Recommended Products

Tektronix Sentry - Video Quality Monitor

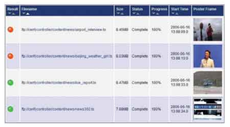
- Blockiness Detection
- Frozen Frame Detection
- Audio/Video Syntax Detection
- Audio Loudness
- Plus many more…

www.tektronix.com/Sentry

Tektronix VQS1000 - Video Quality Analysis Software

- Blockiness Detection
- Frozen Frame Detection
- Black Frame Detection
- Audio Loudness
- Plus many more…

www.tektronix.com/VQS1000



Tektronix Cerify - File-Based Video & Audio Content Analysis

- Blockiness Detection
- Frozen Frame Detection
- Black Frame Detection
- Audio/Video Syntax Detection
- Audio Loudness Detection and Correction
- Plus many more…

www.tektronix.com/cerify

Tektronix MTS4000 - MPEG Analyzer

- RF Levels, MER, SNR, etc.
- Buffer Underflow/Overflow
- Plus many more…

www.tektronix.com/mpeg-test-video/mpeg-analyzer

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Contact List Updated March 2013

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**

05/13 EA/WWW 28W-26444-0

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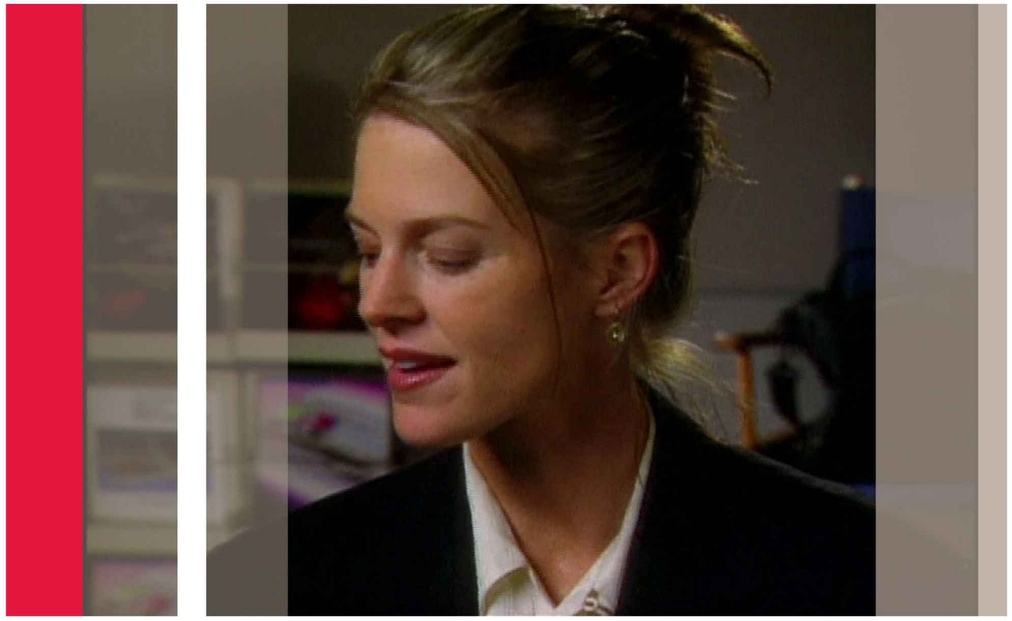
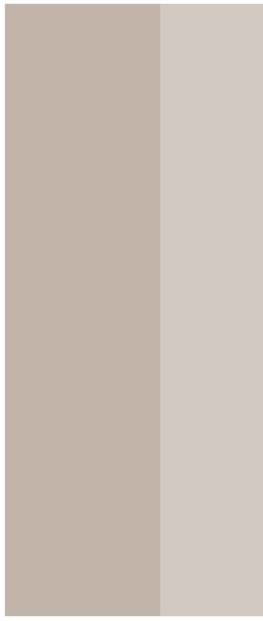
Visualizing Quality of Experience

