Video Clarity

Tools for Video Analysis

Real-Time Monitor (RTM)
System Guide

TABLE OF CONTENTS

1 Real Time Monitoring (RTM) System

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 transmitting layer, broadcasters encounter their familiar RF problems with a new challenge - coverage and interference problems caused by more channels at lower powers. Broadcasters rely on telecommunication technology so 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.

For this reason, the quality must be monitored at multiple points across the network including at the end users device (set-top box, mobile).

RTM - a full reference broadcast quality monitor:
- Measures the audio and video quality,
- Measures the audio and video delay (lip-sync),
- Measures the VANC data lines integrity, and
- Alarms and records the A/V sequences if any of the above have fallen below the degradation threshold.

The degradation threshold is pre-configured by your engineering team and set to detect:
- Fine detail - blur, blockiness, and
- Gross impairment - loss of signal, picture freezes, lip-sync.

RTM can compare
- Reference SDI input to processed SDI input,
- Reference file to processed SDI input, and
- Reference file to processed file

Applications
- In-service broadcast monitoring,
- Long duration QA testing, and
-Television Production Truck to Central Office lip-sync and quality pre-check.

RTM includes reference test patterns, which can be exported as QuickTime, RAW, or AVI files or played through SDI outputs. These can be stored in your Production Truck to check lip-sync and A/V quality or can be used for QA testing.

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

RTM continually aligns to measure lip-sync and it reports any frame loss.

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.

2 Hardware Quick Setup Guide

Figure 1: RTM-1RU Back Panel

Figure 2: RTM-1RU Front Controls

Figure 3: RTM-3RU Back Panel

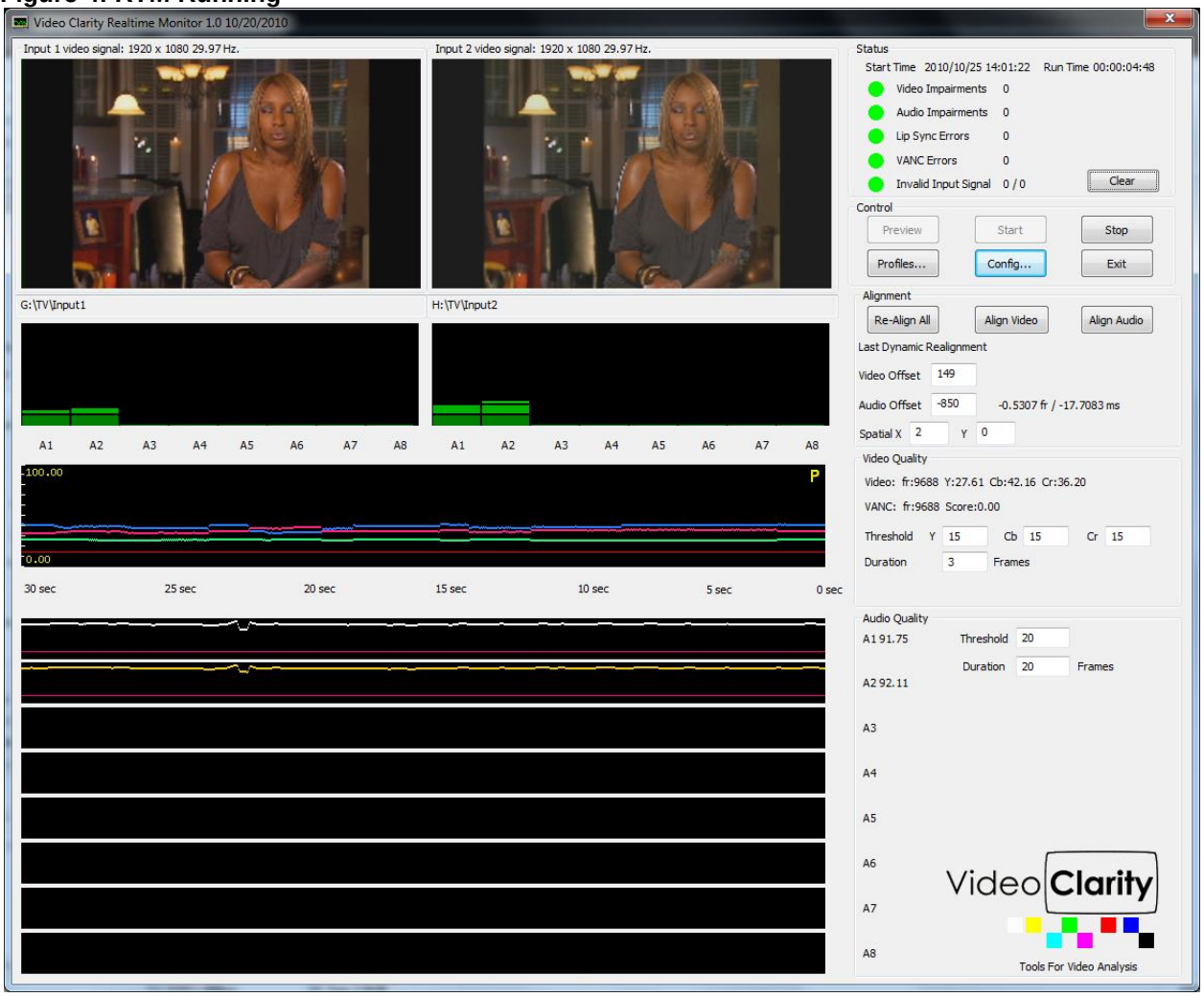
To operate RTM (regardless of model):

- Connect the included USB Keyboard and Mouse,
- Connect a VGA monitor to the VGA output connector,
- Connect signals to Input 1 and Input 2 (For file-based operation, this is not necessary), and
- The Output connectors are an echo output of the input (except when using the separate RTM Player application).

The hardware specifications of each system above is detailed in the RTM datasheets or on the website here.

3 Software Quick Setup Guide

Figure 4: RTM Running



After launching the RTM application if it not set for automatic start, then all you have to do is press the Start button in the Control pane.

Pressing Start will include a full alignment, which independently aligns the audio and video streams. Upon completion, the alignment pane is updated:

- The video offset is noted in frames
- The audio alignment with respect to the video offset is noted in samples, frames, and time (milliseconds/ms)
- The video spatial alignment in pixels is noted.

For the example above, the audio offset is -17.7ms, which means that the audio is ahead of the video by ½ a frame.

The video, audio, and VANC are compared against a threshold/duration, and if they exceed the designated limits:

- a recording is started of both incoming signals,
- a log entry is made,
- the status in the Status pane is updated,

- an audio alert is generated,
- the status on the 1RU's front panel is updated, and
- a log file (.psnr or .audio) is created which contains the difference values for the created recordings. This log file can be dragged/dropped onto ClearView for easy setup and post-anlysis.

It is expected that the incoming signals will drift from each other over time. For example, the delay between the signals may be 344 frames for a day, 343, for a day, and back to 344 the next. This is due to several factors including:

- the sources not being genlocked
- the sources changing between national and local feeds

RTM is aware of this and compensates for it using dynamic re-alignment.

The remainder of the screen is devoted to showing the quality over time. The 2 videos are shown side-by-side after alignment. This is a decimated image and does not necessarily show the entirety of the video quality. The min/max amplitude of the audio is shown as a meter per channel up to 8 channels.

Two graphs are depicted:

- Video graph is showing the PSNR score over time
- Audio graph is showing the frequency/amplitude score over time.

RTM reliably detects MPEG breakups, frozen video, lost audio, most typical causes of impairments found in broadcasts today. The picture below shows how the quality graph reacts to a video impairment.

