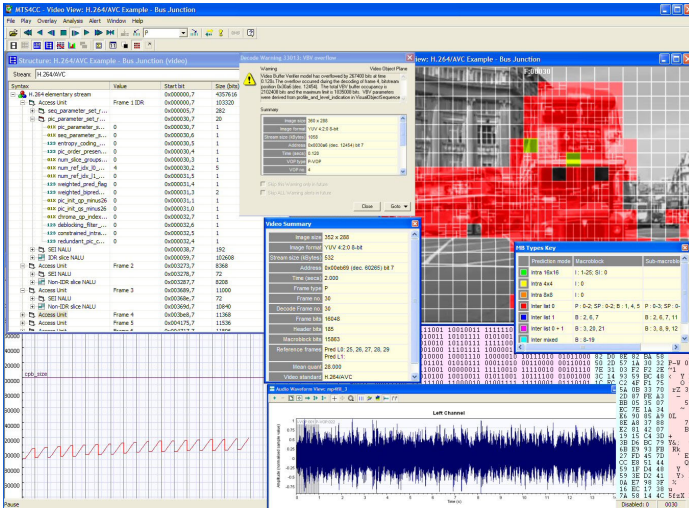


Elementary Stream Compliance Checker and Analyzer

MTS4CC Data Sheet



Features & Benefits

- Verification of the Stream's Compliance with the Encoding Standard
- Video Decode and Analysis
- Extraction of Elementary Streams from Containers
- Comprehensive Stream Navigation and Tracking to Follow All Aspects of the Decoding Process
- Multiple Displays and Overlays of Codec Information
- Synchronized Video, Audio, and Data Views for Instant Cross Reference
- Buffer Analysis
- Video Differencing and Fidelity Analysis
- YUV Decoded Output for use with the **Tektronix PQA600 Picture Quality Analyzer**
- Comprehensive Batch Mode for Automated Regression Testing with Log Report
- Built-in Help and Tutorials

Applications

Intended Users and Applications

- Equipment Development and Verification Test
 - Video CODECs
 - Professional Video Equipment
 - STB, PVR, DVD Consumer Electronics
 - Video Conferencing
 - Mobile Handsets and Multimedia
- Video Content Providers and Broadcast
 - TV, Cable, DVD, Streaming Media
 - Broadcast Test and Monitoring
 - Network Operators and Infrastructure

Compressed Video Compliance Checking and Analysis Software

Elementary Stream Analysis

MTS4CC Video Compliance Checker and Analyzer is a powerful PC-based software package for the deferred time analysis of encoded video elementary streams. Supported video standards include H.264/AVC, VC-1, MPEG-2, MPEG-4 Part 2, and H.263. Supported audio standards include MPEG-2 audio, AAC, and AC-3 (for playback and waveform view).

Video compression standards are complex and involve many elements which are vitally important to the efficiency and interoperability of compressed video in different applications. MTS4CC provides verification of the compliance of the stream against the compression standard, detailed analysis of the video streams, tools for debugging the stream, and fidelity comparison against the original uncompressed stream. YUV decoded output enables baseband video analysis with the Tektronix PQA600 Picture Quality Analyzer. It enables equipment and systems developers to test and bring new designs rapidly to market, and video users to test compliancy, interoperability, and performance of compression products.

Video Summary	
Image size	720 x 576
Image format	YUV 4:2:0 8-bit
Stream size (bytes)	1477
Structure	interlaced top-field first
Address (frame-top-field)	0x00c908 (dec. 51484) bit 7
Address (bottom-field)	0x00e73f (dec. 59199) bit 7
Time (secs)	0.240
Frame type	P
Frame no.	4
Decode Frame no.	4
BIs (frame-top-field)	61880
BIs (bottom-field)	43176
Header bits (frame-top-field)	255
Header bits (bottom-field)	129
Macroblock bits (frame-top-field)	61625
Macroblock bits (bottom-field)	43047
Reference frames	Pred L0: 1, 2, 3, 4 Pred L1:
Mean quant	28.000
Video standard	H.264/AVC Main profile, Level 3

