RTM
Real-Time A/V Quality Monitor/Recorders

Video Clarity

Tools for Video Analysis

Today's multi-device delivery scenario - to TV, PC and handheld devices - puts high demands on broadcasters and multi-channel operators.

Digital media transmission now requires most live or stored assets to be prepared in different formats and delivered through a diverse set of network paths to the consumer.

Advertisers and program providers demand high quality. The technology required to deliver multiple formats and versions of the same asset is now highly complex which can lead to errors that affect quality. Therefore, a high priority should be placed on constantly testing at each step in the delivery chain so that the desired user experience is achieved.

Testing digital assets and delivery methods for quality has also led to new challenges. While experienced analog engineers could detect and classify errors by predictable means, new digital technologies have created a dynamic environment. Minor imperfections generally have no notice-able effect on quality in a digital transmission until the degra-dation hits a threshold. This unpredictable "digital cliff" drops quality to unacceptable levels.

At the processing layer, problems arise when down-converting HD to SD, changing formats and compressing the signal into the available bandwidth. Also the separate processing of audio, video and data can lead to synchroniza-tion problems.

At the transmission layer, broadcasters encounter familiar RF problems with a new challenge - coverage and interfer-ence problems caused by more channels at lower powers.

For multi-channel distribution, operators are relying on a multiplicity of distribution steps in the network and therefore latency, packet loss and synchronization add additional concerns.

Errors in one layer can cause errors in the next. For example blockiness caused by compression looks similar to packet loss/bit errors hidden by the set-top box (receiver).

For this reason, the quality must be assessed at multiple points across the network including a continuous test through an end point device (IRD or set top box) or end point IP stream sample.

RTM compares the following:
- Reference SDI or IP input to processed SDI or IP input
- Reference file to processed SDI input of same file feed
- Reference file to processed file

RTM - features:
- Continuously reports video and audio quality
- Continuously reports audio program loudness
- Continuously reports audio/video offset (lip-sync)
- Measures VANC data integrity, line selectable
- Automatically records the degraded A/V signal and reference input during threshold break periods

Degradation thresholds may be pre-configured by your engineering staff in RTM for reliably finding errors in several key areas:
- Video fine detail - issues such as blur or blockiness
- Gross video impairments - loss of signal, freezes
- Audio silence, pops, clicks and distortions
- Audio loudness according to ITU-R BS.1770-3
- Audio/video offset (lip-sync) errors with a plus or minus measurement accurate to the millisecond

Applications:
- Broadcast quality monitoring and error recording
- Automatic quality analysis of IP streams or file assets
- Long duration product QA testing
- Television production truck to central office lip-sync and A/V quality pre-check as single ended test
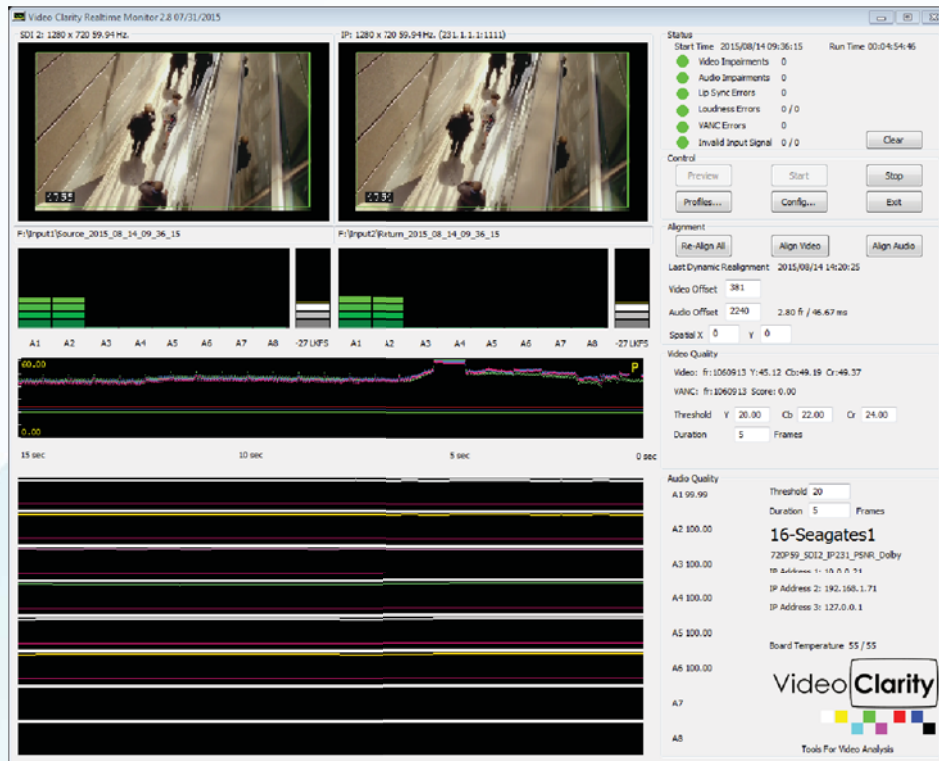
Single Ended Test Operations:
RTM includes a reference test sequence that can be exported as QuickTime, RAW file or recorded to tape via RTM's HDSDI output. Once transferred, the sequence is then played from a server or from tape in a remote site and transmitted to the studio location for live input to an RTM system which can then check lip-sync and A/V quality. Several industry accepted A/V test sequences can also be used to feed RTM in this test mode.