Figure 5: Graph around Video Error

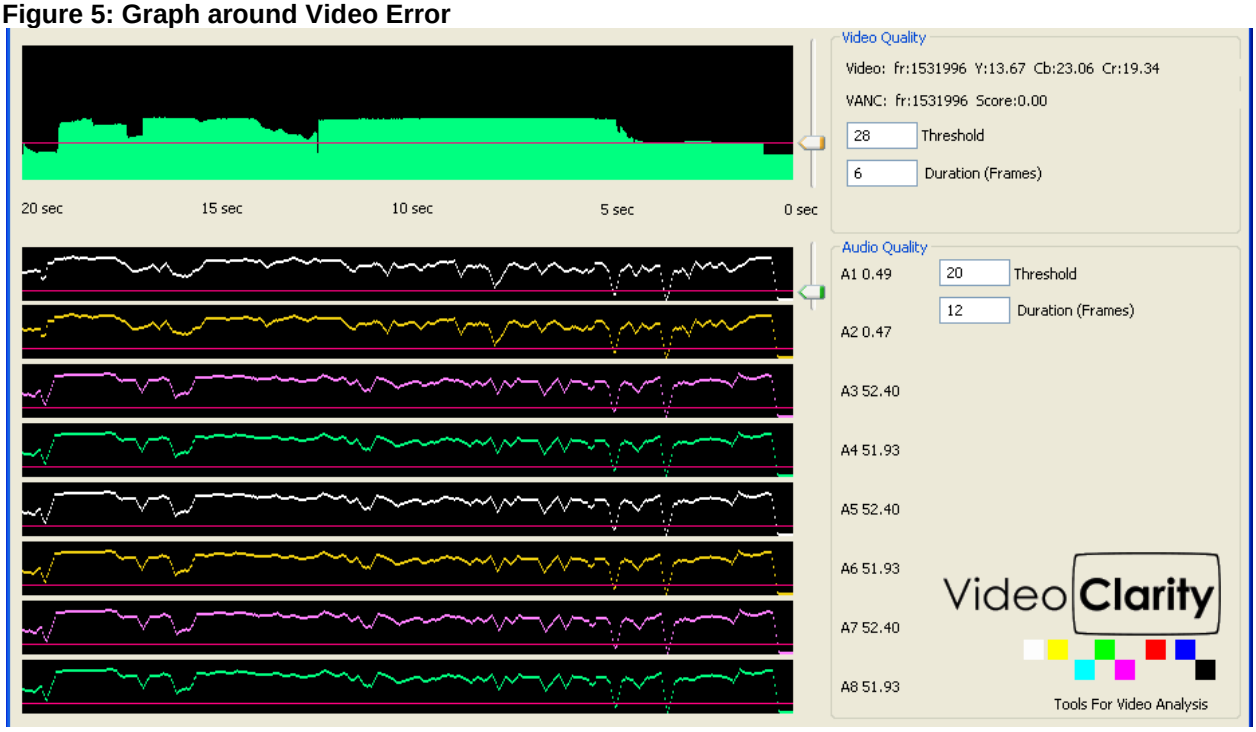


Figure 6: Detected Impairment Example (top-bottom view from ClearView)

The log files are saved in the ClearView Video Analysis format, which means that they can be played back using:

- The included RTM player application, or
- Further analyzed using ClearView, which can generate detailed reports.

4 Typical Applications

4.1 Long Duration Testing

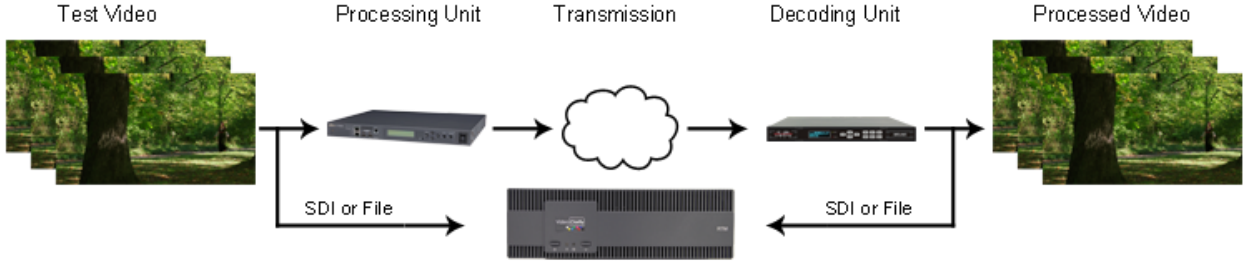
What would happen if the video processing units did not produce an error for several hours or days? Perhaps a particular set of input data sent at just the wrong time was needed to create the problem. This type of problem is very difficult to replicate, but it will be the first problem that your customer's find.

RTM can be used for nearly any extended duration quality monitoring applications. Plug in 2 SDI streams or 1 stream and a file, and RTM will alarm when the quality exceeds the threshold. It will also save the streams before and after the condition for inspection.

Regardless of the input, RTM continually monitors and records the A/V stream when the

- Audio or Video quality drops below a defined threshold,
- Lip-sync exceeds the delay thresholds, or
- Ancillary data (VANC) is missing.

Figure 7: Standard long duration test



4.2 Broadcast Monitoring

Once captured, many problems can be classified

- The video is black
- The audio is silent
- The video and/or audio is distorted
- The video and audio are out of sync with reference to each other
- The ancillary data (closed captioning, subtitles, etc.) is not intact or timed properly

Errors will occur. Simple errors are easily found and corrected, but some happen infrequently and/or in the presence of special conditions.

The recorded stream is stored in the ClearView sequence folder format for further analysis and classification.

In addition, RTM reports

- The average A/V quality,
- A/V delay/offset, and
- Any dropped frames and then dynamically realigns.

4.2.1 Reference Content Caused the Error

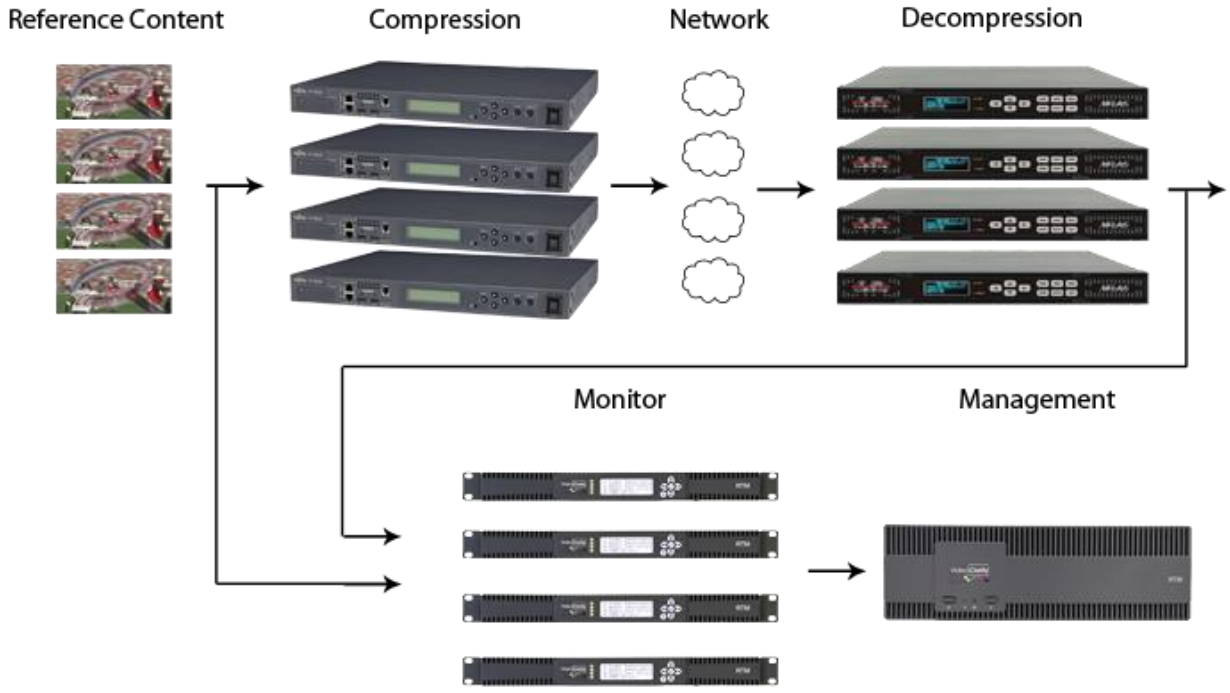
At times the reference content can have break-ups in it, and this can cause the processed content to further break-up or completely freeze.

