videoQC

Version 6
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General

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About videoQC

videoQC is a video and audio analysis and playback tool with both visual and automated quality checking tools. It is available in as a desktop application and as a server. This manual covers the workstation version. A separate manual is available for the server version. videoQC will take the media coming into your facility and perform a series of automated tests on the video, audio and metadata values against a template, then analyze audio and video.

It includes metadata extraction, comparison and templating tools, intuitive charting of audio and video metrics, a full set of audio and video waveform/vectorscope/phase tools, db and PDF reporting, file to file visual comparison and clipping and exporting tools. The standard database format allows seamless and instant sharing of analysis results. Hot folders allow automation, optimizing those in the QC workflow.

videoQC's automated server components can run headless (no interface) for analysis tools. Integration with Net-X-Code suite provides quality control for IP based workflows.

Each level of videoQC was designed to fill a particular part of the Quality Control workflow, from intern to master QC operators and even back end servers. Specific features and codec support may be offered as options depending on the version of videoQC the user has licensed.
Controls and Displays

videoQC has two modes for its main display: Basic mode and Advanced mode.

The interface can be changed between the two modes using the Basic/Advanced menu setting. Under Windows, the menu is available on the left pop out menu, or on the main menus by pressing the <F10> key. Under OS-X and Linux, it is the first menu under the View menu.
The main interface provides video file playback on the main screen, and a related set of controls and displays.

Above is the Basic UI. This UI maximizes the amount of screen space for file playback, and provides minimal controls and displays. The user can switch between Basic and Advanced UIs using the menu.
The UI can be changed, and many more features can be accessed through the menu. Moving the mouse to the left of the screen produces this menu. Above the selection for the Advanced UI is circled.

Following are the controls and displays below the video display screen:
Basic UI

**Browse** button - open the Load Media window, a standard browser which allows the user to load media files from storage or via network.

**Full Screen** - functions as a toggle – when in full screen mode, fills the entire monitor with the video display, except for the controls along the bottom of the GUI.

**Load/Unlock** button - functions as a toggle – If unlocked, the transport area will be removed when playing back for more video real estate. Moving the mouse will bring it back.

**Reverse Play** button – Play at normal speed, in reverse.

**Pause** button – Stop playback and display the current frame

**Play** button – Play forward through the media at normal speed

**Time Code Display** - Displays the current time code location

**Audio Meters display** - Up to 16 audio meters showing peak/RMS or r.128/1194 EBU loudness levels. The line 0 corresponds to -24 decibels.

**Volume Slider** - May be used to adjust the volume of the audio during playback. Zero volume would be slid to the left, and as the slider is moved to the right, the volume is increased. The center of the slider indicates 100%, or normal playback level. Sliding all the way to the right sets the volume to 200%.

**Position Slider Basic UI** - The pointer indicates the current position in the clip. Clicking on the Position Bar cues the clip to that relative location. To scrub through the file, ‘grab’ the pointer and ‘drag’ it toward the relative location you’re looking for.
Advanced UI

Position Slider - The pointer indicates the current position in the clip. Clicking on the Position Bar cues the clip to that relative location. To scrub through the file, ‘grab’ the pointer and ‘drag’ it toward the relative location you’re looking for.

Fast Reverse button - Play the clip from the cued point in reverse at the fastest possible speed.

Back 5 Seconds button - Cue to a point 5 seconds prior to the current location, or the beginning if the current location is less than 5 seconds into the clip.

Back One Frame button - Cue the frame immediately prior to the current frame.

Reverse Play button - Play the clip in reverse at negative normal play speed (-100%).

Pause button - Stop any playback and display the frame at the current location.

Stop button - Stop any playback in progress and cue the first frame of the clip.

Play button - Play the clip forward at normal play speed (+100%).

Forward One Frame button - Cue the frame immediately after the current frame.
**Forward Five Seconds** button - Cues to a point 5 seconds after the current location, or the end if the current location is less than 5 seconds before the end of the clip.

**Fast Forward** button – Play the clip from the cued point forward at the fastest possible speed.

**Volume** slider – May be used to adjust the volume of the audio during playback. Zero volume would be slid to the left, and as the slider is moved to the right, the volume is increased. The center of the slider indicates 100%, or normal playback level. Sliding all the way to the right sets the volume to 200%.

**Time Code Display** advanced mode - Displays the current time code location, along with alternate time code types, and track information including: video standard, playback mode, playback speed, file duration, size, rate, codec, and audio details.

