



T2V017 Asia User Manual

Video Clips for
Testing and Optimisation of
Video Compression



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T2V017_Asia User manual v1.0

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Contents

1. Overview of T2V017 Asia	1
2. Introduction	2
2.1 T2Vids and T3Vids for testing encoders	2
2.1.1 Audio	2
2.1.2 Software	3
2.2 T2Vids and T3Vids for testing decoders	3
2.3 TestVid logo	3
2.4 Safety	3
2.5 Backup	3
3. T2V017 Asia Clip set description	4
3.1 Set content types	4
3.1.1 Scene cuts / composite sequences	4
3.2 Individual clips provided	5
3.2.1 Clip sizes	5
3.2.2 Clip formats	6
3.2.3 Generation of interlaced video	7
3.3 Format of video on disk	7
3.3.1 1920x1080p50 and 1920x1080i25 10-bit 4:2:2	7
3.3.2 1920x1080p50 and 1920x1080i25 8-bit 4:2:0	7
3.3.3 720p50 and 720p25	8
3.3.4 720x576i25 (PAL)	8
3.4 Audio	9
4. Software to view & process YUV video	10
4.1 Viewing/playing the YUV video	10
4.1.1 Computer requirements of viewing the YUV video	10
4.1.2 YUV viewers/players	10
4.1.3 Programs that do not display/import YUV files directly	10
4.1.4 Wrap the YUV within an AVI file	10
4.1.5 Use an AVS file to reference the YUV	11
4.1.6 Convert YUV to another format	12
4.1.7 Real-time play-out of the YUV video	12
4.2 Software tools provided	13
4.2.1 License agreement relating to the software tools provided	14
4.2.2 yuvmake1088	14
4.2.3 yuvletterbox	15
4.2.4 yuv10bto8b	16
5. List of clips	18
5.1 Clips summary	18
5.2 Clip features	21
5.2.1 PDF file searching for specific clip features	21
5.2.2 Excel file sorting for specific clip features	21
5.2.3 List of 'CF' ('clip features') words used	22

6.	Detailed information on individual clips	24
6.1	Detailed description of each clip	24

1. Overview of T2V017 Asia

2-D / 3-D	2D																																																
Compressed/ Uncompressed	Uncompressed																																																
Description of video	Scenes from Asia (S. Korea - Seoul; Japan -Tokyo and Kyoto; China - Beijing, Xi'an, Yangshuo, Hong Kong)																																																
Purpose	Test an encoder to deal with 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	245 individual video clips (35 at each resolution)																																																
Length of video	Total of 2 hours 13 minutes (just over 19 minutes at each resolution)																																																
Total size on disk	1,112 GBytes																																																
Resolution and format of clips	<table><tr><th>Format number</th><th>Resolution</th><th>Frame rate</th><th>Chroma</th><th>Bps</th><th>Interlaced / progressive</th></tr><tr><td>0</td><td>1920x1080</td><td>50.0</td><td>4:2:2</td><td>10</td><td>Progressive</td></tr><tr><td>1</td><td>1920x1080</td><td>50.0</td><td>4:2:0</td><td>8</td><td>Progressive</td></tr><tr><td>2</td><td>1920x1080</td><td>25.0</td><td>4:2:2</td><td>10</td><td>Int. Top Field First</td></tr><tr><td>3</td><td>1920x1080</td><td>25.0</td><td>4:2:0</td><td>8</td><td>Int. Top Field First</td></tr><tr><td>4</td><td>1280x720</td><td>50.0</td><td>4:2:0</td><td>8</td><td>Progressive</td></tr><tr><td>5</td><td>1280x720</td><td>25.0</td><td>4:2:0</td><td>8</td><td>Progressive</td></tr><tr><td>6</td><td>720x576</td><td>25.0</td><td>4:2:0</td><td>8</td><td>Int. Top Field First</td></tr></table>	Format number	Resolution	Frame rate	Chroma	Bps	Interlaced / progressive	0	1920x1080	50.0	4:2:2	10	Progressive	1	1920x1080	50.0	4:2:0	8	Progressive	2	1920x1080	25.0	4:2:2	10	Int. Top Field First	3	1920x1080	25.0	4:2:0	8	Int. Top Field First	4	1280x720	50.0	4:2:0	8	Progressive	5	1280x720	25.0	4:2:0	8	Progressive	6	720x576	25.0	4:2:0	8	Int. Top Field First
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3	1920x1080	25.0	4:2:0	8	Int. Top Field First																																												
4	1280x720	50.0	4:2:0	8	Progressive																																												
5	1280x720	25.0	4:2:0	8	Progressive																																												
6	720x576	25.0	4:2:0	8	Int. Top Field First																																												
	All YUV planar																																																
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 (or higher resolution, e.g. 2K).

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. T2V017 Asia 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 3D 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, tracking, hand-held camera, zooming in/out
- ❑ subject motion such as into, out of or across the picture, in front of and partially behind objects, fast and slow
- ❑ lighting conditions, from bright sunlight, dull daylight, shaded areas, night-time..
- ❑ hard to encode items such as reflections, fine lines, patterns, round objects..
- ❑ varying camera properties such as depth of field, in/out-of-focus..
- ❑ and with sound associated with the 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.

A significant number of the sequences use a relatively shaky hand-held method of filming, as is often used in cinema currently (and sometimes TV also) to denote a scene with stress or urgency.

Note that for this set, the filming was done in a very hot climate (often over 38deg. C / 100deg. F) with much heat haze (and other atmospheric affects on visual quality such as smog or very high humidity causing low contrast).

In addition, in order to provide a different set of tests than other similar **TestVid** sequences (such as T2V012 USA West and T2V013 Europe3060) there is a different mix of visual qualities, with more grain and camera artefacts in this set (introduced by using neutral density filters and increasing camera gain).

3.1.1 Scene cuts / composite sequences

Some sequences have fades/transitions within them, and also cuts are provided within the clips, there are not complete scene changes within the set of clips as they are easy to do simply by adding two of the YUV files together.

One way to do this is using the DOS command window:

```
copy /b file1.yuv+file2.yuv file12.yuv
```

(where `file1.yuv` and `file2.yuv` are the two files to be added together, and `file12.yuv` is the result)

This makes a combined file '`file12.yuv`' with a scene cut at the join between the two. (This works as there are no headers on the YUV files.)