4.2.2 Processing Content Caused the Error

By putting traffic on the network or by over-compressing the reference, the received (set-top box output) may have breakups.

The only way to find these is to monitor every channel at the end-points and then diagnose problems backwards in time until you find the problem.

Figure 8: Network using multiple RTMs

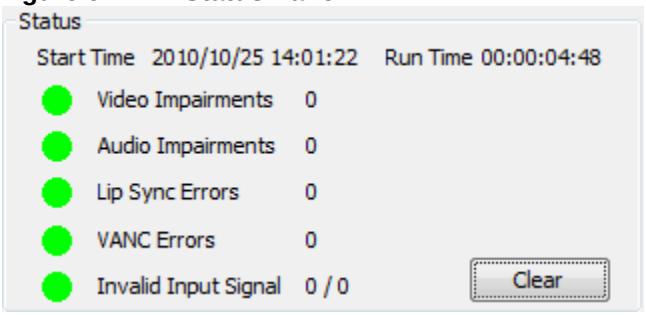


5 Setting RTM Parameters

Upon startup, RTM will launch with the configuration from the last time that it was operating. The parameters on this page, can be changed while, the system is running.

5.1 RTM Status

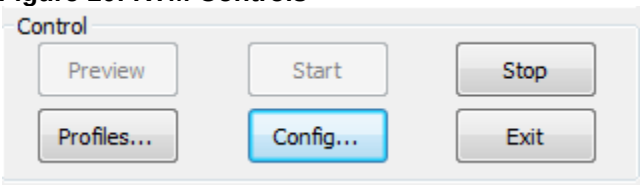
Figure 9: RTM Status Pane



Status Messages	This is the current status of each type of error. If the status is red, then an error has occurred. The number of errors is noted. *NOTE: details are in the RTM log files.*
Clear	This resets the status to 0 errors and turns everything green.

5.2 RTM Controls

Figure 10: RTM Controls



Preview	Pressing this button acquires the audio and video and shows the 2 images in the preview pane. It does not start the operation of checking quality.
Start	Pressing this button performs the operations of preview and starts the operation of checking quality.
Stop	Pressing this button stops the operations of RTM.
Profiles	Pressing this button allows you to load a configuration profile that you have previously saved.
Config	Pressing this button brings up the configuration menu
Exit	Pressing this button exits RTM (closes the application).

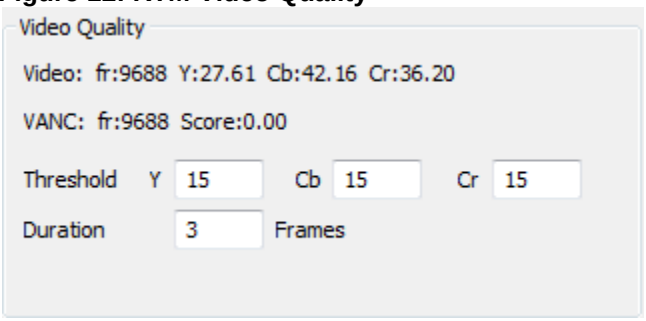
5.3 RTM Alignment

Figure 11: RTM Alignment

Re-Align All	This button does a full alignment of the video and audio.
Align Video	This button aligns the videos but does not align the audios
Align Audio	This button aligns the audios assuming that the current video alignment is correct. *NOTE: if the video alignment is not correct, then the audio alignment may fail.*
Video Offset	This is the calculated video offset in frames after the alignment has completed. *NOTE: alignment is automatic from start* *NOTE 2: you can type in your own alignment*
Audio Offset	This is the calculated audio offset in samples relative to the 2 video streams being aligned. *NOTE: it is also show in video frames and milliseconds (ms)* *NOTE2: you can type in your own alignment*
Spatial X, Y	This is the calculated spatial offset because the 2 videos may have a pixel shift up/down. If the offset is know, you can type in the numbers here and turn off the automatic calculation to speed up the alignment process.

5.4 RTM Video Quality

Figure 12: RTM Video Quality

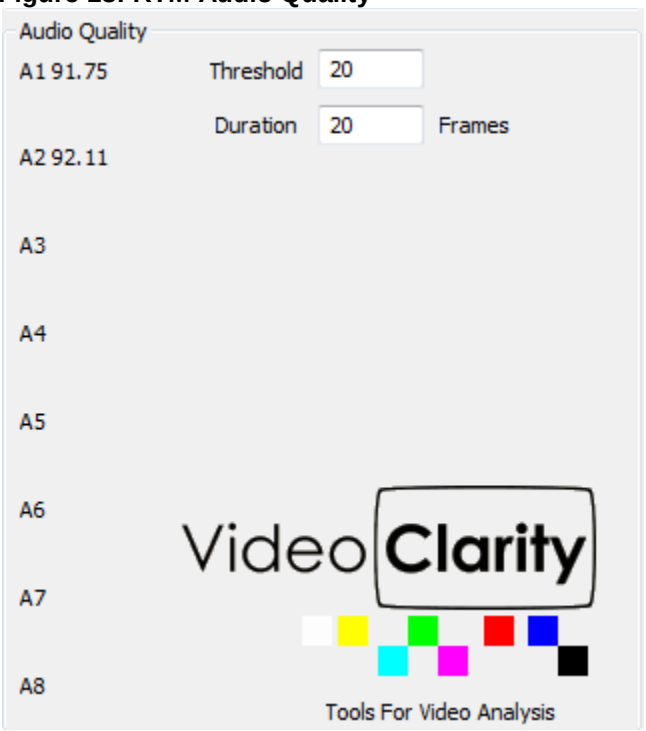


Status	These are status message which display the current frame that is being analyzed (relative to 0/start), the video quality score for Y, Cb, and Cr, and the VANC score based on which lines are being evaluated.
Threshold	The video quality is deemed to be poor if the falls below the threshold stated here. The threshold can be different for Y, Cb, and Cr.
Duration	This value defines how many consecutive video quality failures are needed to trigger a recording.

	NOTE: there are more parameters under the Configure Sequence Creation Pane. *NOTE2: Dynamic re-alignment may notice that the video is not aligned and reset the error counter after making a correction.*

5.5 RTM Audio Quality

Figure 13: RTM Audio Quality



Status	These are status message which display the current audio quality score for each active audio channel.
Threshold	The video quality is deemed to be poor if the falls below the threshold stated here.
Duration	This value defines how many consecutive audio quality failures are needed to trigger a recording. *NOTE: there are more parameters under the Configure Sequence Creation Pane.*

6 Setting Normal Configuration Parameters

Pressing Config from the main RTM page, lets you setup the general configurable parameters. Each of these will be discussed in this section.