**Audio Meters display advanced mode** - Up to 16 audio meters showing peak/RMS or r.128/1194 EBU loudness levels. The line 0 corresponds to -24 decibels.
Menu

The menu is displayed upon opening. Once video has been loaded, the menu disappears but can be called up by moving the mouse to the left of the display area. The menu offers access to a wide range of system controls, settings dialog boxes, and signal analysis tools.

Open File

Open File button - pressing the Open File button opens the Load Media window, which allows the user to find the correct media file and load it into videoQC.
Load Media File Type Filter

Pressing the All Files* button reveals a list of file types. Selecting a file type from this list lets the user search by specific file type, to help locate files more quickly.

Open Stream

Open Stream button - Opens the Open url window, which allows the user to enter a known URL to access a video stream.

Once the user has entered the network address into the URL field, pressing the OK button loads the stream for viewing.
Close Media button - Close the current file
**Settings**

**Settings** button - Open the **Settings** window

![Settings Window Image]
License

Press the **License** button to open the licensing dialog.

The top field displays the current status of the license.

The **User Name** field allows the user to type in a first and last name during the licensing process.

The **Email Address** field allows the user to type in the email at which they would like to receive the site key for their license.

Once the name and address fields have been filled out, pressing the **Generate** button populates the **Site Code** field with a string of alphanumeric characters. This string is the Site Code.

The **Site Code** field is where the site code displayed during the licensing process. The user may select the site code and use Ctrl+C to copy it to the clipboard, or use the **Copy** button. The user will need to send the site code to Drastic Authorization to get a Site Key to enable the license.

If the system has been set up with email, pressing the **Send** button will open a new email to Drastic Authorization, with the site code in the body of the email.

Once a reply email containing the **Site Key** has been returned by Drastic Authorization, the user may select it and copy it, then paste it into the Site Key field either using the **Paste** button or Ctrl+V.

Once the Site Key has been pasted into the **Site Key** field, pressing the **Register** button registers the license. The system may need to be restarted for the change in license status to be updated.

**Accept** – Press the Accept button to accept any changes that have been made, and close the Settings window.

**Close** – Press the Close button to close the Settings window without changing the current setting.

**Disable Aja Kona** – when set, the software will ignore any AJA cards
Disable BlueFish444 – when set, the software will ignore any BlueFish444 cards
Disable Decklink – when set, the software will ignore any Blackmagic cards
Default Log Name – if logging to a file is enabled, this is where the log file will be saved
No Internal Audio Video – if set, this forces the audio to an external audio card, rather than the internal audio of the AJA, BlueFish444 or Blackmagic card
Production Mode – if set, then playback will continue even if frames are dropped. Otherwise, dropped frames will cause playback to pause
ShowVITC Lines – show any vertical blank area in the applications video window
Skip Boards – the number of cards in the system to skip. This allows videoQC to use the second card in the system, and allow another software to use the first one
Superimpose – if set, then timecode and user bits will be displayed/burned into the video
Superimpose Type – there are 3 layouts for video burn in/overlay available
Allow Aspect Ratio Changes – when set, the aspect ratio will remain fixed
Allow Frequency Changes – when set, the frequency will not change as new files are loaded
Allow Resolution Changes – when set, the resolution will not change as new files are loaded
OP47 Default Character Set – OP-47 decoders have a setting which allows the user to specify the default alternate character set when it is not specified by the sender. This is normally the character set of the local language.
  ◦ 0 – (Latin) English, French, German, Swedish, Finnish, Hungarian, Italian, Portuguese, Spanish, Czech, Slovak
  ◦ 1 – (Latin) Polish
  ◦ 2 – (Latin) Turkish
  ◦ 3 – (Latin) Serbian, Croatian, Slovenian, Romanian
  ◦ 4 – (Latin) Estonian, Lettish, Lithuanian
  ◦ 4 – (Cryillic) Serbian, Croatian, Russian, Bulgarian, Ukrainian
  ◦ 6 – Greek
  ◦ 10 – Hebrew
De-interlace Type – When working with interlaced material, the display on the progressive VGA monitor:
  ◦ 0 – default handling
  ◦ 1 – disable processing, show interlace on progressive
  ◦ 2 – discard one field
  ◦ 3 – duplicate one field
  ◦ 4 – duplicate the non dominant field
  ◦ 5 – blend the two fields
  ◦ 6 – process for motion detect de interlaced
  ◦ 7 – split the fields, upper and lower
Audio 1/2 Encoded – should be set if using Dolby encoded audio on the first pair of channels
Dither 8 Bit – on AJA hardware, if set, 8 bit files will be up dithered to 10 bit on SDI output
Genlock Enabled – use the incoming genlock signal to lock the SDI output
Use Both Board Channels – if a board supports more than one channel, allow multiple channels to use the same board
Enable NDI Search – allow searching for NDI sources.
Ignore HTTP – disable HTTP control of videoQC
Ignore CTL – disable RS-422 serial control of videoQC
Ignore Net – disable network control of videoQC
SD Aspect Ratio 16:9 – if set, then all SD files will be treated as 16:9 instead of 4:3
HTTP Port – custom port value to use for the HTTP server
Port – custom port value to use for the Net server
Auto Select Proxy – when a high resolution and proxy resolution file reference pair are dropped from an Adobe web bin, automatically load the proxy file rather then the high res file. If not set, the high resolution file will be loaded.
Color Space – select 708 or 2020 as the default color space for 4K/QHD signals
Color Transfer – select standard of HDR-10/ST-2084 transfer characteristics for 4K/QHD signals
**Watch Folder**

