input video)
- <xcrop> = number of columns to crop from the right-hand side of each frame. Limitations: this must a multiple of 2 (yuvcropsize will round up if this is not the case); the remaining number of columns in a frame cannot be less than 16 (yuvcropsize will reduce xcrop if this is not the case).
- <ycrop> = number of lines to crop from the top of each frame. Limitations: this must a multiple of 2 for progressive input files and multiple of 4 for interlace input files (yuvcrop will round up if this is not the case); the remaining number of lines in a frame cannot be less than 16 (yuvcropsize will reduce ycrop if this is not the case).
- <fff> = number of video frames to process. Set to 0 to process all frames. If <fff> is greater than the number of frames then all frames will be processed

The filename for the output file, with the lines/columns removed, will be

```
inputfile_CROP_<newx>x<newy>.yuv
```

where <newx> and <newy> are the new horizontal and vertical dimensions of the cropped file (the '_CROP_<newx>x<newy>' is added by yuvcropsize).

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> <tl>
```


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)
```


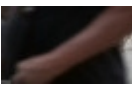
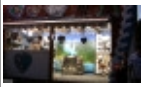










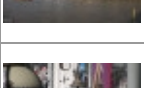
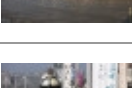

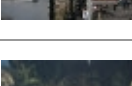




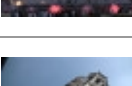
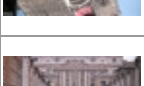



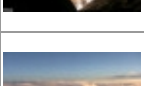
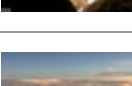
The output file is put in the same folder as the input file.

5. List of clips

5.1 Clips summary

□ Total time of clips at each resolution (at 25 fps): **49 mins 25 secs 08 frames**

Clip number(s)	Title	Main purposes	Duration (mins:secs:frames) at 25fps	Begin	End
T2V004nn01	Bars countdown	Monitor set up; text	00:50:00		
T2V004nn02	Big Ben	Rapid motion tracking and linear detail patterns with bright colours and large monochromatic areas	00:17:13		
T2V004nn03	Red leaves	Shallow focus on detailed natural patterns and irregular global motion	01:01:24		
T2V004nn04	Priest	Compression of facial features with objects passing behind and in front	00:49:06		
T2V004nn05	Eye pod	Slow global motion with high contrast	02:23:18		
T2V004nn06	Angled ride	Fast global motion	00:29:00		
T2V004nn07	Duckman	Compression of bright and rounded features with quick movement	00:47:19		
T2V004nn08	Green weed	Macroblock motion vectors in high contrast image, with small particles in front of objects	00:34:04		
T2V004nn09	Neon tunnel	Medium speed leftwards global motion with rapid irregular motion and bright changing colours	01:05:16		
T2V004nn10	Pidgeon bully	Compression of fur-like detailed features with shallow focus	00:39:21		
T2V004nn11	Red white crane	Rapid global and macroblock motion vector tracking behind objects	00:22:04		
T2V004nn12	Raindrops	Irregular random objects (raindrops) with patterns and fine detail	00:32:07		

T2V004nn13	Polizia	Text and people compression with limited then rapid global motion and macroblock motion vector tracking	01:31:09		
T2V004nn14	Beer festival	High contrast early evening images with some very bright and some dark grainy images with people	00:31:15		
T2V004nn15	Mind the wall	Compression of very rapidly moving patterns (rapid but consistent global motion and macroblock motion vectors)	00:21:04		
T2V004nn16	Little girl	Random but relatively slow global motion with zoom in and tracking person with people obscuring view	00:51:11		
T2V004nn17	Flower focus	Brightly sunlit natural patterns with focus shifting and zoom out	01:14:02		
T2V004nn18	Bike woman	Medium speed tracking of motion vectors with frequently obscured subject and opposite direction global motion in highly patterned image	00:32:11		
T2V004nn19	Cargo boat	Tracking linear object moving on water with round and detailed pattern objects in background	00:43:09		
T2V004nn20	Globes	Slow global zoom out with round objects and rapidly changing focus	00:18:16		
T2V004nn21	Lion fish	Motion vector tracking slow moving natural high-contrast patterns	01:01:12		
T2V004nn22	Nelsons monument	Slow global scroll down with irregular shapes and patterns and irregular small global movement	00:25:19		
T2V004nn23	Lit fountains	High contrast indistinct objects (water) rapidly changing position and colour in grainy image	01:18:00		
T2V004nn24	Clock tower	Macroblock motion vectors of identical mirrored areas with detail but monochromatic background	00:10:17		
T2V004nn25	Vatican traffic	Complex scene with multiple objects for motion vector tracking, with scene jump	00:21:17		
T2V004nn26	Water up	High contrast image macroblock motion vector tracking with random angled motion	00:25:11		
T2V004nn27	Sky clouds	Slow uniform global motion and macroblock tracking of indistinct irregular shapes	01:03:06		