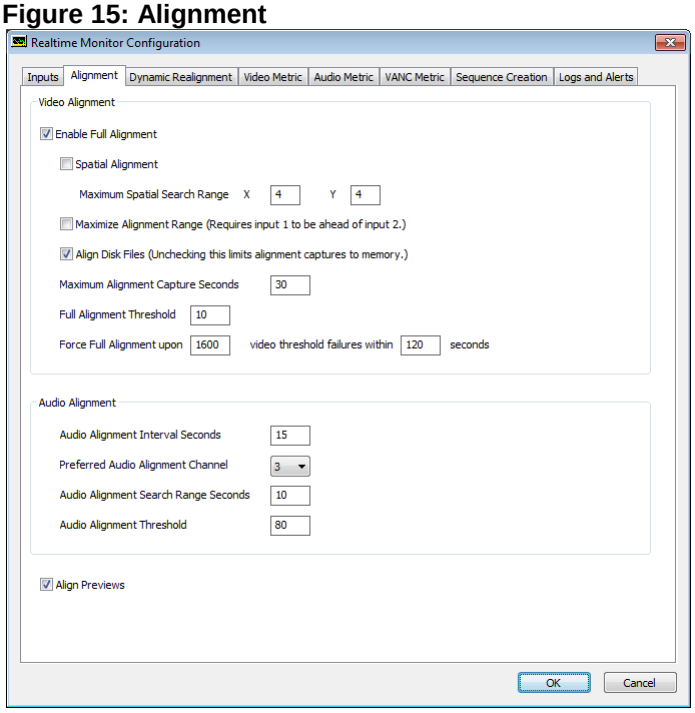
6.1 Inputs Pane

Figure 14: Video Input Pane

Video Input	SDI Input is the hardware input ClearView Sequence is the file input. *Note: You must use ClearView to convert the compressed or uncompressed file into the appropriate format or you can record the input.*

6.2 Alignment Pane

Figure 15: Alignment



6.2.a Video Alignment

Enable Full Alignment	Checking this box will enable a full alignment when the Start button (from the main RTM window), on startup, or when RTM realizes that it cannot dynamically realign.
Spatial Align	This flag enables a spatial test between the two incoming signals. Since compression algorithms often eliminate the border pixels knowing that the TV will over-scan (e.g. MPEG generates a 704x480 image to fill a 720x486 video display), the decoding device needs to orient the picture. Thus, a horizontal or vertical shift will take place.

	RTM needs to detect and compensate for this shift before the monitoring begins. *NOTE: if you know the spatial offsets, you can uncheck this box and simply type in the values on the main RTM page's alignment pane.*
Max X, Max Y	This is the maximum horizontal and vertical search range for spatial alignment. The values are X – 0..8 and Y – 0..8.
Maximize Alignment Range	When RTM starts it must first determine the temporal and possible spatial offsets between two signals. This is done by capturing a number of frames from both inputs and then finding a best match between the two and determining the temporal and spatial offsets. In situations where delay is greater than 100 frames, this box should be checked. *NOTE: requires Input 1 to be ahead of Input 2*
Align Disk Files	This flag enables RTM to use the hard disk during full alignment to store the sequences; instead of RAM. The advantage is that the number of frames can be larger. The only downside is that it requires some hard disk space.
Max Alignment Capture Frames	For the initial full alignment, RTM will record from both inputs for as many frames as are defined in this field. During this time interval, both inputs must have at least 2 temporally significant events. *NOTE: Time is saved by properly setting this value. If you know your delay is < 3 seconds, 12 seconds would most often be sufficient for Max Alignment Frames. A value of 0 uses the maximum available in the 8 GB of onboard RAM.*
Full alignment threshold	When using the video quality metric, this minimum value must be met before stating successful alignment. The number is on a 0-100 scale where anything over 15 or 20 is good.
Full alignment upon	If RTM sees too many errors over a period of time, it can be caused by no longer being in alignment. This setting tells RTM how many errors are too many in what period of time (seconds).

6.2.b Audio Alignment

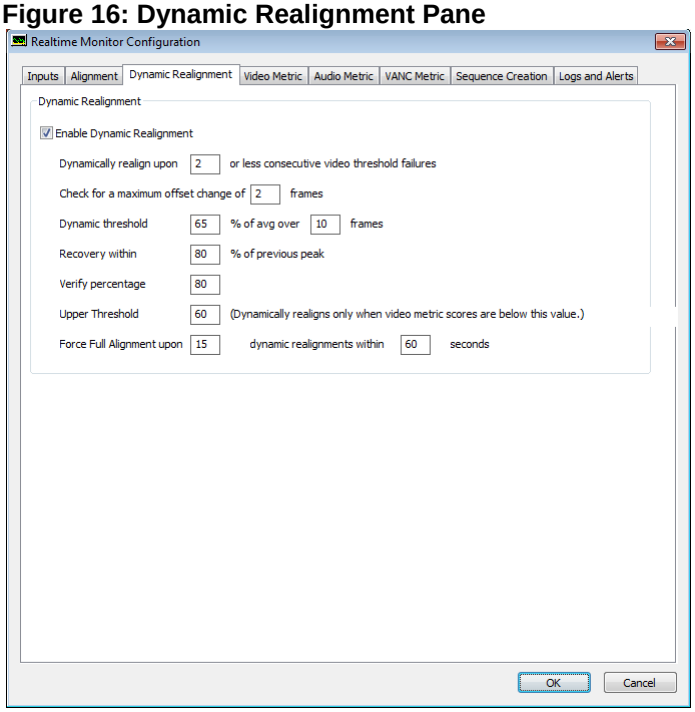
Audio Alignment Intervals	Defines how often RTM will check for audio drift. This is also how often the file AudioAlign.log is updated. AudioAlign.log records the value of the audio offset for long-term monitoring. *NOTE: this is in seconds.*
Preferred Audio Alignment Channel	RTM will first try to use this audio channel for audio alignment. The audio channel must be enabled and the audio on this channel must have sufficient audio events required to perform a successful alignment. If the preferred audio alignment channel does not contain enough audio information, then RTM will circulate through all of the enabled audio channels looking for sufficient audio information.
Audio Alignment Search Range Seconds	When measuring the audio quality a number of secondsshould be grouped together before processing.
Audio Alignment Threshold	When the audio alignment threshold is set to a non-zero value and all enabled audio channels have an average value greater than or equal to this threshold, then the periodic audio alignment is skipped. At least one enabled audio channel must have an average value less than this threshold for the periodic audio alignment to occur.