As a full-reference monitoring device, RTM is not influ-enced by the "artistic" quality of the source.

RTM saves valuable time and money by:
- **Finding quality problems that you have missed**
- **Confirming errors that you have already observed**
- **Recording only the audio and video of each error with synced source content for off-line analysis**
- **Combining several A/V quality measurements into one solution that automatically compiles scores for any testing duration**
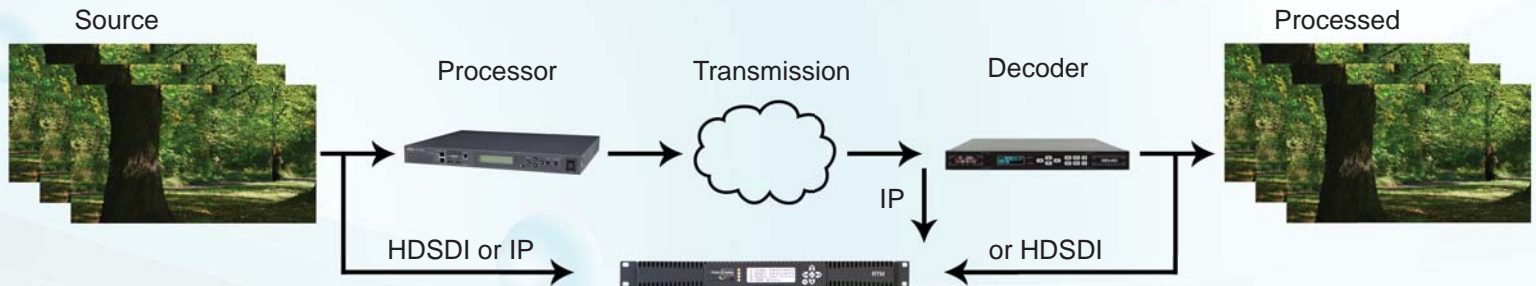
RTM - Main User Interface

Control

RTM is controlled via graphical user interface, command line or SNMP MIB client.
- The optional RTM Manager also provides set up and control of one or multiple RTM systems

RTM Player

RTM - Signal Flow Diagram

Source

Processor

Transmission

Decoder

Processed

HDSDI or IP

IP

or HDSDI

Operation

Automatically aligns:
- Finds motion/transitions in audio/video
- Aligns video inputs spatially/temporally
- Aligns audio to the sample
- Calculates audio and video offset

Set automatic recordings based on:
- Pre-set degradation thresholds
- Frequency of error event
- Consecutive number of events

Dynamically realigns:
- Missing frames/samples
- Changes in processing or network delay

Continually reports and logs:
- Video quality with DMOS or PSNR
- Audio performance with aFreq
- Audio program group loudness
- A/V offset - non-invasively
- VANC data integrity per video line

