

## VideoQ, Inc.

# StresTracker™ Dynamic Test Pattern

Training Presentation

October 2013



[www.videoq.com](http://www.videoq.com)

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## Applications

Sophisticated dynamic test pattern for video compression quality analysis by direct playout and viewing or by comparison of decoded YUV video files:

1. Visual estimation by skilled observer
2. Instrumental analysis by software Video Analyzer & Viewer, e.g. VideoQ VQCA and/or VQV

Video compression QA/QC tool:

- Y Easy-to-use tool, instantly revealing performance of your video codec or complete CDN system
- Y Analysis of systems with any bitrate, frame rate, interlace, or aspect ratio
- Y Suitable for analysis of all codecs, types of video materials and encoding profiles
- Y Patent pending test pattern composition and measurement methodology
- Y Unique Stress Response measurement methodology
- Y Full Reference (A vs. B) and Self-Reference ( $A_{\text{Stress\_Level}}$  vs.  $A_{\text{Stress\_Level}} = 0$ ) modes
- Y Ideal tool for development labs, software developers and high volume manufacturers

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## Test Pattern Composition

All-In-One: Single test sequence allows automatic measurement of multiple video system parameters

Mini Test Patterns:  
Y & UV Sweeps,  
B & W PLUGEs,  
0-255 Grayscales

Stress Level Indicator

Stress Level Increase Direction

Stress Area:  
Variable Height,  
Pseudo-random  
YUV Noise Shapes

Spinning Clock:  
Frames  
Continuity Check

Central Zone:  
Live Clip,  
Static Photo  
or  
Test Pattern


Central Zone:  
Live Clip,  
Static Photo  
or  
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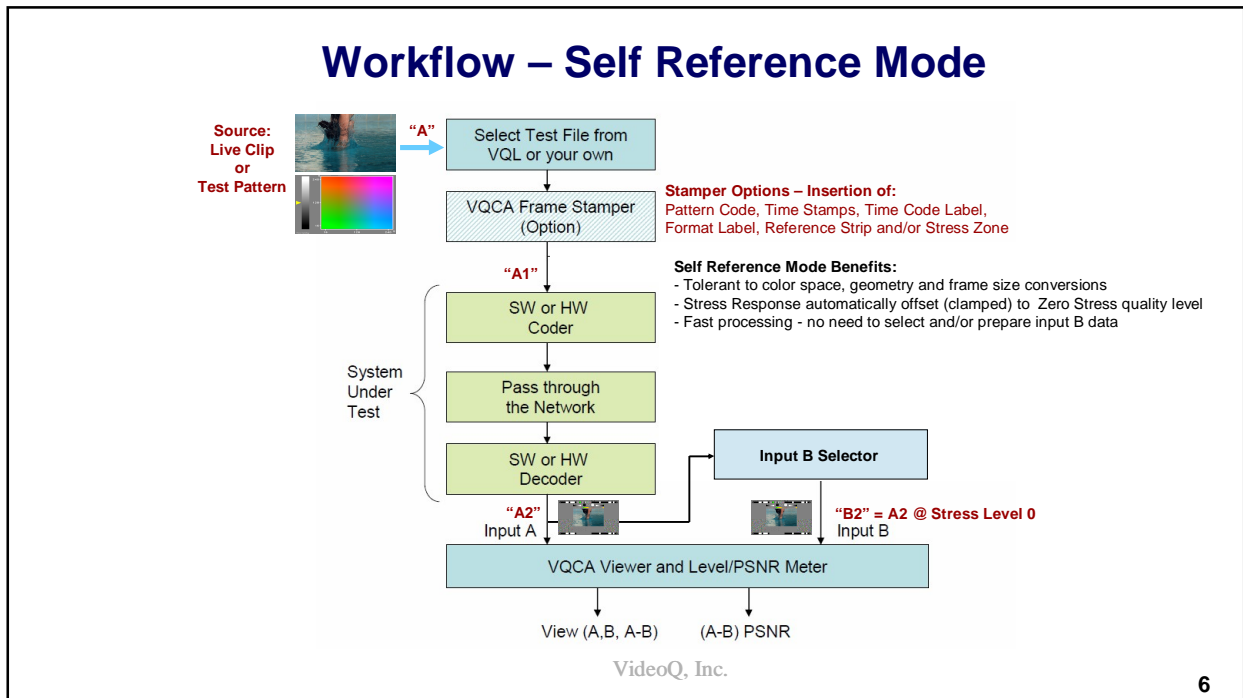
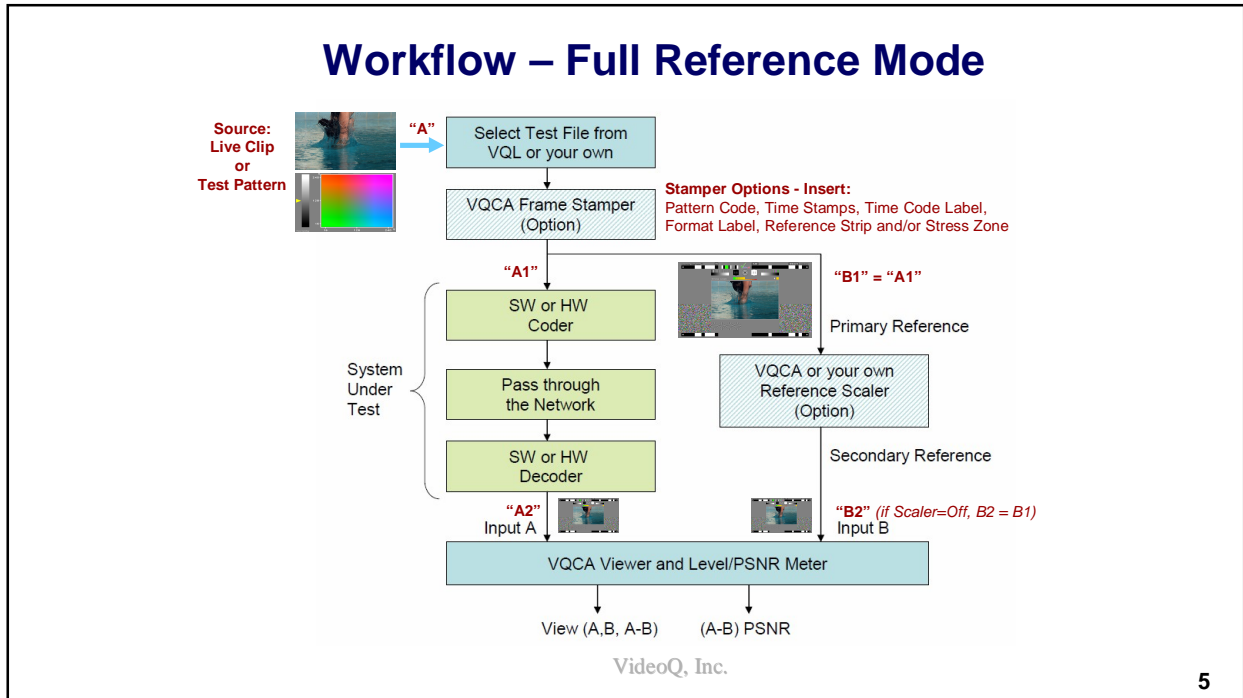
## Features

