

Recommended Products



Tektronix Sentry - Video Quality Monitor

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

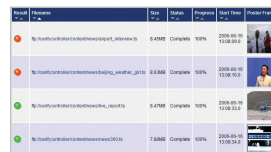
www.tektronix.com/Sentry



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

Contact Tektronix:

ASEAN / Australia (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
 Ireland* 00800 2255 4835
 India +91-80-30792600
 Italy* 00800 2255 4835
 Japan 0120-441-046
 Luxembourg +41 52 675 3777
 Macau 400-820-5835
 Mongolia 400-820-5835
 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
 Puerto Rico 1 (800) 833-9200
 Republic of Korea +822-6917-5000
 Russia +7 (495) 7484900
 Singapore +65 6356-3900
 South Africa +27 11 206 8360
 Spain* 00800 2255 4835
 Sweden* 00800 2255 4835
 Switzerland* 00800 2255 4835
 Taiwan 886-2-2656-6688
 United Kingdom* 00800 2255 4835
 USA 1 (800) 833-9200

* If the European phone number above is not accessible, please call +41 52 675 3777

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



Copyright © 2013, Tektronix. All rights reserved. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX and TEK are registered trademarks of Tektronix, Inc. All other trade names referenced are the service marks, trademarks or registered trademarks of their respective companies.

05/13 EA/WWW

28W-26444-0



Visualizing Quality of Experience To Improve the Subscriber's Viewing Experience



Understanding Quality of Experience (QoE) Artifacts

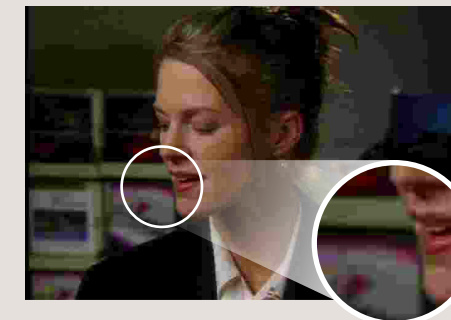
Improving the Subscriber's Viewing Experience

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.



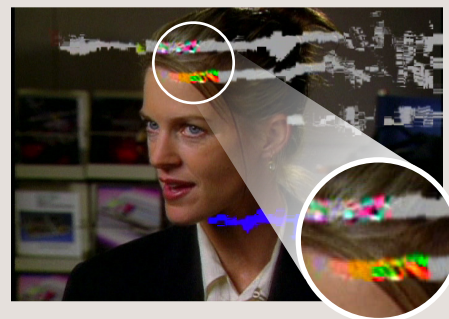
Blocky - Full Screen / Continuously	
What is it?	Every frame appears to be blocky. Fine picture details are missing.
What causes it?	Video element bandwidth set too low.
How to fix it?	Increase bandwidth.



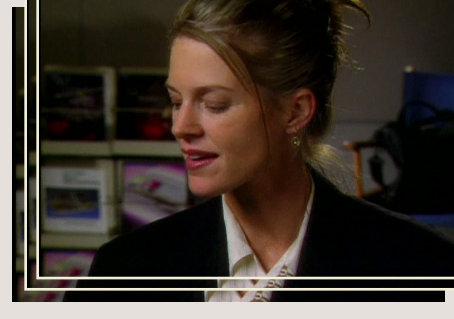
Network Slice Error	
What is it?	One or more of the 16-pixel-high rows is shifted to the left.
What causes it?	IP Packet lost, or large amount of data from RF transmission lost. Buffer overflows and syntax errors can cause this too.
How to fix it?	Reduce IP switch/router capacity. Increase RF Signal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



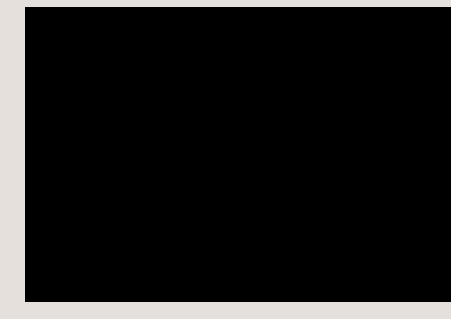
Network Bit Error - After Several Frames	
What is it?	A single bit error, or in this case four bit errors in a signal frame, linger and move about the picture due to Motion Vector adjustments. The artifact will disappear once a new GOP arrives (about every 500 ms).
What causes it?	Bit error inserted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



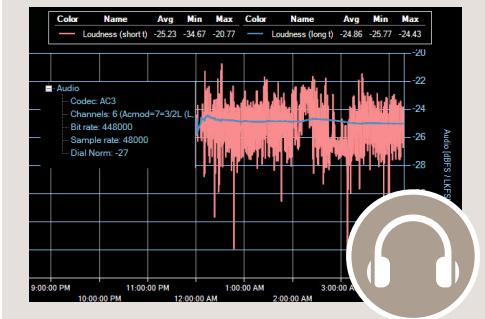
Frozen Video	
What is it?	The same video frame repeats for many seconds or minutes.
What causes it?	Live video input to encoder/mux/remux is lost, or the link to the Receiver/Decoder has been lost. Buffer underflows can cause this too.
How to fix it?	Maintain live video at encoder/mux/remux. Ensure that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