T2V004nn28	Times Square	Global motion of frame to the right with some fast-moving objects in opposite direction	00:29:14		
T2V004nn29	Chrysler building	Global zoom of low-contrast complex scene with many fine lines and detail	00:38:13		
T2V004nn30	Display	Rapidly changing scene on display, with high-contrast	00:21:10		
T2V004nn31	Smiling	Compression of faces, some in and some out of focus	00:19:17		
T2V004nn32	Traffic duty	Compression of people with many movements and some obscuration	00:32:19		
T2V004nn33	Empire State	Global motion scrolling up with fine lines, patterns and angles	00:57:17		
T2V004nn34	Checked caps	Motion vectors of multiple people moving semi-randomly with some obscuration and out-of-focus	00:21:19		
T2V004nn35	Gold statue	Compression of water and largely monochromatic object but which has round and other patterns	00:49:07		
T2V004nn36	Eyewitness news	Compression of rapidly moving text	00:13:06		
T2V004nn37	Buggy ride	Tracking of large object in foreground moving across detailed background	00:40:00		
T2V004nn38	Couple talking	Efficiency check dealing with scene with low movement but fine-detailed background	01:00:09		
T2V004nn39	86th floor	Global motion of pseudo-random movement of whole scene, then global zoom out in addition	00:35:21		
T2V004nn40	Please tell	Compression of screen dots/potentially moiré fringing	00:36:16		
T2V004nn41	Traffic twds	Motion vectors of multiple objects growing larger	00:12:16		
T2V004nn42	NY rant	Efficient compression of talking head foreground and multiple objects moving in background	00:53:08		

T2V004nn43	Grey buildings	Compression of patterns and lines in visually flat areas (test ringing artefacts around lines)	00:30:03	
T2V004nn44	Blue coat	Efficiency of talking heads compression with movement and increasing size	00:24:13	
T2V004nn45	People crossing	Motion vectors of many objects and people of different sizes moving in different directions	00:35:18	
T2V004nn46	Pan left	Tracking of large object filling image then across detailed scene including text then tracking multiple objects (people)	00:31:23	
T2V004nn47	Washington Circle	Circular global motion of high contrast but largely monochromatic objects with patterns	00:18:16	
T2V004nn48	Running backwards	Compression of scene played backwards	00:25:05	
T2V004nn49	Following	Compression of highly random movement with highlights on large dark area	00:24:23	
T2V004nn50	Times Sq night	High contrast with multiple very dark areas and very bright areas	00:26:11	
T2V004nn51	Evening cabs	Night-time scene with many reflective objects mainly getting smaller	00:43:11	
T2V004nn52	Football game	Motion vectors of objects (people) moving in random directions with pattern and detail (grass) behind	00:56:22	
T2V004nn53	Coney Island	Text compression and tracking of object (man) in busy scene with largely monochromatic but detailed area (sand)	00:32:21	
T2V004nn54	Hazy crowd	Motion vectors of very large number of objects (people) in low-contrast scene	00:31:08	
T2V004nn55	Dizzy dragons	Compression of large high contrast rapidly moving areas (mainly monochromatic), with frequent obscuration	01:05:21	
T2V004nn56	Turnpike	Motion vectors of small objects moving fast, diagonally, where intermediate frames have been removed	00:52:11	
T2V004nn57	Enjoy the adventure	Slow global motion & slow zoom	00:47:19	