Preview

Align Previews	This flag enables Video alignment on the main RTM page

6.3 Dynamic Realignment Pane

Figure 16: Dynamic Realignment Pane

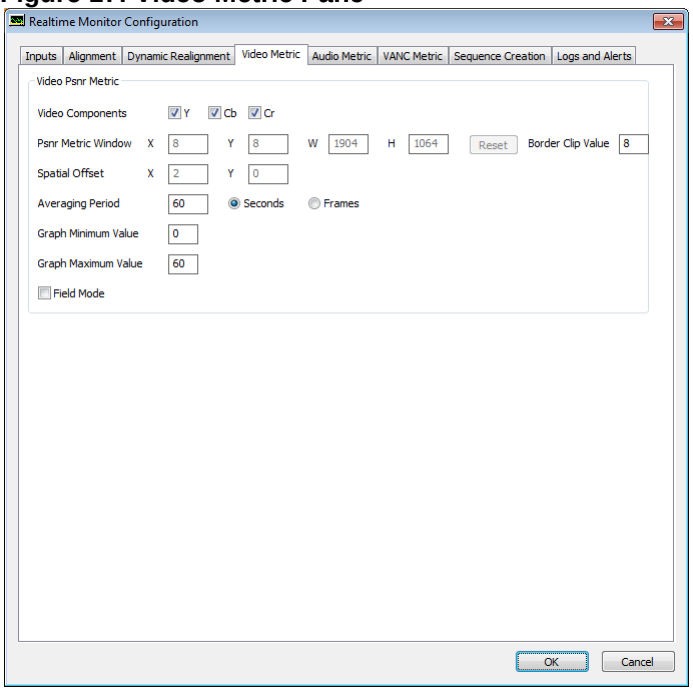


Enable Dynamic Re-Alignment	Checking this box will enable a dynamic re-alignment if the video quality drops for X number of consecutive video quality failures. *NOTE: this can happen if the source changes or if the inputs are not genlocked. If you know this should not occur, then uncheck this box.*
Dynamically Re-Align upon	This defines how many frames (or less) to check the alignment when the video quality drops below the threshold. *NOTE: 2 is a fairly safe number. It will take care of genlock issues and/or momentarily dropping frames.*
Check for maximum alignment	When a dynamic re-alignment happens, this value determines how many frames will be searched in each direction for the best new-match for video offset.
Dynamic threshold	If the video quality scores drop below the running average, but they have not hit the error threshold, it can indicate that a dynamic re-alignment is needed. This setting tells RTM to check the dynamic re-alignment if the video quality score drops below a percentage of average over a period of time (frames)
Recovery within	After dynamic re-alignment, verify that the video quality has improved. The first check is that it is within X percentage of the previous peak score. *NOTE: a failure will trigger a full alignment if allowed.*
Verify Percentage	After dynamic re-alignment, verify that the video quality has improved. The second check is that it is within X percentage of the previous average score. *NOTE: a failure will trigger a full alignment if allowed.*

Upper Threshold	Dynamically realigns only when video metric scores are below this value.
Max Realignments	If RTM sees too many dynamic re-alignments over a period of time, it can indicate that a full alignment is needed. This setting tells RTM how many re-alignments are too many in what period of time (seconds).

6.4 Video Metric Pane

Figure 17: Video Metric Pane

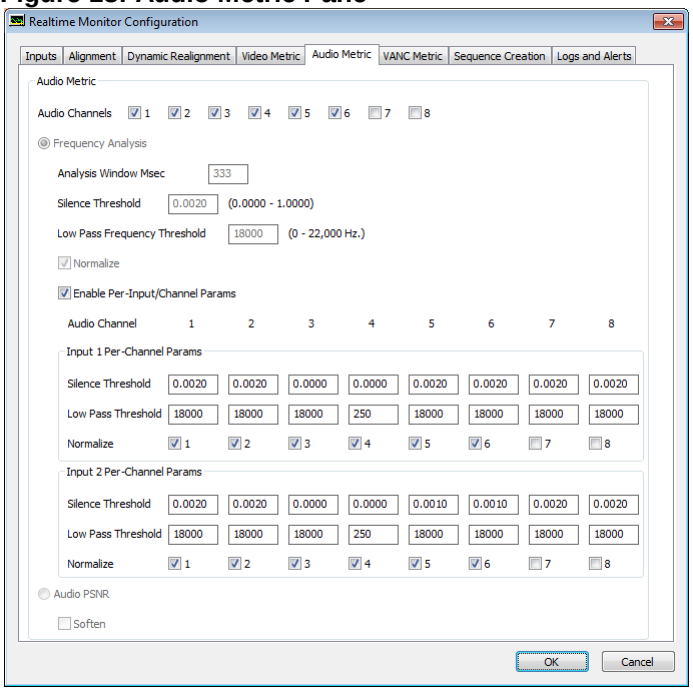


Video Components	Checking these boxes will enable/disable the measurement of the various components. *NOTE: you must check at least 1 box or video quality will not be measured.*
PSNR Metric Window	This defines the area where the video quality will be measured. *NOTE: several advanced compression algorithms blur the image around the edges assuming that the TVs over-scan.*
Reset	Reset returns the Metric Window to the full size of the image
Border clip value	Instead of setting the PSNR Metric Window size using X, Y, W, and H. You can state that there is an equal border around the edges of X pixels *NOTE: X, Y, W, and H will be automatically set.*
Spatial Offset	This is carried over from the RTM main alignment pane. You can set it here as well.
Average Period	Defines how often the file *psnrAvg.Log* will be updated. This logfile contains the Min, Max, Average, and Mean values for this many seconds or frames of video.
Graph Minimum Value	Normally, the graph is shown on a 0 to 100 scale where 100 is perfect quality. You can change this if you know that your normal values are between 0 (minimum) and 40 (maximum) to make the graphs easier

	to read. *NOTE: the real values will be measured and logged.*
Graph Maximum Value	Normally, the graph is shown on a 0 to 100 scale where 100 is perfect quality. You can change this if you know that your normal values are between 0 (minimum) and 40 (maximum) to make the graphs easier to read. *NOTE: the real values will be measured and logged.*
Field Mode	This flag forces RTM to run in field mode instead of frame mode. It will compensate for field roll. *NOTE: it will not compensate for field flip*

6.5 Audio Metric Pane

Figure 18: Audio Metric Pane

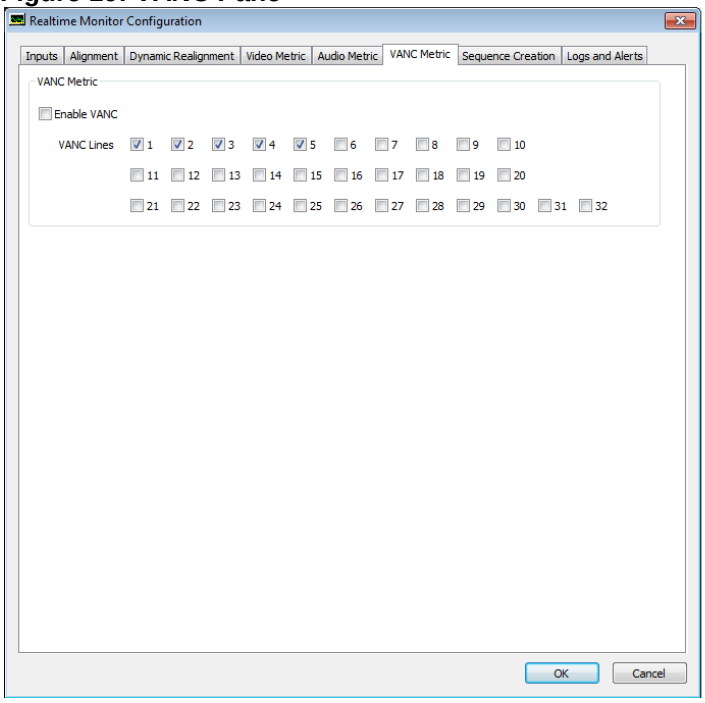


Audio Channels	Checking these boxes will enable audio quality measurements on any of the inputs. The algorithm performs quality measurements assuming mono for each channel (i.e. each channel is judged separately).
Frequency Analysis	To measure the audio quality this algorithm measures the frequency/amplitude response of the two streams and then correlates their differences. This flag enables this Metric *NOTE: this is normally used*
Analysis Window Msec	When measuring the audio quality a number of seconds should be grouped together before processing. This is the number of seconds. *NOTE: the number is in video frames and the audio samples are calculated based on the frequency.*
Silence Threshold	If RTM detects silence or very low audio, then it can force a score. Perfect Score: if both streams have silence or very low audio Poorest Score: if one stream has silence and the other does not This is the level for audio to be detected as silence. *NOTE: setting this to 0 (zero) turns this analysis off.*
Low Pass Frequency Threshold	When using Frequency/Amplitude to analyze the audio quality, some low frequencies could be ignored. This value tells RTM to ignore

	frequencies below this number *NOTE: setting this to 0 (zero) turns this analysis off.*
Normalize	This flag enables the detection of normalizing amplitude differences before performing audio PSNR
Enable Per-Input/Channel Params	When enabled, normalization, silence threshold and low-pass threshold are defined separately for each audio channel. Silence threshold is also defined for each input. When disabled, then normalization, silence threshold and low-pass threshold are global across all audio channels and both inputs.
Audio PSNR	To measure the audio quality, one algorithm is similar to video PSNR. It measures the quality by detecting differences in the audio streams. This flag enables this Metric. *NOTE: this is normally turned off.*
Soften	This flag enables the detection of loudness/softness before performing audio PSNR.