Pressing the **Watch Folder** button opens a dialog to allow the user to set up a watch folder, to analyze files and create RTIndex files and Reference Movies.

The **Watch** window allows the user to select a source stream, and perform one of three actions. The following controls are available:

- **Source** – enter a known video source stream location
- **Target** – enter the target destination for the file created by the action selected in the Action pulldown menu.

The **Action** pulldown menu offers the following options:
- **Analysis** – analyze the loaded file.
- **Make RTIndex** – make a real time index file for the source stream.
- **Make Reference Movie** – make a QuickTime Reference Movie from the source stream.
**Advanced/Basic**

**Advanced/Basic** toggle - a toggle switch, which switches between displaying the basic controls along the bottom of the GUI, or displaying the advanced controls.

**Advanced Transport Controls** - The Advanced mode provides a larger set of controls and displays. The Open Media, Full screen toggle and the Lock/unlock are removed. Playback controls include fast reverse, reverse, five seconds back, 1 frame back, pause, stop, play, one frame ahead, five seconds ahead, and fast forward. The position slider and volume control are moved to the playback controls section. Video standard, time code, playback mode, playback speed, LTC time code, VITC time code, and track info (duration, size, frame rate, codec, and audio parameters) are displayed. The audio meters are increased in size.

**Basic Transport Controls** - Provides a set of controls for playback/output. The user also may right click on the transport controls to switch between Basic and Advanced display. The Basic mode provides reverse, pause and play controls. There are reduced time code and audio displays. The volume control and position control are displayed to their right.
Display Mode

**Display Mode** button - opens the Monitor Settings window, which allows the user to fine tune their display settings.

The pulldown menu at the top provides the following display modes:
- **Luma Only** – display only the luminance portion of the video
- **Red Only** – display only the red portion of the video
- **Green Only** – display only the green portion of the video
- **Blue Only** – display only the blue portion of the video
- **Zebra Luma** – display the video in zebra luma mode
- **Zebra Chroma** – display the video in zebra chroma mode
- **Clipping** – display the portions of the video which are clipping
- **Edge Difference** – display the portions of the video where edges are detected
- **Focus Assist** – magnify the area in focus
- **Flip Flop** - 
- **Show Alpha** – show the alpha portion of the selected source stream
False Color – show the stream in false color
Color Selector – in Focus Assist mode, click to bring up the color selector.
Browse button
Luma slider
High Luma slider
Low Luma slider
Smoothing slider
Opacity slider
Intensity slider
Brightness slider
Contrast slider
Saturation slider
Warmth slider
Gamma (unpopulated)
Chroma slider
Hue Diff slider
Sat Diff slider
Lightness slider
Interlaced checkbox
Full Range checkbox
Invert checkbox
Flip checkbox
Flop checkbox
Basic
Primatte
Ultimatte
Mask
Captions

