

# RTM

## Broadcast Quality Monitoring



Video **Clarity**



Tools for Video Analysis

**Today's "three screens" 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 noticeable effect on quality in a digital transmission until the degradation 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 synchronization problems.

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

For internal distribution, broadcasters are relying on telecommunication technology 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 monitored 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 - a full reference broadcast quality monitor:

- Measures video and audio quality, including loudness
- Measures audio/video offset (lip-sync)
- Measures VANC data lines integrity
- Alarms and records the A/V sequences if any of the above have fallen below a degradation threshold

Degradation thresholds are pre-configured by your engineering team 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
- Audio/video offset (lip-sync) errors with a plus or minus measurement accurate to the millisecond

RTM compares the following:

- Reference SDI or IP input to processed SDI or IP input
- Reference file to processed SDI input
- Reference file to processed file

Applications:

- In-service broadcast monitoring
- Long duration QA testing
- Television production truck to central office lip-sync and quality pre-check as single ended test

Single Ended Test Operations:

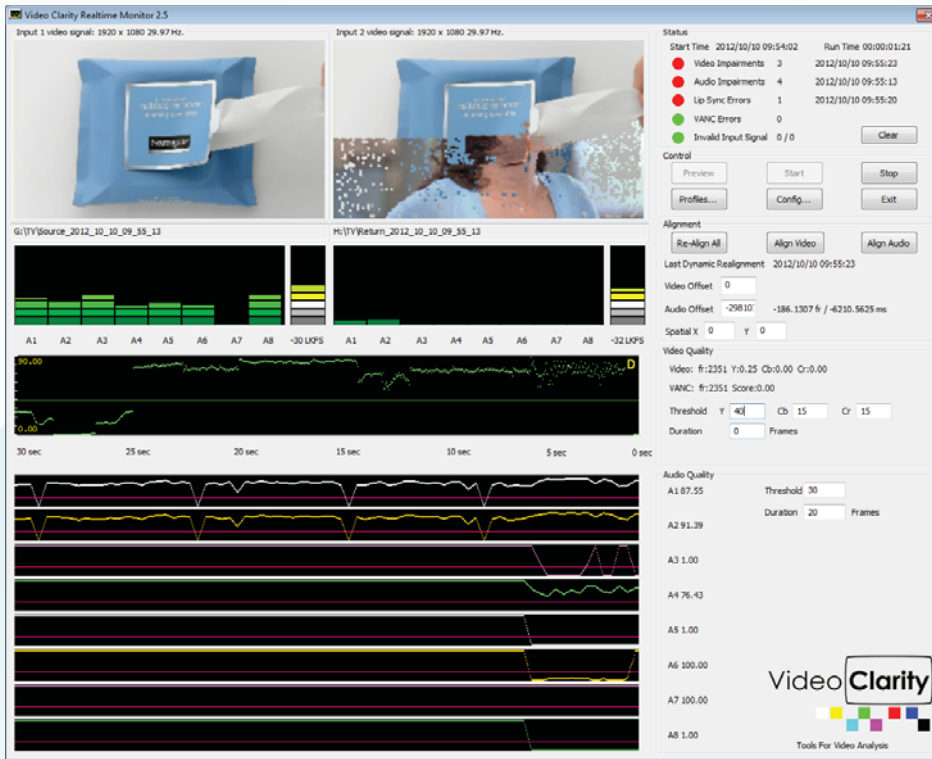
RTM includes reference test patterns, which can be exported as QuickTime, RAW, or AVI files or recorded to tape through SDI outputs. These are then played from a server or from tape in a remote site and transmitted to the studio location for live input to an RTM system which can then check lip-sync and A/V quality. Several industry accepted A/V test sequences can also be used to feed RTM in this test mode.

Being a full-reference monitoring device, RTM is not influenced by the "artistic" quality of the source.

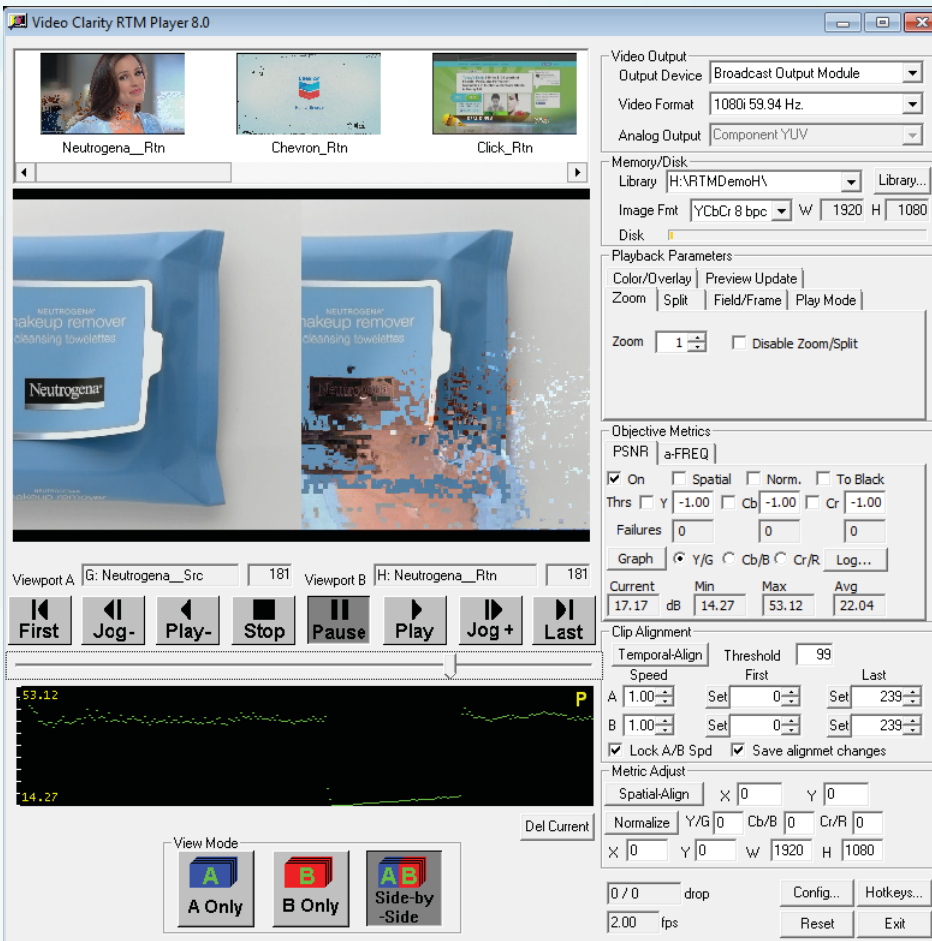
**RTM saves you valuable time and money by:**