6.6 VANC Metric Pane

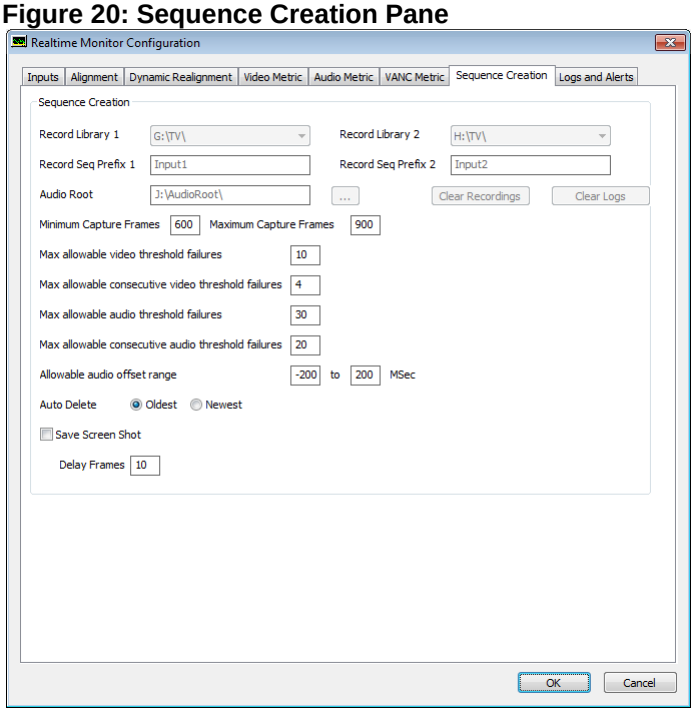
Figure 19: VANC Pane



Enable VANC	This flag enables VANC processing
VANC	Checking these boxes will enable VANC quality measurements on any of the inputs. The algorithm performs quality measurements on each line separately and will report which lines exceed the threshold.

6.7 Sequence Creation Pane

Figure 20: Sequence Creation Pane

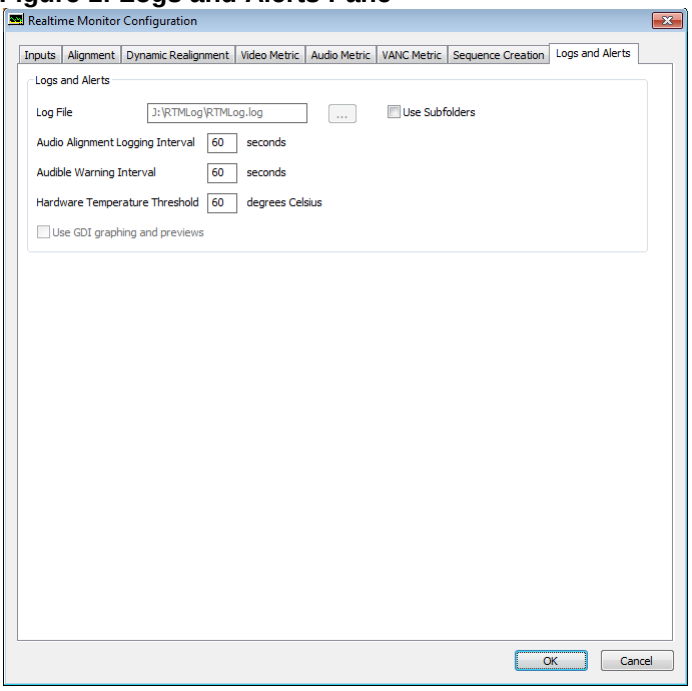


Record Library	This is the library where the recorded sequences are stored upon error. *NOTE: One library must be located on the "G: array" and the other must be on the "H: array". To create new libraries, use the ClearView Library Manager. RTM does not have the ability to create new libraries.*
Record Seq Prefix	This field defines the base name of all recordings. The text that is automatically concatenated is the following: YYYYMMDD_HH_MM_SS. *NOTE: that the entire sequence name cannot exceed 35 characters.*
Audio Root	The Audio streams should be stored in a different directory than the video. This is the audio location. The video root will be appended to this audio root to form the exact name of the audio sequences.
Clear Recordings	This button clears the contents of the currently selected record library. Be aware that it removes all recordings (sequences), even from prior sessions.
Clear Logs	This button clears the log files, but it does not clear the recordings.
Minimum Capture Frames	This defines the number of frames that will be buffered. If any error is triggered, then these frames will be recorded for further analysis.
Maximum Capture Frames	Since errors may occur near the end of the buffered number of frames, RTM compensates by looking beyond the minimum captured frames and may write a bigger file up to this limit.
Max allowable video threshold failures	This value defines how many video quality failures are needed to trigger a recording within the Minimum Capture Frames.
Max allowable consecutive video failures	This value defines how many consecutive video quality failures are needed to trigger a recording within the Minimum Capture Frames. *NOTE: if dynamic re-alignment is checked and an alignment problem is detected, then errors will be reset.* *NOTE 2: consecutive failures should be set lower than allowable*

	failures.
Max allowable audio threshold failures	This value defines how many video quality failures are needed to trigger a recording within the Minimum Capture Frames.
Max allowable consecutive audio failures	This value defines how many consecutive video quality failures are needed to trigger a recording within the Minimum Capture Frames. *NOTE: consecutive failures should be set lower than allowable failures.*
Allowable Audio Offset Range	This should probably be set to the SMPTE specification based on which points are measured. It is a variable because SMPTE defines the range based on the measuring points.
Auto Delete	If the disk fills to near maximum, sequences will need to be deleted. This flag enables deleting the oldest files or the newest files.
Save Screen Shot	When an error occurs, the video frame that triggered the error (even if it is a VANC or Audio quality error) can be saved as a single image.
Delay Frames	This saves to save the screen shot X frames after the triggered event.

6.8 Logs and Alerts Pane

Figure 1: Logs and Alerts Pane



Log Files	All events are logged. These events include startup conditions, alignment parameters, realignment, etc. The log file is stored at the location specified here.
Use Subfolders	The log file can become very long as we append information about start/stops from all operations into the same log file. Instead of this, you may want a log file every time you start and stop and the log file will be put into a subfolder with the time/date appended to it. This flag enables writing multiple log files per stop/start; as opposed to one big log file.
Audio Alignment Logging Interval	This defines the interval in seconds between each entry into the audio alignment log. It must be greater than or equal to the audio alignment

	interval.
Audio Warning Interval	When an error occurs, a log entry is written, the count is increased on the main RTM page, if you are running the 1RU RTM, the front panel count is increased. In addition to these, an audible alert can sound. This audio alert can happen 1 time or it can happen at a frequency until you clear it. This is the audio warning frequency. *NOTE: 0 (zero) is generate an audio warning 1 time.*
Hardware Temperature Threshold	A threshold that if surpassed will alert in the RTMonitor GUI.
Use GDI Graphing and Previews	Most of the time, RTM uses DirectX. Some machines do not operate properly, with DirectX. If your Video Clarity support engineer tells you to check this box, RTM can run in Graphics Device Interface (GDI) mode, which is the older way. This flag enables this mode.