The YUV files being added together must be the same resolution, although they can be different frame rates.

The advantages with adding files together in this manner are that:

- ❑ it allows composite sequences which either contain fairly similar scenes, so that the resulting scene cut is more 'gentle', or completely different scenes, depending upon how radical a scene cut you wish to have;
- ❑ several scenes can be added together to make composite sequences with multiple different levels of scene cuts (from gentle to radical);
- ❑ and looping or very long composite sequences can be generated if required, e.g. to play continuously for an hour or more.

3.2 Individual clips provided

A total of 235 YUV clips are provided, comprising 35 individual clips each at the resolutions given in section 3.2.2 below. All the clips were originally filmed 1920x1080 4:2:2: where necessary the clips concerned were downsized from this.

3.2.1 Clip sizes

For each YUV clip the following naming convention is used:

T2V017n01_Asakusa_man_<xsize>x<ysize><f>rr_<d>b_P<chr>.yuv

T2V017ncc_<Clipname>_<xsize>x<ysize><f>rr_<d>b_P<chr>.yuv

where

n	Number 0 to 6 denoting format: <table><tr><td>0</td><td>1920x1080</td><td>prog</td><td>50</td><td>10-bit</td><td>4:2:2</td></tr><tr><td>1</td><td>1920x1080</td><td>prog</td><td>50</td><td>8-bit</td><td>4:2:0</td></tr><tr><td>2</td><td>1920x1080</td><td>int/TFF *</td><td>25</td><td>10-bit</td><td>4:2:2</td></tr><tr><td>3</td><td>1920x1080</td><td>int/TFF *</td><td>25</td><td>8-bit</td><td>4:2:0</td></tr><tr><td>4</td><td>1280x720</td><td>prog</td><td>50</td><td>8-bit</td><td>4:2:0</td></tr><tr><td>5</td><td>1280x720</td><td>prog</td><td>50</td><td>8-bit</td><td>4:2:0</td></tr><tr><td>6</td><td>720x480</td><td>int/TFF *</td><td>25</td><td>8-bit</td><td>4:2:0</td></tr></table> * 'TFF' = Top Field First	0	1920x1080	prog	50	10-bit	4:2:2	1	1920x1080	prog	50	8-bit	4:2:0	2	1920x1080	int/TFF *	25	10-bit	4:2:2	3	1920x1080	int/TFF *	25	8-bit	4:2:0	4	1280x720	prog	50	8-bit	4:2:0	5	1280x720	prog	50	8-bit	4:2:0	6	720x480	int/TFF *	25	8-bit	4:2:0
0	1920x1080	prog	50	10-bit	4:2:2																																						
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4	1280x720	prog	50	8-bit	4:2:0																																						
5	1280x720	prog	50	8-bit	4:2:0																																						
6	720x480	int/TFF *	25	8-bit	4:2:0																																						
cc	Number of clip content, 01-35																																										
<Clipname>	Name of clip content																																										
<xsize>	Horizontal resolution in pixels																																										
<ysize>	Vertical resolution of frame in pixels. Note that for Interlaced video these are 'full height' frames i.e. both fields in the same frame (this is different from some other TestVid sets of video)																																										
<f>	'p' or 'i', denoting Progressive or Interlace																																										
rr	Frame rate, expressed as '50' (for 50.0 fps) or '25' (for 25.0 fps)																																										
<d>	Bit depth, either '10' or '8'																																										
<chr>	Chroma format, either '422' or '420'																																										

Examples:

- ❑ T2V017001_Asakusa_man_1920x1080p50_10b_P422.yuv
is: the 'Asakusa_man' scene, 1920x1080, progressive, 50 fps, 10-bits per sample, 4:2:2
- ❑ T2V017001_ Asakusa_man _720x576i25_8b_P420.yuv
is: the 'Asakusa_man' scene, 720x576, interlaced (Top Field First), 25 fps, 8-bits per sample, 4:2:0

The interlaced clips are provided 'fields combined', i.e. the Top and Bottom fields are combined into one frame.

NOTE that this is different to the format of the interlaced clips in other sets such as T2V013 Europe3060 where the interlaced clips are provided 'field sequential' (i.e. where one half-height field is followed by the other half-height field).

3.2.2 Clip formats

Each of these clips are:

- ❑ planar YUV (i.e. a frame of Y followed by a frame of U then a frame of V. See section 3.3 for details of the format on disk)
- ❑ 4:2:2 or 4:2:0 chroma format
- ❑ progressive scan is indicated by 'p' in the filename and interlaced where indicated by 'i' in the filename.
- ❑ square pixels
- ❑ picture aspect ratio appropriate to the horizontal and vertical resolutions
- ❑ no headers
- ❑ top picture row first

All 4:2:2 video is:

- ❑ 10-bits per sample, in two bytes (upper bits set to zero)
- ❑ Y planes are unsigned nominally 64-940 but may go 0-1023
- ❑ U and V planes are centred at 512 and are nominally 64-960 but may go from 0-1023

All 4:2:0 video is:

- ❑ 8-bits (one byte) per sample
- ❑ 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 50.0 frames per second, although the YUV may be re-played / encoded at any speed e.g. 59.94 fps or 60 fps (the speed difference will be noticeable on some clips at 59.94 / 60 fps).

3.2.3 Generation of interlaced video

All the clips were originally filmed progressive at 50.0 fps. The interlaced clips provided are at 25.0 fps: the fields have been generated by extracting the alternate lines from alternate frames in the progressive source video.

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 1920x1080p50 and 1920x1080i25 10-bit 4:2:2

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

Each of the Y, U and V samples occupies two bytes with the upper bits set to zero.