Opens the Captions pullout menu, to select between the available types of closed captions, or to browse to a closed caption file to open. Whichever closed caption type is selected will be rendered on the VGA display.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td></td>
</tr>
<tr>
<td>CC1 (608)/Subtitle</td>
<td>this is either the first cc channel in SD, the first compatibility byte channel in HD 708, or the subtitle file, if it has been loaded</td>
</tr>
<tr>
<td>CC2 (608)</td>
<td>either the second channel in SD or 708 compatibility bytes</td>
</tr>
<tr>
<td>CC3 (608)</td>
<td>either the third channel in SD or 708 compatibility bytes</td>
</tr>
<tr>
<td>CC4 (608)</td>
<td>either the fourth channel in SD or 708 compatibility bytes</td>
</tr>
<tr>
<td>Service1 (708)</td>
<td>the first service in 708</td>
</tr>
<tr>
<td>Service2 (708)</td>
<td>the first service in 708</td>
</tr>
<tr>
<td>Service3 (708)</td>
<td>the first service in 708</td>
</tr>
<tr>
<td>Service4 (708)</td>
<td>the first service in 708</td>
</tr>
<tr>
<td>OP-47</td>
<td>Display OP-47 teletext</td>
</tr>
<tr>
<td>Select File...</td>
<td>- select a subtitle file to be displayed with the video playback</td>
</tr>
</tbody>
</table>

**CC1 (608)/Subtitle** – this is either the first cc channel in SD, the first compatibility byte channel in HD 708, or the subtitle file, if it has been loaded

**CC2 (608)** – either the second channel in SD or 708 compatibility bytes

**CC3 (608)** – either the third channel in SD or 708 compatibility bytes

**CC4 (608)** – either the fourth channel in SD or 708 compatibility bytes

**Service1 (708)** – the first service in 708

**Service2 (708)** – the first service in 708

**Service3 (708)** – the first service in 708

**Service4 (708)** – the first service in 708

**OP-47** – Display OP-47 teletext

**Select File...** - select a subtitle file to be displayed with the video playback
Mode

Opens the **Mode** pullout window, to select between the available types of playback mode. Choices include normal, loop, palindrome, audio and video, audio only, and video only.

- **Normal** – standard playback
- **Loop** – continue playing from the beginning when the end is reached
- **Palindrome** – play forwards from the start and then backwards from the end
- **Audio and Video** – play both audio and video
- **Audio Only** – play the audio, but not the video
- **Video Only** – play the video, but not the audio
Media Info button - opens the Track Info window, which displays information about the track's video, audio, system and metadata.
Media Info - Video

Clicking on the Video Tab reveals the information associated with the video in the selected media file.

<table>
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<tr>
<th>Type</th>
<th>Value</th>
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</thead>
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<tr>
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<tr>
<td>Height</td>
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<td>Y Pels Per Meter</td>
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<td>Rate</td>
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<td>Start</td>
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</tr>
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<td>Initial Frames</td>
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<td>Suggestedbuffersize</td>
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<tr>
<td>Quality</td>
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<tr>
<td>Sample Size</td>
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<td>Edit Count</td>
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<td>Format Change Count</td>
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<td>Name</td>
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</tr>
<tr>
<td>Pitch</td>
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</tr>
<tr>
<td>Dr Flags</td>
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<td>File Type</td>
<td>164</td>
</tr>
<tr>
<td>File Type String</td>
<td>MOV QuickTime</td>
</tr>
</tbody>
</table>

**Channels** - number of channels

**Size** - Size of a single frame of video uncompressed

**Width** - Width of video frame in pixels

**Height** - Height of video frame in pixels

**Planes** - Number of RGB groups (like Photoshop layers)

**Bit Count** - (or, Bit Depth) – Number of bits per pixel reported in video
Compression - Compression setting - a fourcc usually, but not always equal to fccHandler. Denotes compression type of frame

Compression String - Name of the compression type in human readable form

Size Image - Size of the Image in unsigned chars

X Pels Per Meter - Number of horizontal picture elements per meter (a width resolution description)

Y Pels per Meter - Number of vertical picture elements per meter (a height resolution description)

Clr Used - For color tables, the number of RGBQUAD elements used

Clr Important - Number of RGBQUAD elements that are critical to display

Fcc Type - Type of Audio/Video FourCC Compression Code

Fcc handler - Handler used for the FCC type

Flags - Flags setting

Caps - Capabilities

Priority - Priority of the selected video or audio stream in relation to other streams in the file

Language - Language setting

Scale - Scale of the frame

Rate - Frame rate setting

Start - Delay in units for this stream to start before video commences

Length - Length of the video stream

Initial Frames - Amount of audio in the file before video commences

Suggested Buffer Size - Recommended buffer size

Quality - Quality used by the compressor

Sample Size - Size, in unsigned chars, of a single data sample

Edit Count - Number of edits that have been performed on the file

Format Change Count - Number of times the file's format has been changed

Name - Name of the reader for this file type

Pitch - Video line pitch

Dr Flags - Internal Drastic flags

File Type - Name for the Drastic file type

File Type String - Name of the file kind/type in human readable form
Media Info - Audio

Clicking on the Audio Tab reveals the information associated with the audio in the selected media file.