To Improve the Subscriber's Viewing Experience





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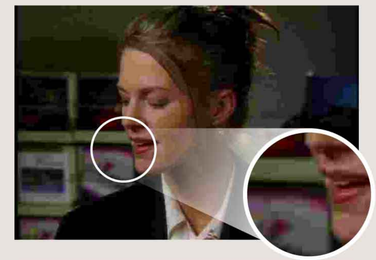
Understanding Quality of Experience (QoE) Artifacts

Improving the Subscriber's Viewing Experience

Independent research conducted with Video Service Providers found that some of the top customer issues reported were content related: macroblocking; video blackouts; frozen video and loss of audio. Unlike QoE probes, traditional IP and Transport Stream (Quality of Service) probes do not directly detect or alarm on these common causes of complaint. But what is QoE? In the context of video and audio programming, QoE is assuring that you deliver pictures and sound that will keep your viewers happy.

This poster describes some of the most frequent types of QoE errors and how to fix/prevent them so that you deliver the best possible viewing experience for your subscribers.

Blocky - Partial Screen / Occasionally	
What is it?	The Video frame looks clean or normal with stationary or slow movement, but very blocky with fast action or scene changes. Some of the video frames show 8x8 pixel blocks in low resolution. The fine details of the blocks appear several frames later.
What causes it?	Long GOP setting. Video element bandwidth set too low. Video prefiltering not enabled.
How to fix it?	Change GOP to Dynamic. Increase bandwidth. Prefilter video.



Blocky - Full Screen / Continuously	
What is it?	Every frame appears to be blocky. Fine picture details are missing.
What causes it?	Video element bandwidth set too low.
How to fix it?	Increase bandwidth.

Network Slice Error	
What is it?	One or more of the 16-pixel-high rows is shifted to the left.
What causes it?	IP Packet lost, or large amount of data from RF transmission lost. Buffer overflows and syntax errors can cause this too.
How to fix it?	Reduce IP switch/router capacity. Increase RF Signal to Noise ratio.

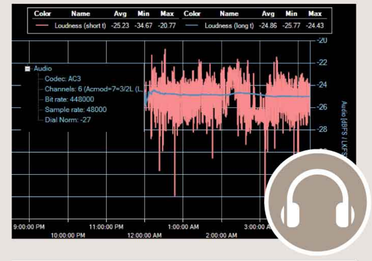
Network Bit Error	
What is it?	An occasional 8x8 or 16x16 block is displayed in an odd color (often green) or an odd pattern. Sometimes trailed with additional color/pattern problems.
What causes it?	Bit error inserted during transmission.
How to fix it?	Increase RF Signal to Noise ratio.

Network Bit Error - After Several Frames	
What is it?	A single bit error, or in this case four bit errors in a signal frame, linger and move about the picture due to Motion Vector adjustments. The artifact will disappear once a new GOP arrives (about every 500 ms).
What causes it?	Bit error inserted during transmission.
How to fix it?	Increase RF Signal to Noise ratio.

Frozen Video	
What is it?	The same video frame repeats for many seconds or minutes.
What causes it?	Live video input to encoder/ mux/remux is lost, or the link to the Receiver/Decoder has been lost. Buffer underflows can cause this too.
How to fix it?	Maintain live video at encoder/ mux/remux. Ensure that the RF/IP link to the Receiver/ Decoder is maintained.

Monochrome Video - Occasionally	
What is it?	Color occasionally disappears from live video. Toggles between monochrome and color (SD TV only).
What causes it?	Extremely out of range PCR values causing composite color burst to run out of range.
How to fix it?	Reset Encoder or Remux to keep PCR values within range.

Black Video	
What is it?	The same black video frame repeats for many seconds or minutes.
What causes it?	Live video input to encoder/ mux/remux is lost, or the link to the Receiver/Decoder has been lost.
How to fix it?	Maintain live video at encoder/ mux/remux. Ensure that the RF/IP link to the Receiver/ Decoder is maintained.



Audio Too Loud / Quiet	
What is it?	Average audio levels should stay within a few dB of the DialNorm reference. Levels between programs and commercials should not change dramatically, but occasionally do. This example shows a program averaging about -25 LKFS (first half), followed by content about 2 dB above and then below the average.
What causes it?	Encoding and Multiplexing audio content without paying attention to DialNorm.
How to fix it?	Adjust audio of levels to be near DialNorm before compression and transmission.

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