One sample of Y, U or V:

Memory address	Byte	0								1							
	Bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Video data	Byte	Least significant								Most significant							
	Bit	0	1	2	3	4	5	6	7	8	9	x	x	x	x	x	x

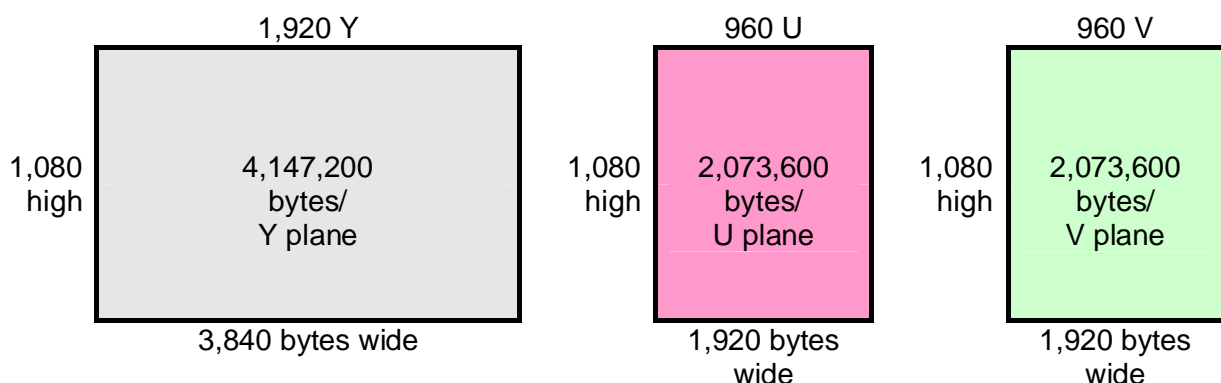
where 'x' = set to 0

Start of each line of Y, U or V

Memory address	Byte	0	1	2	3	4	5	6	7
Video data (10 bits)	Bit	0	x	1	x	2	x	3	x

One frame of Y, U and V:

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



Valid video data ranges:

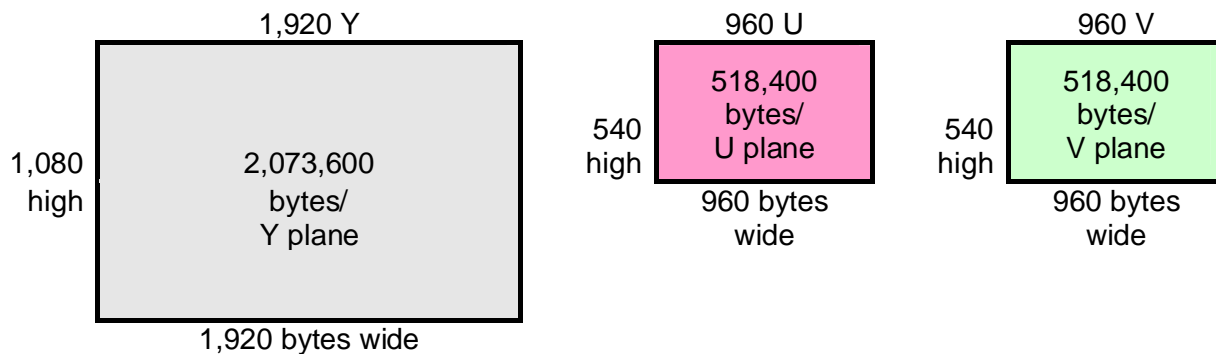
- ❑ Y: 64 - 940
- ❑ U and V: 64 - 960

3.3.2 1920x1080p50 and 1920x1080i25 8-bit 4:2:0

Byte 0 in the file is the start of 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:

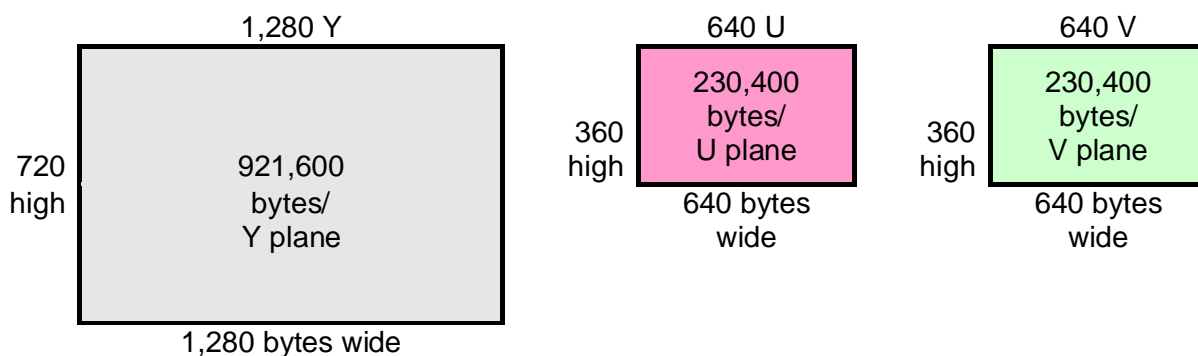
- ❑ Y: 16 - 235
- ❑ U and V: 16 - 240

3.3.3 720p50 and 720p25

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:

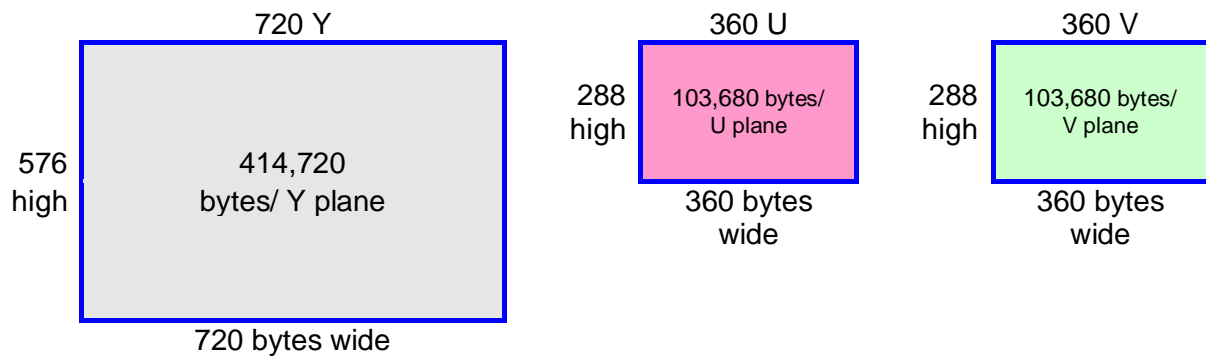
- ❑ Y: 16 - 235
- ❑ U and V: 16 - 240

3.3.4 720x576i25 (PAL)