7 Log Files

RTM creates five types of log files which are useful for a variety of things.

- RTMLog.log
- PSNRAvg.log
- AudioAlign.log
- .psnr Log file when a sequence is create due to a video error
- .audio Log file when a sequence is created due to an audio error

7.1 RTMLog.log

This is the main status log for RTM. It stores all relevant information required for tracking historical data such as settings, frequency of impairments, detected video delay, loss of signal time, etc.

2010/10/26 19:19:42	Full Alignment	Video Offset: 0		Value: 18.3742	
2010/10/26 19:19:42	Monitor Started				
2010/10/26 19:19:42	Version: 1.0.3633.0	Build Date: 10/25/2010			
2010/10/26 19:19:42	Video Input 1: SDI In 1				
2010/10/26 19:19:42	Video Input 2: SDI In 2				
2010/10/26 19:19:42	Analog Video Format 1: 525 Component Beta US				
2010/10/26 19:19:42	Analog Video Format 2: 525 Component Beta US				
2010/10/26 19:19:42	Audio Input 1: SDI Embedded				
2010/10/26 19:19:42	Audio Input 2: SDI Embedded				
2010/10/26 19:19:42	Library 1: G:\Src\				
2010/10/26 19:19:42	Library 2: H:\Imp\				
2010/10/26 19:19:42	Sequence 1: Input1_20101026_19_19_33				
2010/10/26 19:19:42	Sequence 2: Input2_20101026_19_19_33				
2010/10/26 19:19:42	Frames To Record: 450				
2010/10/26 19:19:42	Max Frames To Record: 600				
2010/10/26 19:19:42	Log File: E:\RTMLog\RTMlog.log				
2010/10/26 19:19:42	Enable Log File Overwrite: 1				
2010/10/26 19:19:42	Psnr Components	Y: 1	Cb: 1	Cr: 1	
2010/10/26 19:19:42	Psnr Window	X: 8	Y: 8	W: 1264	H: 704
2010/10/26 19:19:42	Spatial Offset	X: 0	Y: 0		
2010/10/26 19:19:42	Temporal Components	Y: 1	Cb: 0	Cr: 0	
2010/10/26 19:19:42	Temporal Window	X: 8	Y: 8	W: 1264	H: 704

7.2 psnrAvg.log

This is a tab-delimitated text file containing the time of the average video quality. Each component is shown (Y, Cb, and Cr) along with the Average, Minimum, Maximum, and Standard Deviation of each component.

Date/Time	Y Average	Y Minimum		Y Maximum		Y Std Dev	Cb Average		Cb Minimum		Cb Maximum	
	Cb Std Dev	Cr Average	Cr Minimum		Cr Maximum		Cr Std Dev					
2010/10/26 18:46:54	026.5061	025.2716	027.6854	000.4733	031.3782	029.6923	032.7982	000.6296	033.2322	031.7935	034.4151	
	000.5406											
2010/10/26 18:48:16	026.5113	025.2716	027.6854	000.4660	031.3871	029.6923	032.7982	000.6196	033.2405	031.7935	034.4151	
	000.5339											
2010/10/26 18:55:26	026.5061	025.2716	027.6854	000.4660	031.3803	029.6923	032.7982	000.6191	033.2339	031.7935	034.4151	
	000.5336											
2010/10/26 18:56:26	026.5141	025.2716	027.6854	000.4669	031.3930	029.6923	032.7982	000.6224	033.2494	031.7935	034.4151	
	000.5393											
2010/10/26 18:57:26	026.5127	025.2716	027.6854	000.4666	031.3903	029.6923	032.7982	000.6216	033.2460	031.7935	034.4151	
	000.5374											
2010/10/26 18:58:26	026.5121	025.2716	027.6854	000.4665	031.3872	029.6923	032.7982	000.6199	033.2394	031.7935	034.4151	
	000.5337											
2010/10/26 19:05:29	026.5141	025.2716	027.6854	000.4668	031.3934	029.6923	032.7982	000.6225	033.2499	031.7935	034.4151	
	000.5396											
2010/10/26 19:07:45	026.5109	025.2716	027.6854	000.4660	031.3866	029.6923	032.7982	000.6197	033.2404	031.7935	034.4151	
	000.5341											

7.3 AudioAlign.log

This is a tab-delimitated text file containing the time between audio alignments, the current audio offset relative to the video and whether the audio alignment passed or failed (Fail: N is passed).

2010/10/26 19:05:09	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:14	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:19	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:29	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:29	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N

2010/10/26 19:05:39	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:44	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:49	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:59	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N
2010/10/26 19:05:59	Audio Alignment	Audio Offset: 0 samples	0.0000 frames	0.0000 msec Video Offset: 0	Fail: N

7.4 .psnr and .audio Files.

Whenever a threshold is reached and a recording is started, either a .psnr or .audio file is also created in the RTMLog folder. These files contain the measured quality values for the associated recording. These files can also be dragged/dropped onto ClearView for easy synchronized playback and post analysis.

ClearView PSNR Log File (V7.0) 10/15/10 15:53:41
Created by Video Clarity Realtime Monitor 1.0 10/08/2010

Video Output Device: Broadcast Output Module
Video Output Format: 720p 60.00 Hz.
Analog Output Format:
Image Format: YCbCr 8 bpc
Enable VANC: 0

Threshold Y: -1.00
Threshold Cb: -1.00
Threshold Cr: -1.00
Spatial X: 0
Spatial Y: 0
Normalize Y: 0
Normalize Cb: 0
Normalize Cr: 0
Metric Window X: 0
Metric Window Y: 0
Metric Window W: 1280
Metric Window H: 720
Psnr Limit Numerator: 1

Library A: H:\Imp\
Sequence A: Input1_20101015_15_53_36
First Frame A: 0
Last Frame A: 299
Speed A: 1.00