T2V004nn58	Pier 39 shops	Medium speed macroblock motion vectors	01:08:16	
T2V004nn59	Close up carousel	Fast macroblock motion vectors with obscured objects	00:15:11	
T2V004nn60	Golden evening	Slow global zoom in high contrast with fine lines and out-of-focus	02:27:15	
T2V004nn61	Waiting in line	Global motion around focus point	00:52:08	
T2V004nn62	Seagull	Slow global motion and macroblock tracking with highly reflective background	00:21:07	
T2V004nn63	Boat reflection	High reflectivity high contrast	00:21:08	
T2V004nn64	Cable car turn	High contrast with tracking of large macroblock areas	00:50:01	
T2V004nn65	Streets of San Francisco	Highly erratic random global motion and zoom out with line detail and obscured subjects	01:59:17	
T2V004nn66	Blue boarding	Very rapid pan left with high contrast areas	00:07:01	
T2V004nn67	SF silhouette	Slow global zoom with high contrast and over-bright highlights	00:36:02	
T2V004nn68	Moneyrail	High contrast bright colours and reflections with text, with slow global motion and large area macroblock motion	00:50:03	
T2V004nn69	Chandelier reflections	Macroblock motion vector nightmare (very hard to correlate correct macroblocks)	00:17:11	
T2V004nn70	The Real Thing	Slow pan up/down/right with high contrast/high detail and text	00:44:00	

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 'Somehw	
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
2	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:

I	J	K	L	M
CF-bright_daylight	CF-bright_sunlight	CF-brightness_change	CF-complex_scene	CF-coordinated_movement

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

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

- | | | |
|------------------------|-----------------------|-------------------------------|
| 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-zoom_in | CF-zoom_out | |
| CF-panning | CF-scroll | CF-from_above |
| CF-tracking | CF-tracking_following | |
| CF-out_of_focus | CF-depth_of_field | |
| 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-moire

CF-sky

CF-complex_scene

CF-rapid_changes

CF-sound_talking

CF-wind

CF-clouds

CF-graininess

CF-speeded_up

CF-sound_vehicles

CF-clear_distorted

CF-moving_text

CF-animals

CF-music

CF-level_changes

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	T2V004nn01_Bars_countdown_<xsize>x<ysize><f>.yuv (see manual section 3.2.2 for key)
GN.02	Horizontal x vertical size(s)	720x576i; 720x480i; 352x288p; 176x144p; 640x480p; 320x240p; 160x120p; 80x60p; 480x234p; 220x176p; 728x90p; 160x600p
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 *	00:50:00
GN.09	No. of frames (PAL & NTSC 1 less *)	1250
GN.10	PAL & NTSC interlace generation / artefacts	Frame blend
GN.11	Original video format	1080p25
GN.12	File size(s) on disk (MB)	777 : 647 : 647 : 48 : 576 : 144 : 36 : 9 : 211 : 73 : 123 : 180
GN.13	CF words	CF-text, CF-dark_picture, CF-patterns, CF-black_background, CF-round_objects, CF-transitions, CF-large_monochromatic
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	T2a004x01_Bars_countdown_act_MP1LII.mpa T2a004y01_Bars_countdown_act_unc.wav
GN.16	Associated audio description	1kHz audio tone and pips on countdown
GN.17	Audio duration	Same as video (video played at 25fps)

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

SS.05	Trees	-	GM.08	Angled	-
SS.06	Text	Some	GM.09	Zoom in	-
SS.07	Talking head	-	GM.10	Zoom out	-
SS.08	Water	-	GM.11	Hand-held camera	-
SS.09	Leaves/grass	-	SUBJECT MOTION		
SS.10	Sky	-	SM.01	Movement out of picture	-
SS.11	Clouds	-	SM.02	Movement into picture	-
SS.12	Patterns	Some	SM.03	Movement across picture	-
SS.13	Round objects	Some	SM.04	Movement up/down	-
SCENE PROPERTIES			SM.05	Diagonal movement	-
SP.01	Depth of field	-	SM.06	Subjects behind foreground objects	-
SP.02	Out-of-focus	-	SM.07	Low movement	Yes
SP.03	Fine lines / moiré patterns	-	SOUND CONTENT		
SP.04	Reflections	-	SC.01	Talking	-
SP.05	Scene change	4	SC.02	Movement	-
SP.06	Fades	-	SC.03	Vehicles	-
SP.07	Transitions	4	SC.04	Wind	-
SP.08	Slow/fast motion	-	SC.05	Music	-
COLOURS & CONTRAST			SC.06	Background	-
CC.01	Light picture	Most	SC.07	Other	1kHz tone
CC.02	Dark picture	Black	SOUND CHARACTERISTICS		
CC.03	Bright colours	Some	SH.01	Mono/ stereo	Stereo
CC.04	Dull colours	-	SH.02	Average volume	Mid
CC.05	Fine detail/moiré patterns	-	SH.03	Level changes	-
CC.06	High contrast areas	Some	SH.04	Clear/ distorted	-
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	-			