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, with alternating lines for each field



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 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:

- ❑ **1080p50 422 10-bit:** 415MBytes/sec
- ❑ **1080i25 422 10-bit:** 208MBytes/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
- ❑ use an AVS file to reference the YUV
- ❑ 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 50 -s 1920x1080 -i <infile.yuv> -vcodec copy <outfile.avi>
```

where

- ❑ -r 50 sets the frame rate to 50 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

Although FFMPEG is being updated from time to time, it assumes YUV 8-bit 4:2:0 as input, so the above only works directly on the 8-bit 4:2:0 YUV sequences provided.

However, there is a work-around which can be used:

- ❑ convert the 10-bit 4:2:2 YUV sequences to 8-bit 4:2:0 using the supplied program `yuv10bto8b.exe` (see below in section 4.2)
- ❑ then use the above method to wrap the resultant YUV files in AVI files, using a command line such as given above

Also, the 10-bit 4:2:2 YUV sequences can be played by using an AVS file - see 4.1.5 below.

For convenience, a batch file is provided which will make AVIs for all the sequences. For the 10-bit 4:2:2 clips, a batch file is also provided that will make the 4:2:0 8-bit versions and the corresponding AVIs: this is provided in the \Software folder on the disk unit.

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 (as the program `yuv10bto8b.exe` only writes to the same folder as where the source file is located)
- ❑ 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)

4.1.5 Use an AVS file to reference the YUV

AviSynth is an open source program that 'frame serves' video to other programs.

Using AVS files and AviSynth as below allows the 10-bit 4:2:2 YUV files in T2V017 to be loaded directly into various programs such as VirtualDub, Adobe Premiere and Adobe After Effects.

Note that as standard AviSynth does not support the 10-bit 4:2:2 YUV files in T2V017: but **TestVid** has written a custom DLL that supports this.

The steps involved are:

- ❑ install AviSynth [find it by an internet search]
- ❑ copy the custom DLL 'RawSourceTV.dll' to the computer [rawsourceTV.dll is in the \Software folder on the USB disk unit]
- ❑ write a text AVS file which references the YUV file - example below

The next step varies with the program:

- ❑ with VirtualDub, simply use File Open to open the AVS file [NOT the YUV] and the YUV will be rendered in the VirtualDub display

or

- ❑ with Adobe Premiere or After Effects, install the plug-in
'Premiere CS AVS Importer 1.0RC1 Setup.exe'
- ❑ then open the AVS files like any other video file

The advantage with using Adobe Premiere or After Effects is that these can then be used to do real-time output on HD-SDI, by using a plug-in card such as available from BlackMagic Design or Aja.

An example AVS file contains just the following 2 lines of text:

```
loadplugin("c:\vidtools\avisynth\rawsource\rawsourceTV.dll")
RawSourceTV("I:\T2V017_Asia\Video_1080p50_422_10b_YUV\T2V017001_Asakusa_
man_1920x1080p50_10b_P422.yuv", pixel_type="P210", width=1920,
height=1080)
```

Example AVS files are provided for all the 10-bit 4:2:2 YUV files in T2V017 in the folder

\Example_AVS_files

However please note that in each of the AVS files, the folders for the

- ❑ location of rawsourceTV.dll
- ❑ and the drive letter/location of the YUV files may need to be altered.

4.1.6 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.

4.1.7 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.

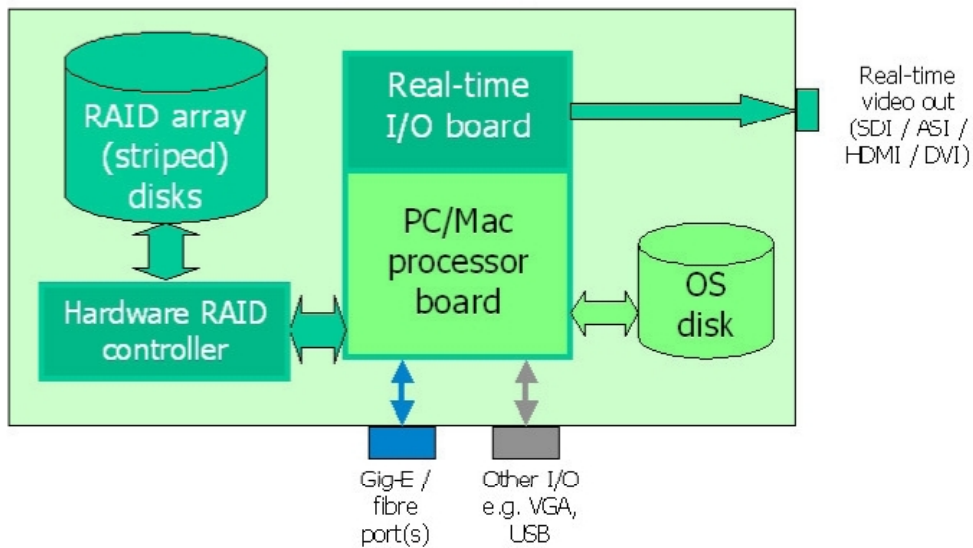
All video servers, many hardware encoders and a large proportion of other professional broadcast equipment have internal hard disks and Gig-E Ethernet interfaces. This allows the **Tvids** to be directly copied over the Ethernet network onto the hard disk, and play-out from there.

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/support.html) 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"

4.2 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 NOTE: this only works on the 1920x1080 8-bit 4:2:0 clips (p50 or i25)
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: this only works on the 1920x1080 8-bit 4:2:0 clips (p50 or i25)
yuv10bto8b	Make 8-bit 4:2:0 versions of the provided 10-bit 4:2:2 video NOTE: this only works on the 1920x1080 10-bit 4:2:2 clips (p50 or i25)

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.

4.2.1 License agreement relating to the software tools provided

This license agreement below applies to all software listed in this section 4.2.

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

4.2.2 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.

Note: this program only works on video that is 1920x1080, 4:2:0, 8-bits per sample.

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.

Example:

```
yuvmake1088 T2V017101_Asakusa_man_1920x1080p50_8b_P420.yuv p 4 16
```

This adds 4 lines to the top and 4 lines to the bottom of each frame of the input file, the extra lines are nominal black (value 16 in Y and 128 in U and V), and names the output file:

```
T2V017101_Asakusa_man_1920x1080p50_8b_P420_1088.yuv
```

4.2.3 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.

Note: this program only works on video that is 1920x1080, 4:2:0, 8-bits per sample.

1080p (1920x1080) videos are 16:9 picture aspect ratio (1.777:1).

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

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

Usage:

```
yuvletterbox <inputfile.yuv> <xsize> <ysize> <nnn>      (cont'd)
               <f> <blk> <l> <tl> <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 1920x1080p (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
- ❑ <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 <tl> and
 are used respectively for the top and bottom of the video; if set to 'p' (for pillarbox) then the values for <tl> and
 are used respectively for the left and right of the video
- ❑ <tl> = 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

Example:

```
yuvletterbox inputfile.yuv 1920 1080 0 p 16 1 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.

4.2.4 yuv10bto8b

This is a command line program for producing a new 1920x1080 resolution file with 4:2:0 and 8-bits per sample from an input file which is 1920x1080 but 4:2:2 and 10-bits per sample.

This assumes the 1920x1080 input video is in the format as supplied by **TestVid**.

Usage:

```
yuv10bto8b <inputfile.yuv> 1920 1080 <nnn> <f>
```

where

- `<inputfile.yuv>` is the input filename which is 1920x1080 (must have extension `.yuv`)
- `<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, 'p' or 'i' i.e. progressive or interlaced input file. Note that if interlaced, this must be field sequential (i.e. as supplied by **TestVid**)

The filename for the output file will be

```
inputfile_420_8b.yuv    (the '_420_8b' is added by yuv10bto8b)
```

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

Example:

```
yuv10bto8b T2V017001_Asakusa_man_1920x1080p50_10b_P422.yuv 0 p
```

This adds 4 lines to the top and 4 lines to the bottom of each frame of the input file, the extra lines are nominal black (value 16 in Y and 128 in U and V), and names the output file:

```
T2V017001_Asakusa_man_1920x1080p50_10b_P422_420_8b.yuv
```

For convenience, a batch file is provided which will make AVIs for all the sequences. For the 10-bit 4:2:2 clips, a batch file is also provided that will make the 4:2:0 8-bit versions and the corresponding AVIs: this is provided in the `\Software` folder on the disk unit.

Also provided are a few example AVIs of the sequences: these are in the `\Example_AVIs` folder on the hard disk unit.

Note that in order to use these batch files:













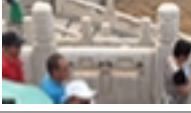



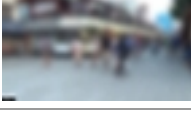



- firstly, the *Tvids* sequences will need to be copied to a different disk as there is insufficient space on the supplied disk unit (as the program `yuv10bto8b.exe` only writes to the same folder as where the source file is located)
- secondly, the correct paths will need to be set up in the batch files, to `FFMPEG`, `yuv10bto8b` and the YUV files by doing a 'Search and Replace' (Ctrl-H in Windows Notepad)









See section 4.1.4 for information on `FFMPEG` and wrapping a YUV file within an AVI.




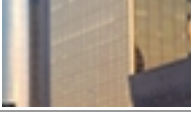
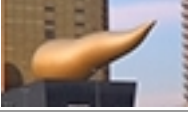


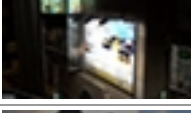
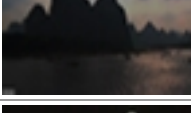
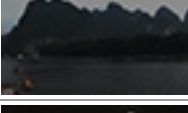








5. List of clips

5.1 Clips summary

- Total time of clips (at each resolution): **19 mins 6 secs and 37 frames (50p)**
15 frames (25i)
22 frames (25p)

Clip number(s)	Title	Main purposes	Duration (mins:secs:frames)	Begin	End
T2V017n01	Asakusa_man	Continuous random movement of background, with foreground obscuration, and no global movement	1,191 (50p) : 595 (25i) : 596 (25p)		
T2V017n02	Seoul_shower	Codec stress and efficiency test with multiple small changes (due to raindrops)	2,186 (50p) : 1,093 (25i) : 1,093 (25p)		
T2V017n03	Nippon_Express	Smooth panning motion left-wards, tracking a main subject with continually varying obscuration and heat-haze causing continual minor movements of parts of the picture	2,869 (50p) : 1,434 (25i) : 1,435 (25p)		
T2V017n04	Masked_dance	Codec efficiency with highly coloured subject moving randomly against a patterned background, with out-of focus transition and camera flashes	1,540 (50p) : 770 (25i) : 770 (25p)		
T2V017n05	Train_ride	Tough combined codec stress test with random rotational global motion with zoom, many line objects, patterns, graininess, high & low contrast areas, obscuration, foreground reflections & spots, brightness changes and a complex scene with a jump cut	1,536 (50p) : 768 (25i) : 768 (25p)		
T2V017n06	Changing_the_guard	Codec efficiency test with scenes with limited movement, plus global translation, plus dip-to-black fades	2,372 (50p) : 1,186 (25i) : 1,186 (25p)		
T2V017n07	Balustrades	Codec stress test with relatively large subjects being frequently obscured by highly patterned objects (no global motion)	1,274 (50p) : 637 (25i) : 637 (25p)		
T2V017n08	Green_scene	Efficiency test with scene comprising detailed natural objects and water, with continuous (generally) smooth translation	1,600 (50p) : 800 (25i) : 800 (25p)		
T2V017n09	Souvenir_shops	Motion vector tracking of many subjects moving in different directions, with continual random lateral and rotational motion	2,494 (50p) : 1,247 (25i) : 1,247 (25p)		
T2V017n10	Rooves	Codec test of motion vector tracking with slow pan left and right of many similarly highly-patterned objects	1,772 (50p) : 886 (25i) : 886 (25p)		

T2V017n11	Dancing_girls	Codec efficiency test in scene where camera gain high due to relatively low light indoors (and consequently some camera artefacts)	1,576 (50p) : 788 (25i) : 788 (25p)		
T2V017n12	Takeshita_street	Slow non-uniform vertical translation and zoom, with many subjects and obscuration	1,152 (50p) : 576 (25i) : 576 (25p)		
T2V017n13	Shipyard_cranes	Codec stress test with very rapid movement of foreground blurred objects obscuring detailed subjects in the background, also moving relatively	1,909 (50p) : 954 (25i) : 955 (25p)		
T2V017n14	Fast_walk	Codec stress and efficiency test of grainy night scene with video effects applied	1,010 (50p) : 505 (25i) : 505 (25p)		
T2V017n15	Skyscrapers	Continuous rotational movement test of relatively simple scene but with highly patterned low-contrast buildings	1,641 (50p) : 820 (25i) : 821 (25p)		
T2V017n16	Pavement_patterns	Global motion tracking with highly patterned background providing a codec stress test	1,642 (50p) : 821 (25i) : 821 (25p)		
T2V017n17	Bullet_train	Stress test with white fade-in and fade-out, white fade in the middle, and rapid direction changes	1,092 (50p) : 546 (25i) : 546 (25p)		
T2V017n18	Great_Wall	Efficiency test with patterns and random global rotational movement, slow cross fade and global non-smooth pan/scroll	3,970 (50p) : 1,985 (25i) : 1,985 (25p)		
T2V017n19	Beijing_traffic	Codec efficiency test where scene changes from one where there is no global motion & limited subject motion, to one where there is a global pan and zoom, plus continual subject movement	2,132 (50p) : 1,066 (25i) : 1,066 (25p)		
T2V017n20	Night_neon	Night-time test with high contrast and slow global scroll upwards	1,034 (50p) : 517 (25i) : 517 (25p)		
T2V017n21	Dragon_river	Efficiency test with global movement into the scene, with reflections, multiple moving subjects, irregular global motion & continuous haze (on distant hills)	1,430 (50p) : 715 (25i) : 715 (25p)		
T2V017n22	Disappear	Motion vector stress test where almost all of image is similar and low contrast, plus check id codec produces banding on output	1,251 (50p) : 625 (25i) : 626 (25p)		
T2V017n23	Shibuya_spin	Rapid left pan with some rotational movement, with many subjects crossing the picture	1,176 (50p) : 588 (25i) : 588 (25p)		
T2V017n24	Shopping_mall	Frequent v. small up/down global movement and background colored light changes with continuous random movement of large and obscured subjects	2,064 (50p) : 1,032 (25i) : 1,032 (25p)		