Records upon threshold breaks in:
- Video quality
- Audio quality
- Audio/Video offset (lip sync)
- VANC data integrity per video line

Off-line Analysis

- Review RTM logs with RTM Log Grapher or easily export to Excel
- Drag and drop log files on RTM Player GUI to restore recordings
- Comparatively view as side by side the source and test video via the video output *or in a separate window on the desktop of the RTM*

RTM systems include:
- Reference test patterns
- RTM Player with file exporter
- Interactive RTM Log Grapher
- RTM Scheduler

Video|**Clarity**
Tools for Video Analysis

RTM 1RU Model: RTM-S1082

RTM-S1082
Storage: 400 GB
Power: 100 - 240VAC, 47-63Hz, Autodetect 300 Watts Max
GUI Display Output: VGA, DVI or HDMI
Includes: Printed manual, 1 RU rack ears, USB to GNIC adapter, RTM Scheduler

Video I/O: ITU-601, SMPTE 259/292/296
- 2 HDSDI - inputs and outputs (BNC)
- Input reference & test signals up to 1080i 60Hz
Audio I/O: 24 bit, 48 KHz
- 2 HDSDI - inputs and outputs (BNC)
- 8 channels of embedded audio per BNC
- Dolby® Digital Plus (input decoder incl.) or PCM
- 1 analog stereo alarm output - stereo mini

IP Network Inputs: 2 - 1000baseT - RJ45
                      1 - 1000baseT - USB/RJ45
Dimensions: 17" W x 1.75" H x 10" D (1 RU)
            43.2 cm x 4.5 cm x 25.4 cm
Weight: 11.7 lbs, 5.3 Kg
Operating Temperature: +5 - +25 Celsius
Storage Temperature: -20 - +50 Celsius
Relative Humidity: 5-95%, non condensing

RTM Portable Model: RTM-S2042

RTM-S2042
Storage: 1.2 TB
Power: 100 - 240VAC, 47-63Hz, Autodetect 300 Watts Max
GUI Display Output: VGA, DVI or HDMI
Includes: Printed manual, 2 RU rack ears, keyboard, mouse, 5 SMB to BNC cable kit, USB to GNIC adapter, RTM Scheduler

Video I/O: ITU-601, SMPTE 259/292/296
- 2 HDSDI - inputs and outputs (SMB/BNC)
- Input reference & test signals up to 1080i 60Hz
Audio I/O: 24 bit, 48KHz
- 2 HDSDI - inputs and outputs (SMB/BNC)
- 8 channels of embedded audio per SMB/BNC
- Dolby® Digital Plus (input decoder incl.) or PCM
- 1 analog stereo alarm output - stereo mini

IP Network Inputs: 2 - 1000baseT - RJ45
                      1 - 1000baseT - USB/RJ45
Dimensions: 8.6" W x 3.5" H x 13.75" D (2 RU)
            22.0 cm x 9.0 cm x 35.0 cm
Weight: 11.5 lbs, 5.4 Kg
Operating Temperature: +5 - +25 Celsius
Storage Temperature: -20 - +50 Celsius
Relative Humidity: 5-95%, non condensing

RTM 3G Portable Model: RTM-S2043

RTM-S2043
Storage: 2.1 TB
Power: 100 - 240VAC, 47-63Hz, Autodetect 300 Watts Max
GUI Display Output: VGA, DVI or HDMI
Includes: Printed manual, 2 RU rack ears, keyboard, mouse, 4 SMB to BNC cable kit, HDMI output cable, analog breakout cable, USB to GNIC adapters (2), RTM Scheduler

Video I/O: ITU-601, SMPTE 259/292/296/424/425
- 2 3G HDSDI (SMB/BNC) - inputs and outputs
- Input reference & test signals up to 1080p 60Hz
- 1 HDMI 2.0b video & audio playback output
Audio I/O: 24 bit, 48 KHz
- 2 HDSDI - inputs and outputs (SMB/BNC)
- 8 channels of embedded per SMB/BNC
- Dolby® Digital Plus (input decoder incl.) or PCM
- 1 analog stereo alarm output - stereo mini