Channels - number of audio channels
Size - The size of any extra info on the audio compression
Format Tag - Windows format type (if applicable)
Samples Per Sec - number of samples per second
Avg Bytes Per Sec - the average number of bytes per second
Block Align - Size in bytes of a sample set (all channels in that stream) of audio
Bits Per Sample - number of bits per audio sample
Size - Size of sample in bytes, but is not set generally
Fcc Type - Type of Audio/Video FourCC Compression Code
Fcc handler - Handler used for the FCC type
Flags - Flags setting
Caps - Capabilities
Priority - Priority of the selected video or audio stream in relation to other streams in the file
Language - Language setting
Scale - Scale of the frame
Start - Delay in units for this stream to start before video commences
Rate - Frame rate setting
Length - Length of the video stream
Initial Frames - Amount of audio in the file before video commences
Suggested Buffer Size - Recommended buffer size
Quality - Quality used by the compressor
Sample Size - Size, in unsigned chars, of a single data sample
Edit Count - Number of edits that have been performed on the file
Format Change Count - Number of times the file's format has been changed
Name - Name of the reader for this file type
Dr Flags - Internal Drastic flags
File Type - Name for the Drastic file type
Clicking on the System Tab reveals the information associated with the system in the selected media file.

- **Micro Sec Per Frame** - number of microseconds per video frame
- **Max Bytes Per Sec** - the maximum number of bytes per second
- **Padding Granularity** - Minimum device block size - only important for tapes like LTO
- **Flags** - File flags - internal
- **Total Frames** - total number of video frames in the file
- **Initial Frames** - Amount of audio in the file before video commences
- **Suggested Buffer Size** - Recommended buffer size
- **Width** - Width of video frame in pixels
- **Height** - Height of video frame in pixels
- **Caps** - Capabilities
- **Scale** - Scale of the frame
- **Rate** - Frame rate setting
- **Length** - Length of the video stream
- **Edit Count** - Number of edits that have been performed on the file
- **File Type String** - Name of the file kind/type in human readable form
**Type** - Our internal numeric value for the file reader

**Mf Caps** - MediaFile capabilities

**Vid Standard** - Video standard value (numeric representation of standards like 1080i29.97 for comparison)

**Dr Flags** - Internal Drastic flags

**File Type Integer** - Numeric value of the file type reader
Media Info - Meta

Clicking on the Meta Tab reveals the metadata information associated with the selected media file.

File Name - File name as it was opened (base name plus extension, no path info)
Native Locator - Native path plus file name plus file extension
Universal Name - (or Universal Name) Network path plus file name plus file extension
Source Locator - System locator for file source, in UniversalLocator, NativeLocator, FileName order
Encoded By - Encoder's name
Full Name - Content's full name
Host Computer - Current computer hosting the file
Version String - Content version
Device Serial Num - Input device serial number
Picture Icon - Small JPG frame capture used as picon
Time Code - Starting time code of the file
User Bits - 32 bit DWORD of user bits stored in the file
Vitc Time Code - Vertical Interval Time Code
Vitc User Bits - Vertical Interval User Bits
Poster Frame - Frame from which a thumbnail is created for the content
**A Frame** - A frame indicator for 3/2 cadence

**Aspect Ratio** - Video aspect ratio

**Original Rate** - Original rate/scale

**Original Scale** - Original rate/scale

**Conversions** - Total times this media has been converted

**Version Number** - Numeric version

**Total Streams** - Total number of streams

**Total Length** - Total length of longest stream

**Time Code Type** - Time code type for the counter/ctl

**Ltc Time Code Type** - LTC time code type for the counter/ctl

**Vitc Time Code Type** - VITC time code type for the counter/ctl

**Unique Id** - Unique identification for the content
Wave/Vector (Scopes)

Wave/Vector - press the Wave/Vector button to open the scopes setup window. The setup window provides controls to set how each scope is displayed, how many scopes are displayed at once, and their position in the scopes layout.

Here is a scopes setup page. Along the top is the layout selector. Below the layout selector, the scope or scopes selection is displayed. The middle section provides setup controls specific to how each scope is displayed. Along the right column, the available scopes can be selected.

Scope Layout

Along the top of each scope config is the layout selector.

The options are: a single scope, two scopes side by side, four scopes in a 2x2 grid, and six scopes in two rows of three scopes.
**Vectorscope**

To display the Vectorscope in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Vectorscope** button. To display the Vectorscope as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Vectorscope** button.