T2V017n25	Star_ferry	Codec tracking efficiency of main subject largely stationary in field of view, with continual relative movement of a complex background	1,500 (50p) : 750 (25i) : 750 (25p)		
T2V017n26	Duck_man	Motion vector/efficiency test at jump cuts and because we liked the audio !	1,444 (50p) : 722 (25i) : 722 (25p)		
T2V017n27	Golden_statue	Smooth panning motion right-wards with a few irregular global movements	1,311 (50p) : 655 (25i) : 656 (25p)		
T2V017n28	Hazy_HK	Codec efficiency and stress test with low-contrast detailed scene (and very strong moire fringes on one building)	835 (50p) : 417 (25i) : 418 (25p)		
T2V017n29	Escalator	Test with dark scene, areas of grain and high contrast, with slow global right-wards translation	1,028 (50p) : 514 (25i) : 514 (25p)		
T2V017n30	Yangshuo_dusk	Stress test with high contrast scene and non-smooth global pan	490 (50p) : 245 (25i) : 245 (25p)		
T2V017n31	Harbour_night	Codec stress test with worst grain ever likely to encounter (e.g. from a nightcam), fine subjects and high contrast	1,064 (50p) : 532 (25i) : 532 (25p)		
T2V017n32	PedXing_below	Motion vector tracking of many objects (people) primarily moving horizontally or vertically, then global motion track	1,708 (50p) : 854 (25i) : 854 (25p)		
T2V017n33	Terracotta_warriors	Efficiency test where there is no subject movement but continual zoom, translation, high camera noise (due to low light) and shimmering due to non-synchronized lighting in a low contrast mono-colour scene	2,902 (50p) : 1,451 (25i) : 1,451 (25p)		
T2V017n34	Forbidden_City	Codec efficiency tracking many subjects moving principally left/right but other directions, many of which small in field of view	1,090 (50p) : 545 (25i) : 545 (25p)		
T2V017n35	Sideways	Efficiency and stress tests with non-standard view (rotated 90 degrees) where translation is not in usual direction	2,052 (50p) : 1,026 (25i) : 1,026 (25p)		

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)	Time	Filename(s)	Horizontal x vertical si	Progressive / Interlaced	Video format	Bits per sam
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 colo		
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	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		
7	T2V001005, T2V001105, T2V001205	Display	T2V001005_Display_1920x1080p.yuv	1920x1080; 1280x720	'p' file suffix = progressive; 'i' YUV planar 4:8 (for each of 'Large		

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

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

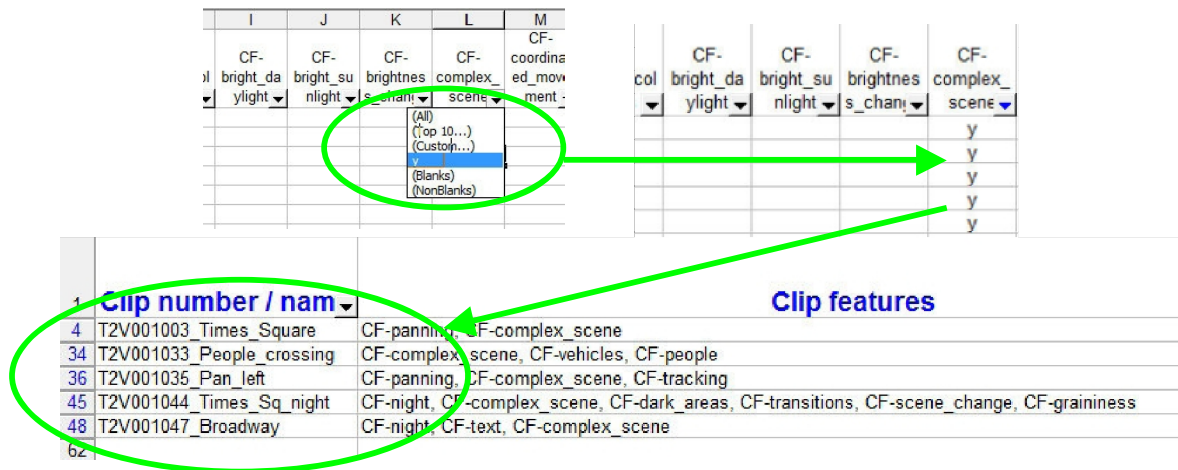
Select 'One' to show only clips with 'One' under 'SS.01 People'

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:

A	B	C	D	E	F	G
Clip number / nam	Clip features	CF-animal	CF-angl	CF-bandin	CF-black_bac	CF-bright_da
1						
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_FONY	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:



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-sunrise_sunset
CF-dull_daylight	CF-brightness_change	CF-shaded
CF-indoors_bright	CF-indoors_dark	CF-night
CF-twilight	CF-light_picture	CF-dark_picture
CF-high_contrast	CF-black_background	CF-dark_areas
CF-low_contrast	CF-white_background	CF-monochromatic
CF-people	CF-vehicles	CF-water
CF-buildings	CF-faces	CF-text
CF-trees	CF-leaves_grass	CF-crowd
CF-sky	CF-clouds	CF-complex_scene
CF-patterns	CF-reflections	CF-round_objects
CF-round		
CF-lines	CF-moire	CF-moving_text
CF-fine_details	CF-highlights	CF-light_sky
CF-graininess	CF-out_of_focus	CF-depth_of_field
CF-bright_colours	CF-dull_colours	CF-large_monochromatic
CF-movement_in	CF-movement_out	CF-movement_up/down
CF-movement_across	CF-random_movement	CF-diagonal_movement
CF-coordinated_movement	CF-from_above	CF-hand_held
CF-low_subject_movement	CF-rapid_movement	CF-rapid_changes
CF-slow_motion	CF-speeded_up	
CF-fast_track_pan	CF-panning	CF-scroll
CF-tracking	CF-tracking_following	CF-jerky

CF-transition

CF-zoom_in

CF-angled

CF-sound_vehicles

CF-sound_other

CF-transitions

CF-zoom_out

CF-
subjects_behind_foreground

CF-sound_talking

CF-wind

CF-fade

CF-rapid_zoom

CF-banding

CF-sound_water

CF-music

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.

01_Asakusa_man



GN.01	Filename(s)	T2V017n01_Asakusa_man_<xsize>x<ysize><f>rr_<d>b_P<chr>.yuv
GN.02	Horizontal x vertical sizes	1920x1080p50 10-bit 4:2:2 ; 1920x1080p50 8-bit 4:2:0 ; 1920x1080i25 10-bit 4:2:2 TFF; 1920x1080i25 8-bit 4:2:0 TFF; 1280x720p50 8-bit 4:2:0 ; 1280x720p25 8-bit 4:2:0 PAL (720x576i25 8-bit 4:2:0 TFF)
GN.03	Progressive / Interlaced	1080p - Progressive; 1080i - Interlaced TFF; 720p - Progressive; PAL - Interlaced TFF
GN.04	Video format	YUV planar 4:2:2 or 4:2:0
GN.05	Bits per sample	10 or 8 (for each of Y, U, V)
GN.06	Video description	Japanese man looking directly at the camera (with heat-haze in background on rooves)
GN.07	Principal purposes	Continuous random movement of background, with foreground obscuration, and no global movement
GN.08	Duration (mins:secs:frames): '60p' at 59.94 fps; '30i' & '30p' at 29.97 fps	0:23:41 (50p), 0:23:20 (25i and 25p)
GN.09	Number of frames	1,191 (50p) : 595 (25i) : 596 (25p)
GN.10	File sizes on disk (MB) [same order as Horizontal x Vertical sizes]	9,879 : 3,704 : 4,935 : 1,851 : 1,646 : 824 : 370
GN.11	Original video format	1920x1080 progressive 50.0 fps
GN.12	CF-words	CF-bright_daylight, CF-brightness_change, CF-crowd, CF-depth_of_field, CF-faces, CF-movement_across, CF-people, CF-sound_talking, CF-talking_head
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	T2a017x01_Asakusa_man_act_MP1LII.mpa : T2a017y01_Asakusa_man_act_unc.wav
GN.15	Associated audio description	Actual audio recorded with video
GN.16	Audio duration	Same as video (video played at 50.0fps)

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

SS.05	Trees	-
SS.06	Text	-
SS.07	Talking head	One
SS.08	Water	-
SS.09	Leaves/grass	-
SS.10	Sky	-
SS.11	Clouds	-
SS.12	Patterns	-
SS.13	Round/curved objects	One

SCENE PROPERTIES

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