IP Network Inputs: 1 - 1000baseT - RJ45
                      2 - 1000baseT - USB/RJ45
Dimensions: 8.6" W x 3.5" H x 13.75" D (2 RU)
            22.0 cm x 9.0 cm x 35.0 cm
Weight: 11.5 lbs, 5.4 Kg
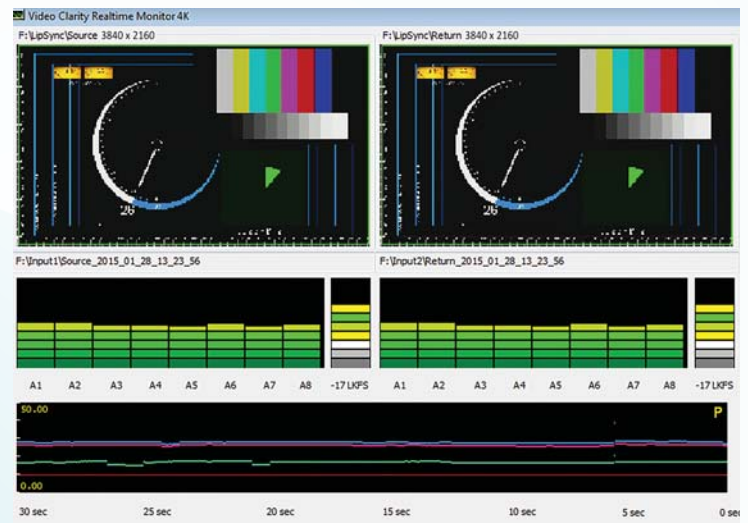Operating Temperature: +5 - +25 Celsius
Storage Temperature: -20 - +50 Celsius
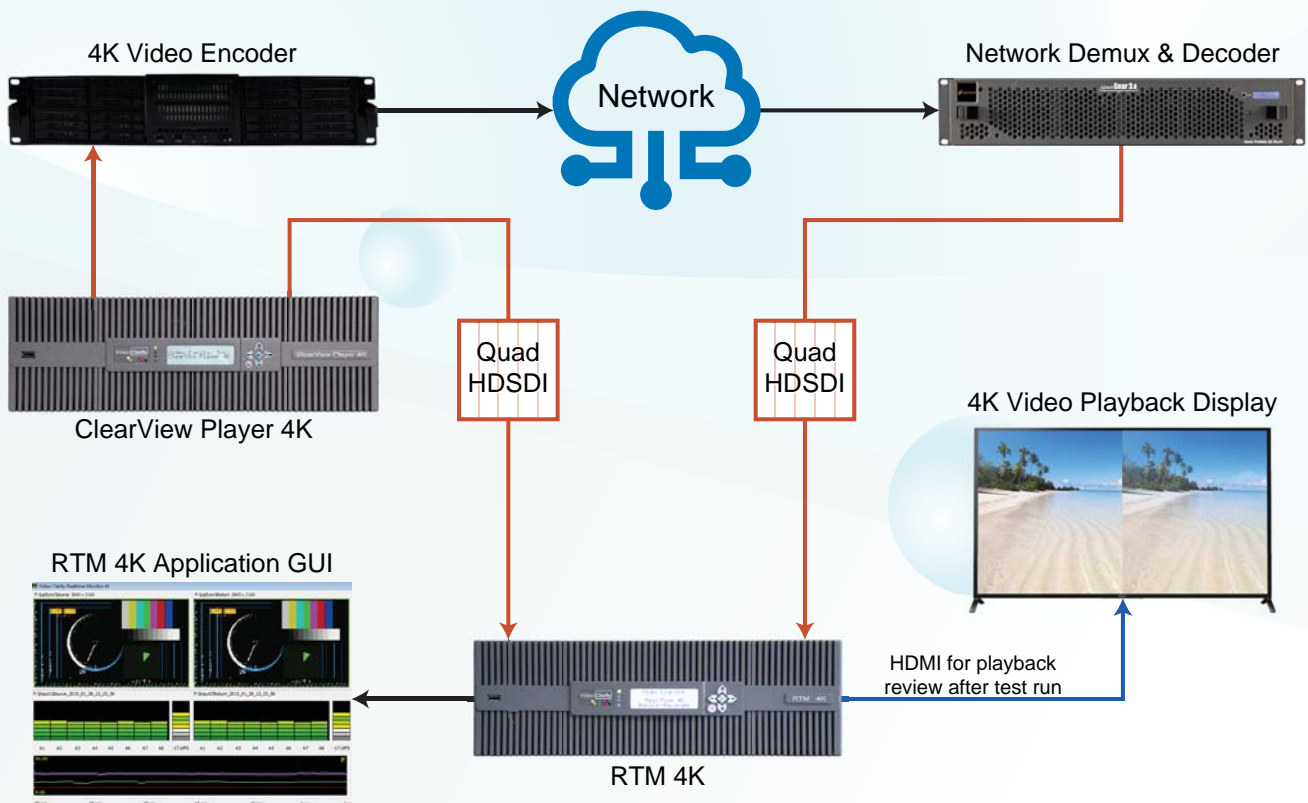Relative Humidity: 5-95%, non condensing