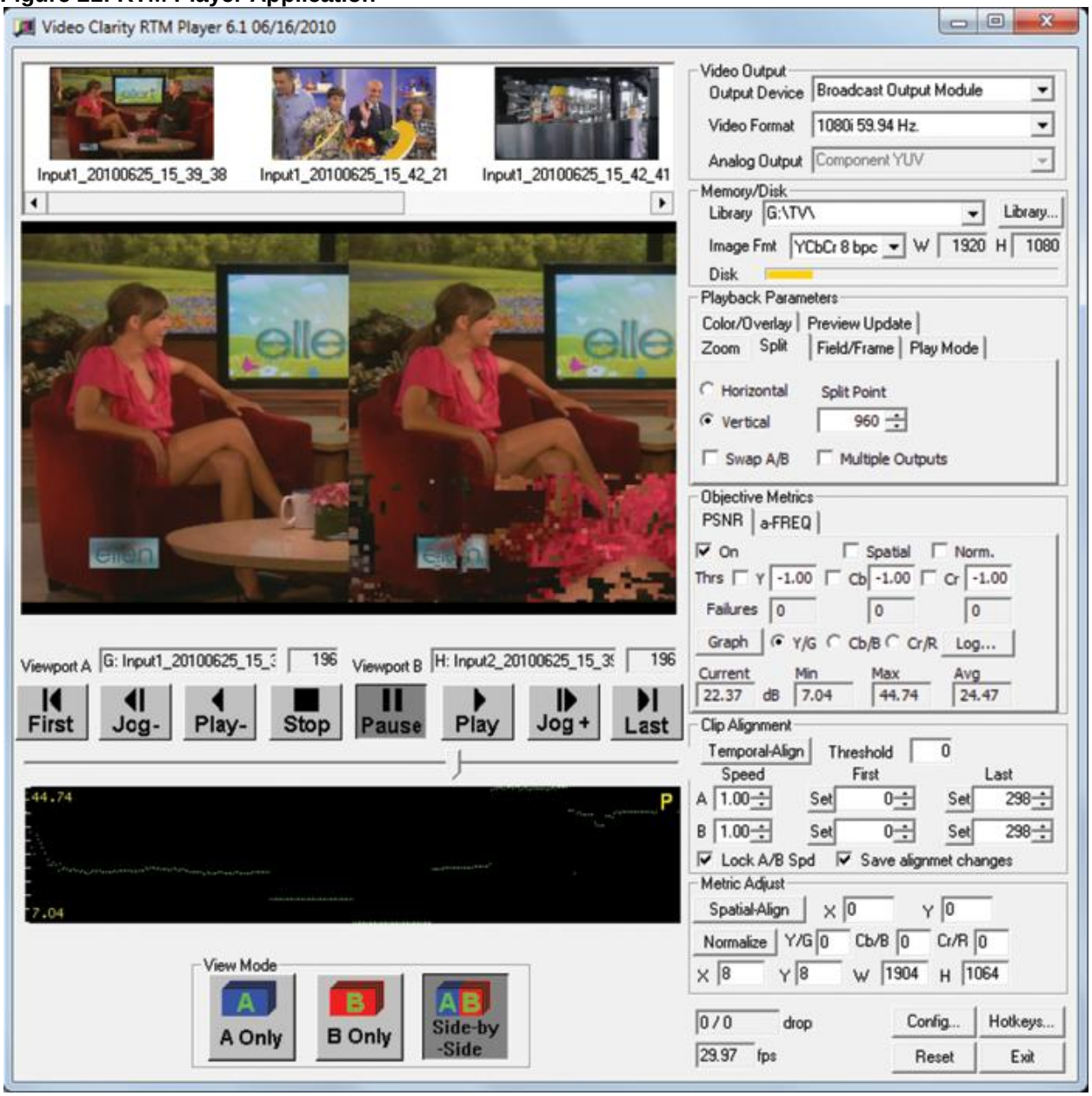
Library B: G:\Src\
Sequence B: Input2_20101015_15_53_36
First Frame B: 0
Last Frame B: 299
Speed B: 1.00

Sequence Metric Y Min: 13.88
Sequence Metric Y Max: 100.00
Sequence Metric Y Avg: 99.71
Sequence Metric Cb Min: 26.20
Sequence Metric Cb Max: 100.00
Sequence Metric Cb Avg: 99.75
Sequence Metric Cr Min: 20.13
Sequence Metric Cr Max: 100.00
Sequence Metric Cr Avg: 99.73

Frame	Y/G	Cb/B	Cr/R	Y/G	Cb/B	Cr/R	Y/G	Cb/B	Cr/R	Fail Y	FailCb	FailCr
000000	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000001	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000002	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000003	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000004	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000005	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000006	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000007	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000008	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000009	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000010	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000011	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000012	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000013	000.00	000.00	000.00	000.00	000.00	000.00	100.00	100.00	100.00	000000	000000	000000
000024	000.00	000.00	000.00	000.00	000.00	000.00	013.88	026.20	020.13	000000	000000	000000

Any .psnr or .audio file can be dragged onto the RTM Player application for detailed post analysis. The RTM Player is included on your RTM system.

Figure 21: RTM Player Application



8 Command-Line Interface

The monitoring process can also be programmatically controlled via scripting by using RTMServer.exe and rtm.exe

8.1 RTMServer.exe

Once started, RTMServer.exe will receive commands from rtm.exe (the client) and allow scriptable control of the RTM system. This allows the ability for multiple units to be controlled from a single controller application. Commands can also be sent from other machines which have access to the RTM system via a network.

RTM ships with a desktop shortcut to start RTMServer. Double-Click to start and then open a DOS command window to send commands to RTMServer using the client rtm.exe.

8.2 rtm.exe

This is the client executable which acts as the command-line interface. This program must either be in the folder where commands are sent from or it the “path” environment variable.

To view a list of RTM commands, type RTM ?.

To get a syntax description of the RTM commands, type RTM ? <command name>

To execute any command, type RTM <command name>.

The following is a list of RTM commands.

RestoreConfig	Restore a saved configuration
SaveConfig	Save the current configuration
Preview	Preview the streams, but do not start
Stop	Stop Operations
Start	Start RTM
Realign	Manually re-align
AlignVideo	Manually align just the video
AlignAudio	Manually align just the audio
Status	Reports the status of each impairment class
BoardTemp	Reports the internal temperature of RTM
ShellCmd	Issues a Windows command
Version	Reports the RTM version
StartTime	Reports when RTM started
RunTime	Reports how long RTM has been running
Exit	Exits RTM
AudioChannelsEnabled	Reports which audio channels are enabled
AudioChannelEnabled	Reports the status of each audio component
VideoComponentEnabled	Reports the status of each video component (Y, Cb, and Cr)
VANCLineEnabled	Reports the status of each VANC line
AudioThreshold	Sets or Displays the current Audio threshold per channel
AudioDuration	Sets or Displays the current Audio duration for error per channel
VideoThreshold	Sets or Displays the current Video threshold per component
VideoDuration	Sets or Displays the current Video duration for error per component
VANCThreshold	Sets the VANC on/off

VANCDuration	Sets the VANC on/off
SpatialX	Sets or Displays the SpatialX offset
SpatialY	Sets or Displays the SpatialY offset
VideoImpairments	Reports the number of video impairments and the data/time of the last one
AudioImpairments	Reports the number of audio impairments and the data/time of the last one
LipSyncErrors	Reports the number of lip sync errors and the data/time of the last one
VANCErrors	Reports the number of VANC errors and the data/time of the last one
InvalidSignals	Reports the number of times that the input became invalid and the data/time of the last one
ClearImpairments	Resets the impairment count to 0
ClearRecordings	Clears all of the audio and video streams saved
ClearLogs	Clears all 5 of the log files generated
AlignmentStatus	Reports the audio and video offsets
VideoMin	Reports the current video quality minimum score
VideoMax	Reports the current video quality maximum score
VideoAvg	Reports the current video quality average score
VideoStdDev	Reports the current video quality score's standard deviation
AudioMin	Reports the current audio quality minimum score
AudioMax	Reports the current audio quality maximum score
AudioAvg	Reports the current audio quality average score
AudioStdDev	Reports the current audio quality score's standard deviation
VANCMin	Reports the current VANC quality minimum score
VANCMax	Reports the current VANC quality maximum score
VANCAvg	Reports the current VANC quality average score
VANCStdDev	Reports the current VANC quality score's standard deviation

9 RTM from File

9.1 RTM from File

RTM from file is very easy.

RTM will need to be in stop mode and you will go into the Configuration Menu.

At the top of this menu you will choose the Video Input, by default it is set to SDI, you will change this to “Clearview Sequence”.

A pop up menu will come up, here you will choose the library in and sequence in which you want to analyze. Please note that you are only able to compare one video to one SDI feed.

When you are finished and the rest of the RTM settings are set as you require you will choose OK in the configuration menu and start running RTM.

RTM will look to the Clearview sequence (looping when the sequence is finished) and compare to the incoming video and log any errors that are required. It is important that the libraries for the video input be opposite of the sequence selected.