Frame Summary

Motion Vectors

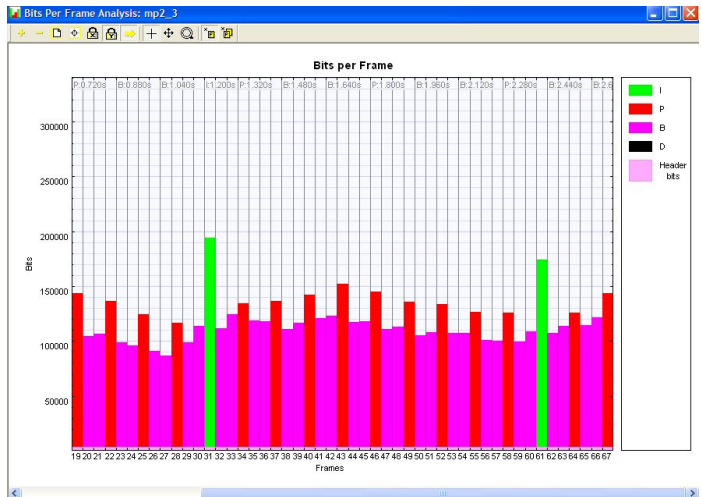
Warning Video Object Plane

Video Complexity Verifier model has overflowed by 158.4 MacroBs at time 0.040s. The overflow occurred during the decoding of frame 2, bitstream position 0xfd9 (dec. 4057). The total VCV buffer occupancy is 554.4 MacroBs and the maximum limit is 396.0 MacroBs. VCV parameters were derived from profile_and_level_indication in

Summary	
Image size	352 x 288
Image format	YUV 4:2:0 8-bit
Stream size (kBytes)	716
Address	0x000fd9 (dec. 4057) bit 7
Time (secs)	0.040
VOP type	P-VOP
VOP no.	2

Skip this Warning only in future
 Skip ALL Warning alerts in future

Real-time Compliance Testing and Error Alerts



Frame Statistics

Structure: H.264/AVC Example - Grenadier Guards (video)

Stream: H.264/AVC

Syntax	Value	Start bit	Size (bits)
H.264 elementary stream		0x000000,7	12097552
Access Unit	Frame 1 IDR (to...	0x000000,7	149592
seq_parameter_set_r...		0x000005,7	234
pic_parameter_set_r...		0x00002a,7	24
pic_parameter_s...	0	0x00002a,7	1
seq_parameter_s...	0	0x00002a,6	1
entropy_coding_...	1	0x00002a,5	1
pic_order_presen...	1	0x00002a,4	1
num_slice_groups...	0	0x00002a,3	1
num_ref_idx_l0_...	9	0x00002a,2	7
num_ref_idx_l1_...	1	0x00002b,3	3
weighted_pred_flag	0	0x00002b,0	1
weighted_bipred...	0	0x00002c,7	2
pic_init_qp_minus26	0	0x00002c,5	1
pic_init_qs_minus26	0	0x00002c,4	1
chroma_qp_index...	0	0x00002c,3	1
deblocking_filter...	0	0x00002c,2	1
constrained_intra...	0	0x00002c,1	1
redundant_pic_c...	0	0x00002c,0	1
sei_rbsp		0x000033,7	144
sei_message		0x000033,7	72
last_payload...	0x0	0x000034,7	8
last_payload...	0x7	0x000034,7	8
buffering_per...		0x000035,7	49
bit_equal_to...	'1'	0x00003b,6	1
bit_equal_to...	'0'	0x00003b,5	1