RTM 4K - The Latest Innovation In 4K Device And Network Quality Testing From Video Clarity

The real-time test of audio and video quality provides users with certain benefits including...

- The ability to perform long term quality testing on fully uncompressed video and audio for any length of time.
- A full-reference test that compares video and audio source to a return channel after processing so that highly accurate measurements and fault thresholds can be applied for automatic event recording.
- Quality measurements that are not influenced by the creative effects applied to source video material, saving valuable time and effort with no false positives for every test run.

The RTM 4K presents a significant technological breakthrough by applying a fully uncompressed 4K video source with embedded audio and performing a real-time video PSNR or DMOS via comparison to a 4K encoded/decoded signal input along with audio quality, lip sync and audio program loudness measurements at the same time.

Real-Time Quality Testing for Network 4K Encoder or Transcoder

RTM 4K Features

- RTM 4K GUI provides visual thumbnail of source and test video inputs with instant test score updates.
- RTM 4K Player allows drag and drop of test logs for comparison playback of recorded error sequences.
- PSNR or DMOS (with MS-SSIM algorithm) is selectable as the video quality test in RTM 4K.
- aFreq is applied for audio performance and lip sync measurement with audio/video offset thresholds.
- aPeak is applied for LKFS audio program loudness measurement with min and max thresholds.
- VANC data check is selectable per line and is measured for data payload accuracy.
- RTM Log Grapher provides continually updated selectable measurements with timeline pan & zoom.
- RTM Scheduler runs the RTM application on a test schedule with start time and test length per job.

RTM 4K System Model: RTM-S8084

Model: RTM-S8084
Storage: 10.0 TB
Power: 100 - 240VAC, 47-63Hz, 600 W Max
GUI Display Output: VGA, DVI or HDMI
Includes: Printed manual, 3 RU rack kit, keyboard, mouse, 4 SMB to BNC cable kit (2), HDMI output cables (2), analog output cables (2), USB to GNIC adapter (1), RTM Log Grapher, RTM Scheduler

Video I/O: ITU-601, SMPTE 259/292/296/424/425
- 2 Quad 3G HDSDI (SMB/BNC) - inputs or outputs
- Input source & test signals up to 2160p 60Hz each
- 2 HDMI 2.0b 4K video & audio playback outputs
Audio I/O: 24 bit, 48 KHz
- 2 HDSDI - inputs and outputs (SMB/BNC)
- 8 channels of embedded per SMB/BNC
- Dolby® Digital Plus (input decoder incl.) or PCM
- 1 analog stereo alarm output - stereo mini

IP Inputs For HD or SD Testing and Control Use: 2 - 1000baseT - RJ45
        1 - 1000baseT - USB/RJ45
Dimensions: 17" W x 5.25" H x 20.15" D (3 RU)
        43.2 cm x 13.5 cm x 51.4 cm
Weight: 40 lbs, 18 Kg
Operating Temperature: +5 - +25 Celsius
Storage Temperature: -20 - +50 Celsius
Relative Humidity: 5-95%, non condensing

Product design and specifications are subject to change without notice or obligation. Video Clarity, Inc.