- **Finding errors that you have missed**
- **Confirming errors that you have already observed**
- **Saving A/V sequences around each error for off-line analysis and identification**

## RTM GUI



## RTM Player GUI



## Control

RTM is controlled via an included graphical user interface, command line interface or SNMP MIB client.

## Operation

Set alerts based on:

- Pre-set degradation thresholds
- Frequency of error event
- Consecutive number of events

Automatically aligns:

- Finds activities in the audio/video
- Aligns video spatially/temporally
- Aligns audio to the sample
- Calculates audio and video offset

Dynamically realigns:

- Missing frames/samples
- Changes for processing delay

Continually reports:

- Video quality with DMOS or PSNR
- Audio performance with aFreq
- Audio loudness - ITU-R BS. 1770-3
- A/V sync - non-invasively
- VANC data integrity per video line

Alerts, records and logs upon exceeded thresholds for:

- Video quality
- Audio quality
- Audio loudness
- A/V sync
- VANC line data integrity

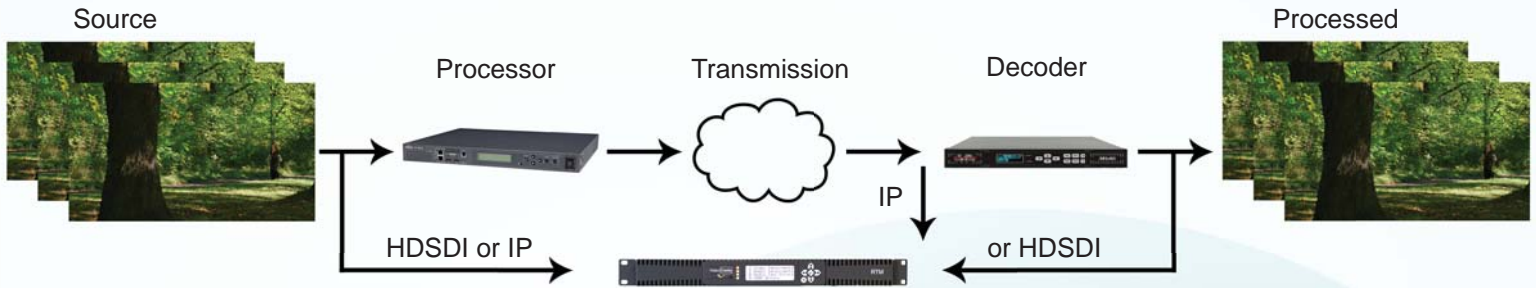
RTM systems include:

- Reference test patterns
- RTM Player with file exporter

## Off-line Analysis

- Review RTM logs as text or automatically export to Excel
- Drag and drop log files on RTM Player GUI to restore recordings
- Comparatively view as side by side the source and processed AV recordings with scalable graph

## RTM - Real Time Monitoring



### RTM 1RU Model: RTM-S1081



#### RTM-S1081

**Storage** - 120 GB

#### Power

100 - 240VAC, 47-63Hz, Autodetect  
300 Watts Max

**GUI Display Output** - VGA

Includes printed manual, 1 RU rack ears

#### Video I/O

ITU-601, SMPTE 259/292/296  
2 HD/SD-SDI - inputs and outputs (BNC)  
- input two signals up to 1080i 60Hz each

#### Audio I/O

24 bit, 48 KHz PCM  
2 HD/SD-SDI - inputs and outputs (BNC)  
- 8 channels of embedded audio per BNC  
1 analog stereo alarm output - stereo mini

**IP Network Inputs** - 2 - 1000baseT - RJ45

#### Physical Specifications

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

#### Temperature

Operating: +5 - +35 Celsius

Storage: -20 - +50 Celsius

Relative Humidity: 5-95%, non condensing

### RTM Portable Model: RTM-S2042



#### RTM-S2042

**Storage** - 1.3 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

#### Video I/O

ITU-601, SMPTE 259/292/296  
2 HD/SD-SDI - inputs and outputs (SMB/BNC)  
- input two signals up to 1080i 60Hz each

#### Audio I/O

24 bit, 48KHz PCM  
2 HD/SD-SDI - inputs and outputs (SMB/BNC)  
- 8 channels of embedded audio per SMB/BNC  
1 analog stereo alarm output - stereo mini

**IP Network Inputs** - 2 - 1000baseT - RJ45

#### Physical Specifications

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

#### Temperature

Operating: +5 - +35 Celsius

Storage: -20 - +50 Celsius

Relative Humidity: 5-95%, non condensing

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