COLOURS & CONTRAST

CC.01	Light picture	-
CC.02	Dark picture	-
CC.03	Bright colours	-
CC.04	Dull colours	-
CC.05	Fine detail/moiré patterns	-
CC.06	High contrast areas	-
CC.07	Large monochromatic areas	-
CC.08	Graininess	-
CC.09	Black background	-
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	-
SM.02	Movement into picture	-
SM.03	Movement across picture	Some
SM.04	Movement up/down	-
SM.05	Diagonal movement	-
SM.06	Subjects behind foreground objects	Few
SM.07	Low movement	-

SOUND CONTENT

SC.01	Talking	Some
SC.02	Movement	Footsteps
SC.03	Vehicles	-
SC.04	Wind	-
SC.05	Music	Background
SC.06	Background	People
SC.07	Other	-

SOUND CHARACTERISTICS

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

02_Seoul_shower



GN.01	Filenames [see section 3.2.1 for key]	T2V017n02_Seoul_shower_<xsize>x<ysize><f>rr_<d>b_P<chr>.yuv
GN.02	Horizontal x vertical sizes	1920x1080p50 10-bit 4:2:2 ; 1920x1080p50 8-bit 4:2:0 ; 1920x1080i25 10-bit 4:2:2 TFF; 1920x1080i25 8-bit 4:2:0 TFF; 1280x720p50 8-bit 4:2:0 ; 1280x720p25 8-bit 4:2:0 PAL (720x576i25 8-bit 4:2:0 TFF)
GN.03	Progressive / Interlaced	1080p - Progressive; 1080i - Interlaced TFF; 720p - Progressive; PAL - Interlaced TFF
GN.04	Video format	YUV planar 4:2:2 or 4:2:0
GN.05	Bits per sample	10 or 8 (for each of Y, U, V)
GN.06	Video description	People walking on the street in the rain, mainly away from the camera, with umbrellas
GN.07	Principal purposes	Codec stress and efficiency test with multiple small changes (due to raindrops)
GN.08	Duration (mins:secs:frames): '60p' at 59.94 fps; '30i' & '30p' at 29.97 fps	0:43:36 (50p), 0:43:18 (25i and 25p)
GN.09	Number of frames	2,186 (50p) : 1,093 (25i) : 1,093 (25p)
GN.10	File sizes on disk (MB) [same order as Horizontal x Vertical sizes]	18,132 : 6,799 : 9,066 : 3,400 : 3,022 : 1,511 : 680
GN.11	Original video format	1920x1080 progressive 50.0 fps
GN.12	CF-words	CF-dark_areas, CF-dark_picture, CF-graininess, CF-movement_in, CF-people, CF-shaded, CF-twilight
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	T2a017x02_Seoul_shower_act_MP1LII.mpa : T2a017y02_Seoul_shower_act_unc.wav
GN.15	Associated audio description	Actual audio recorded with video
GN.16	Audio duration	Same as video (video played at 50.0fps)

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

SS.05	Trees	Few
SS.06	Text	-
SS.07	Talking head	-
SS.08	Water	Rain
SS.09	Leaves/grass	Some
SS.10	Sky	-
SS.11	Clouds	-
SS.12	Patterns	-
SS.13	Round/curved objects	Many

SCENE PROPERTIES

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

COLOURS & CONTRAST

CC.01	Light picture	-
CC.02	Dark picture	All
CC.03	Bright colours	-
CC.04	Dull colours	Most
CC.05	Fine detail/moiré patterns	-
CC.06	High contrast areas	Several
CC.07	Large monochromatic areas	-
CC.08	Graininess	Some - light
CC.09	Black background	-
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	Lots
SM.02	Movement into picture	Lots
SM.03	Movement across picture	Some
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	Some
SC.02	Movement	Other
SC.03	Vehicles	Traffic
SC.04	Wind	Some
SC.05	Music	Background
SC.06	Background	Rain
SC.07	Other	-

SOUND CHARACTERISTICS

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

03_Nippon_express



GN.01	Filenames [see section 3.2.1 for key]	T2V017n03_Nippon_Express_<xsize>x<ysize><f>rr_<d>b_P<hr>.yuv
GN.02	Horizontal x vertical sizes	1920x1080p50 10-bit 4:2:2 ; 1920x1080p50 8-bit 4:2:0 ; 1920x1080i25 10-bit 4:2:2 TFF; 1920x1080i25 8-bit 4:2:0 TFF; 1280x720p50 8-bit 4:2:0 ; 1280x720p25 8-bit 4:2:0 PAL (720x576i25 8-bit 4:2:0 TFF)
GN.03	Progressive / Interlaced	1080p - Progressive; 1080i - Interlaced TFF; 720p - Progressive; PAL - Interlaced TFF
GN.04	Video format	YUV planar 4:2:2 or 4:2:0
GN.05	Bits per sample	10 or 8 (for each of Y, U, V)
GN.06	Video description	Tracking view of a delivery truck on an elevated roadway, with some heat-haze
GN.07	Principal purposes	Smooth panning motion left-wards, tracking a main subject with continually varying obscuration and heat-haze causing continual minor movements of parts of the picture
GN.08	Duration (mins:secs:frames): '60p' at 59.94 fps; '30i' & '30p' at 29.97 fps	0:57:19 (50p), 0:57:09 (25i and 25p)
GN.09	Number of frames	2,869 (50p) : 1,434 (25i) : 1,435 (25p)
GN.10	File sizes on disk (MB) [same order as Horizontal x Vertical sizes]	23,797 : 8,924 : 11,894 : 4,460 : 3,966 : 1,984 : 892
GN.11	Original video format	1920x1080 progressive 50.0 fps
GN.12	CF-words	CF-bright_sunlight, CF-buildings, CF-coordinated_movement, CF-diagonal_movement, CF-graininess, CF-large_monochromatic, CF-light_sky, CF-movement_across, CF-smooth, CF-sound_other, CF-tracking_following
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	T2a017x03_Nippon_Express_act_MP1LII.mpa : T2a017y03_Nippon_Express_act_unc.wav
GN.15	Associated audio description	Actual audio recorded with video
GN.16	Audio duration	Same as video (video played at 50.0fps)

Clip features		Details	LC.06	Indoors dark	-
LIGHT CONDITIONS			LC.07	Twilight	-
LC.01	Bright sunlight	-	LC.08	Sunrise/sunset	-
LC.02	Bright daylight	All	LC.09	Night	-
LC.03	Dull daylight	-	LC.10	Backlighting	-
LC.04	Shaded areas	-	LC.11	Large brightness change	Once
LC.05	Indoors bright	-			

SCENE SUBJECTS

SS.01	People	-
SS.02	Faces	-
SS.03	Vehicles	Mixed traffic
SS.04	Buildings	Many
SS.05	Trees	-
SS.06	Text	Some
SS.07	Talking head	-
SS.08	Water	-
SS.09	Leaves/grass	-
SS.10	Sky	Blue w clouds
SS.11	Clouds	Light
SS.12	Patterns	Many
SS.13	Round/curved objects	-

SCENE PROPERTIES

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

COLOURS & CONTRAST

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

GLOBAL MOTION

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

SUBJECT MOTION

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

SOUND CONTENT

SC.01	Talking	Lots
SC.02	Movement	Other
SC.03	Vehicles	Boat
SC.04	Wind	Little
SC.05	Music	-
SC.06	Background	Water - waves
SC.07	Other	-

SOUND CHARACTERISTICS

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