- Y StresTracker™ Test Pattern provides for:
  - Y Subjective estimation of Stress Response
  - Y Objective Stress Response measurement
- Y Test Pattern can be used with VideoQ or 3<sup>rd</sup> party PSNR (or similar metric) Meter
- Y Central Insert could be static or dynamic image, photo, live clip or artificial test pattern
- Y PSNR or similar indicator can be measured for the whole frame or for separate zones:
  - Y Central Insert (Noise-free Area)
  - Y Noise Area only (ignoring Central Insert)
- Y Linear Stress Profile means that stress noise area is directly proportional to stress level
- Y Input file format : UYVY 4:2:2, large .YUV file or folder with separate .YUV frames
- Y Optional Add-On Modules:
  - Y Separate VideoQ **Stamper** module converting any YUV file/folder into timeline indexed sequence
  - Y VideoQ or 3<sup>rd</sup> party **Indexer** module for precise A clip vs. B clip timeline auto-alignment  
*by reading A & B clips time-stamps inserted by Stamper module*



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## Using StresTracker™ in Self Reference Mode

- ∇ **Self Reference Mode** results are close enough to **Full Reference Mode** results
- ∇ In Self Reference Mode access to uncompressed **source video** at **meter location** is **not required**
- ∇ Self Reference Mode makes test procedures tolerant to **color space, geometry and frame size** conversions within the system under test
- ∇ In Self Reference Mode extra **pre-processing** is **not required**:  
*In Full Reference Mode Original A video data should be processed by Scaler and Stamper modules prior to entering the system under test*
- ∇ Self Reference Mode means **fast post-processing**:  
*Single A input mode, there is no need to select and/or prepare input B data.*  
*No need for spatial position or video level range alignment.*  
*If there is no freeze/skip events, then even time-line auto-alignment stage can be omitted.*
- ∇ Easy nearly real time tuning and benchmarking, e.g. for Compression Profile optimization

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## Example of Decoded Image, Stress Level = 0

Victor Stenberg StresTracker™

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Stress Level: 0

1080p5994, H264 9 Mbps

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### Example of Decoded Image, Stress Level = 1

Victor Steinberg StressTracker™ © 2005-2012

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Stress Level: 1

1080p5994, H264 9 Mbps

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### Example of Decoded Image, Linear Stress Level = 9

Victor Steinberg StressTracker™ © 2005-2012

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Stress Level: 9

1080p5994, H264 9 Mbps

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## Example of Decoded Image, Stress Level = 6, fragment



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## Example of Full Reference Linear Stress Response

Two Stress Response plots for two bitrates: **25 Mbps** (BluRay quality) and **9 Mbps** (secondary distribution quality), **10 linear Stress Levels** each.

Test Pattern: CST2\_Diving\_High, 2400 frames, the same 240 frames video clip for each stress level, total duration = 40 seconds @ 59.94 fps.

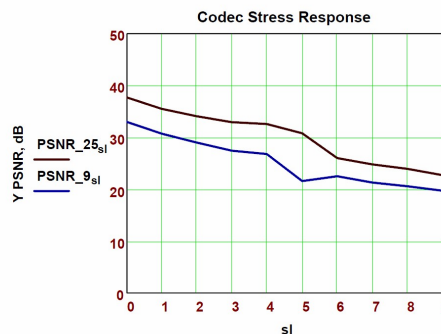
Equipment used: VideoQ **VQTS200** with VideoQ **VQAC** SW Analyzer.

Quality metric: Y channel **PSNR** in dB (*total image, including: static background, central live clip area and stress component zone*).

System Under Test: YUV to H264, then H264 to YUV by Main Concept "Reference" SW codec version 2.2.

Transport Stream format: 1080p59.94, H264 profile = 4.2 VBR mode: target = max, GOP size = 30 frames,

PSNR_25	PSNR_9
37.7	33.0
35.5	30.7
34.1	29.0
32.9	27.4
32.6	26.8
30.8	21.6
26.0	22.5
24.8	21.3
23.9	20.6
22.7	19.7



1. In both cases Stress Response slope is about **1.5 dB per linear stress level**

2. At Stress Level = 5 there is noticeable change in codec behavior; possible explanation – **adaptive encoding algorithm** reaction to higher image activity