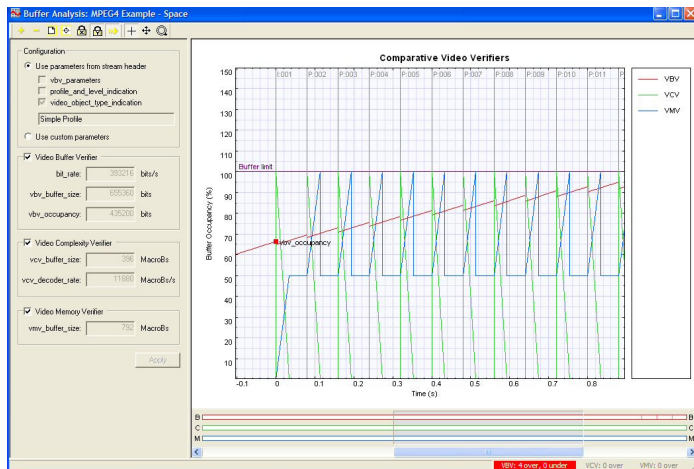
File Structure

Characteristics

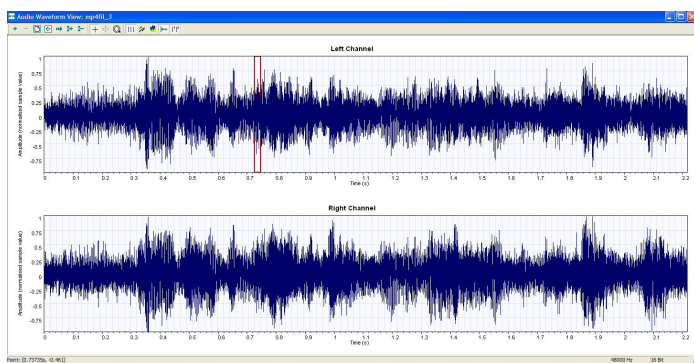
Standards Supported

Video

- H.264/AVC – Baseline, Extended, Main, High, High 10, High 4:2:2, and High 4:4:4 profiles at all levels 1 to 5:1
- H.264/AVC Intra profiles, High10, High422, High444, and CALVC at levels 1 to 5:1
- H.264/AVC Scalable Video Coding (SVC) Extensions – Baseline, High, and High Intra profiles at levels 1 to 5:1
- MPEG-2 – Main Profile at Main, High and High 1440 levels, 4:2:2 Profile at Main and High levels
- VC-1 – All profiles at all levels
- MPEG-4 – Simple Profile at levels 0 to 5 and Advanced Simple Profile at levels 0 to 5
- H.263 Baseline
- Uncompressed YUV, RGB, or Grayscale Color Models, 8 to 16 bit Sample Depth, Various Chroma Subsampling Formats



Buffer Analysis



Audio Channels

Audio (Decode only)

- MPEG-1 Part 3 Layers I and II
- MPEG-2 Part 3 Layers I and II
- MPEG-2 Part 7 (AAC) Main (Excludes LC and SSR)
- MPEG-4 Part 3 (HE-AAC) AAC Main, AAC LC (Low Complexity, AAC LTP (Long-term Prediction), SBR (Spectral Band Replication))
- Dolby Digital (AC-3) Baseline Standard, Annex D: Extended/Alternate Bit Stream (Playback and Waveform only)

System Layer

- Elementary Streams contained within:
 - MPEG-2 Transport/Program Streams
 - MP4 Parts 1 and 15
 - ASF
 - 3GPP
 - DVD VOB

System Requirements

- Windows XP or 7
- Processor Speed >1.5 GHz (2.5 GHz recommended)
- 512 MB or greater RAM
- 400 MB hard disk space

- ASEAN / Australasia (65) 6356 3900
- Austria 00800 2255 4835*
- Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
- Belgium 00800 2255 4835*
- Brazil +55 (11) 3759 7627
- Canada 1 800 833 9200
- Central East Europe and the Baltics +41 52 675 3777
- Central Europe & Greece +41 52 675 3777
- Denmark +45 80 88 1401
- Finland +41 52 675 3777
- France 00800 2255 4835*
- Germany 00800 2255 4835*
- Hong Kong 400 820 5835
- India 000 800 650 1835
- Italy 00800 2255 4835*
- Japan 81 (3) 6714 3010
- Luxembourg +41 52 675 3777
- Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90
- Middle East, Asia, and North Africa +41 52 675 3777
- The Netherlands 00800 2255 4835*
- Norway 800 16098
- People's Republic of China 400 820 5835
- Poland +41 52 675 3777
- Portugal 80 08 12370
- Republic of Korea 001 800 8255 2835
- Russia & CIS +7 (495) 7484900
- South Africa +41 52 675 3777
- Spain 00800 2255 4835*
- Sweden 00800 2255 4835*
- Switzerland 00800 2255 4835*
- Taiwan 886 (2) 2722 9622
- United Kingdom & Ireland 00800 2255 4835*
- USA 1 800 833 9200

Ordering Information

To order the MTS4CC for an existing MTS400, MTS430, or even to integrate it on an existing MTS4XA dongle, select the LUD licensing option, plus the other options that you need.

Base Product

MTS4CC

Software Video Compliance Checker and Analyzer. Includes English manual and CD.

Product Options

Option	Description
Opt. AVC	H.264/AVC Baseline, Extended, Main, and High Profiles with FRExT (10 bit, 4:2:2, 4:4:4), plus Intra and SVC Profiles
Opt. MPG2	MPEG-2 Main Profile Main Level, 4:2:2 Profile at Main Level, MPEG-2 Main Profile High Level, High Level 1440, and 4:2:2 Profile at High Level*1
Opt. VC1	VC-1 (All profiles, all levels) and ASF extraction*1
Opt. MPG4	MPEG-4 Simple Profile (Levels 0 to 3), Advanced Simple Profile (Levels 0 to 5), and H.263*1
Opt. FID	Fidelity (PSNR) analysis and visual differencing

*1 At least one of the CODEC options MPG4, MPG2, AVC, or VC1 must be ordered.

Licensing Options

Option	Description
Opt. PPD	Parallel Port dongle*2
Opt. USB	USB dongle*2
Opt. LUD	Installation on a pre-existing MTS400/430/4XA dongle*2

*2 One of the licensing options PPD, USB, or LUD must be ordered.

Note: Full audio decode is enabled for any purchased video CODEC. Supported audio CODECS are MPEG-2 Layer 1 and 2, AAC, HE AAC, and AC-3.



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

* European toll-free number. If not accessible, call: +41 52 675 3777

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For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.tektronix.com



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