Big_Ben



GN.01	Filenames	T2V004nn02_Big_Ben_<xsize>x<ysize><f>.yuv (see manual section 3.2.2 for key)
GN.02	Horizontal x vertical size(s)	720x576i; 720x480i; 352x288p; 176x144p; 640x480p; 320x240p; 160x120p; 80x60p; 480x234p; 220x176p; 728x90p; 160x600p
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	Looking up at London bus passing in front of Big Ben
GN.07	Principal purposes	Rapid motion tracking and linear detail patterns with bright colours and large monochromatic areas
GN.08	Duration (mins:secs:frames) at 25 fps	00:17:13
GN.09	No. of frames	438
GN.10	PAL & NTSC interlace generation / artefacts	Frame blend
GN.11	Original video format	1080p25
GN.12	File size(s) on disk (MB)	272 : 227 : 227 : 17 : 202 : 50 : 13 : 3 : 74 : 25 : 43 : 63
GN.13	CF words	CF-bright_daylight, CF-buildings, CF-fine_details, CF- large_monochromatic, CF-monochromatic, CF- movement_across, CF-round, CF-scroll, CF-sky, CF- subjects_behind_foreground, CF-vehicles
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	T2a004x02_Big_Ben_act_MP1LII.mpa T2a004y02_Big_Ben_act_unc.wav
GN.16	Associated audio description	Actual audio recorded with video
GN.17	Audio duration	Same as video (video played at 25fps)

	Clip features	Details			
			LC.08	Sunrise/sunset	-
			LC.09	Night	-
			LC.10	Backlighting	-
			LC.11	Large brightness change	-
			SCENE SUBJECTS		
			SS.01	People	-
			SS.02	Faces	-
			SS.03	Vehicles	Buses
			SS.04	Buildings	One
	LIGHT CONDITIONS				
LC.01	Bright sunlight	-			
LC.02	Bright daylight	All			
LC.03	Dull daylight	-			
LC.04	Shaded areas	-			
LC.05	Indoors bright	-			
LC.06	Indoors dark	-			
LC.07	Twilight	-			

SS.05	Trees	-	GM.02	Tracking in/out	-
SS.06	Text	-	GM.03	Tracking	-
SS.07	Talking head	-	GM.04	Panning	-
SS.08	Water	-	GM.05	Tracking (following)	-
SS.09	Leaves/grass	-	GM.06	Fast scroll	-
SS.10	Sky	Monochromatic blue	GM.07	Scroll	Slow Up
SS.11	Clouds	-	GM.08	Angled	-
SS.12	Patterns	Many	GM.09	Zoom in	-
SS.13	Round objects	Few	GM.10	Zoom out	Once, fast
SCENE PROPERTIES			SUBJECT MOTION		
SP.01	Depth of field	Deep	SM.01	Movement out of picture	-
SP.02	Out-of-focus	-	SM.02	Movement into picture	-
SP.03	Fine lines / moiré patterns	-	SM.03	Movement across picture	Lots, fast
SP.04	Reflections	-	SM.04	Movement up/down	-
SP.05	Scene change	-	SM.05	Diagonal movement	-
SP.06	Fades	-	SM.06	Subjects behind foreground objects	-
SP.07	Transitions	-	SM.07	Low movement	-
SP.08	Slow/fast motion	-	SOUND CONTENT		
COLOURS & CONTRAST			SC.01	Talking	-
CC.01	Light picture	-	SC.02	Movement	-
CC.02	Dark picture	-	SC.03	Vehicles	Traffic
CC.03	Bright colours	-	SC.04	Wind	-
CC.04	Dull colours	-	SC.05	Music	-
CC.05	Fine detail/moiré patterns	-	SC.06	Background	-
CC.06	High contrast areas	-	SC.07	Other	-
CC.07	Large monochromatic areas	One (sky)	SOUND CHARACTERISTICS		
CC.08	Graininess	-	SH.01	Mono/ stereo	Stereo
CC.09	Black background	-	SH.02	Average volume	Loud
CC.10	White background	-	SH.03	Level changes	-
GLOBAL MOTION			SH.04	Clear/ distorted	-
GM.01	Fast track/pan	-			