CST2 Test Pattern - Stress Level

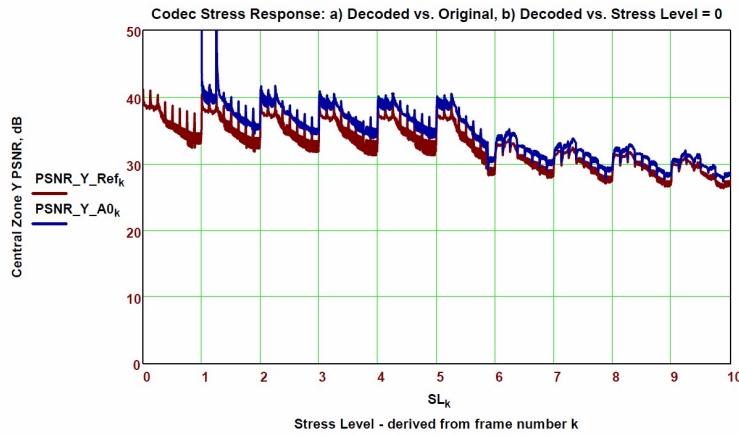
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## Example of Self Reference Linear Stress Response

Stress Response plots for YUV to H264 25 Mbps, then H264 to YUV codec, 2400 frame, 10 linear Stress Levels, 240 frames per Stress Level. Comparison of two *different* quality metrics, both providing Y channel *zonal* PSNR in dB, for central area live clip only:

- a) Full Reference Mode, A - B difference, where A = decoded image, B = original uncompressed image
- b) Self Reference Mode, A - A0 difference, where A = decoded image, A0 = decoded image at Stress Level = 0



1. There are strong PSNR variations within 30 frames long GOPs and within 240 frames long live clip segments
2. In both modes Stress Response is about the same for Stress Levels from 1 to 5, but there is big jump between Stress Levels 5 and 6.
3. Self Reference Mode results are close to Full Reference Mode results, except infinite Self Reference Mode PSNR at Stress Level 0: A0 - A0 = 0.

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## Other Related VideoQ Products

### VQL – Comprehensive library of sophisticated static and dynamic test patterns and live sequences

Library files are in compressed and uncompressed formats. VQL provides basis for

- I Instant visual-aural quality estimation
- I Objective measurements of video and audio performance
- I Fully automated (robotic) Quality Control Analysis

### VQMA – Multi-resolution Software Video Analyzer and Scope

- I Self-contained software solution, replacing expensive and bulky competitive boxes
- I Manual or automated performance measurement of video cameras, video processors and/or video capture devices
- I Measures quality of HD .YUV and .BMP files or 3G-SDI/HD-SDI, DVI/HDMI/DP/LVDS, YPrPb signals

### VQV – Media Files Player/Viewer/Analyzer/Converter

- I Displays XY positions, YUV and RGB levels of every pixel; switchable zoom ratio and signal gain
- I Built-in high-gain spatial and temporal high-pass filters reveal even hardly visible artefacts

### VQDM – Test Pattern Generator with Delay & AV Sync Analyzer

- I Instant visual-aural quality estimation plus automatic latency, AV sync and 3D LR sync measurement
- I Multi-channel real-time analysis

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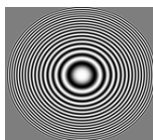
## VideoQ, Inc.

VideoQ is a California-based company, focused on video test & measurement and video enhancement technologies, products and services.

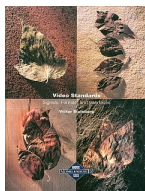
More than 50 man-years of award-winning experience in the field of Broadcast, Consumer Electronics, Transcoding and Video Data Compression.

Experts in Video Calibration, Critical Picture Quality Technologies for Broadcast, Consumer Electronics, Transcoding, Video Data Compression, SDTV, HDTV, Digital Cinema, Mobile TV, IPTV.

### *Expertise*



### *Reference Books*



### *USA & UK Awards*



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