For a multiple scope layout, click on the window in which you would like the Vectorscope displayed.

---

**Graticule** checkbox – when selected, the graticule is laid over the Vectorscope. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

**100% Marks** checkbox – when selected, the 100% Marks are displayed over the Vectorscope

**75% Marks** checkbox - when selected, the 75% Marks are displayed over the Vectorscope

**Angle Marker** checkbox - when selected, the Angle Marker is displayed over the Vectorscope

**Skin Tone Line** checkbox - when selected, the Skin Tone Line is displayed over the Vectorscope

**Intensity** slider – Moving the Intensity slider brightens or dims the display of the video signal through the Vectorscope. The current setting is displayed above the slider, as a percentage, 0% providing no display and 100% being maximum intensity.

**Quality** slider - moving the Quality slider uses more or less of the data points to draw the video signal through the scope. The current setting is displayed above the slider, as a percentage, 0% being rather poor indeed and 100% drawing every pixel. Where system resources are less capable, it may be useful to reduce the quality to allow the system to keep up.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output

**8 bit Processing** checkbox - when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Graticule Brightness** slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.
Pressing the x in the upper right corner will close the Scope Config window.
Vectorscope Display

Here is the Vectorscope.

The **Vectorscope** displays a traditional Cb by Cr X-Y display with overlaid reference graticule. Color accurate graticules automatically switch between SD and HD color spaces. The markers include color points (for standard bar checks) at 75% and 100% saturation. All the standard points are boxed; red, magenta, blue, cyan, green and yellow. A skin tone/flesh line is provided to allow for easy hue adjustment as well as standard diagonals.

At all times a minimum and maximum value for each of the channels (Y, Cr and Cb) is displayed in 10 bit mode (0-1023). The color of the text for each channel indicates the following: in range (green), out of range but legal (yellow) and illegal/sync values (red).

For single link 8 and 10 bit YCbCr files, there is no color processing involved. For dual link 4:4:4 RGB signals, the equivalent Cb and Cr are calculated to create the display.
Waveform YCbCr

To display the Waveform YCbCr in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Waveform YCbCr** button. To display the Waveform YCbCr as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Waveform YCbCr** button.

For a multiple scope layout, click on the window in which you would like the Waveform YCbCr displayed.

**Graticule** checkbox – when selected, the graticule is laid over the Waveform YCbCr display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.
Show Parade checkbox – when selected, the display is from left to right. When not selected, the display is stacked top to bottom.

![Stacked](image1.png) ![Parade](image2.png)

Only Luma checkbox – when selected, displays only the luminance of the signal.

![Only Luma](image3.png)

Intensity slider – Moving the Intensity slider brightens or dims the display of the video signal through the Vectorscope. The current setting is displayed above the slider, as a percentage, 0% providing no display and 100% being maximum intensity.

Quality slider - moving the Quality slider uses more or less of the data points to draw the video signal through the scope. The current setting is displayed above the slider, as a percentage, 0% being rather poor indeed and 100% drawing every pixel. Where system resources are less capable, it may be useful to reduce the quality to allow the system to keep up.

Action Safe checkbox - when selected, the Action Safe graticule is displayed over the video.

Graphic Safe checkbox - when selected, the Graphic Safe graticule is displayed over the video output

Active Region checkbox - when selected, the Active region graticule is displayed over the video output

8 bit Processing checkbox - when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit
path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Graticule Brightness** slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Waveform YCbCr Display

Here is the Waveform YCbCr.

The YCbCr Waveform Monitor displays the levels of the Y, Cb and Cr from the left of the picture to the right of the picture with all the lines summed into one graph. The Y, or luma/luminance, graph provides accurate white and black level information, as well as the range in between. The Cb and Cr display the +/- 512 levels of chroma of both types. This provides a visual representation of the chroma range of the signal.

Critical for downstream color correction is the need to ensure proper luminance levels at the stage of initial capture, so any corrections will not muddy or wash out the signal information.

At all times a minimum and maximum value for each of the channels (Y, Cr and Cb) is displayed in 10 bit mode (0-1023). The color of the text for each channel indicates the following: in range (green), out of range but legal (yellow) and illegal/sync values (red).
Waveform RGB

To display the Waveform RGB in a single scope layout, press the Scope Config button on the Scope window, and press the Waveform RGB button. To display the Waveform RGB as one window of a multiple scope layout, press the Scope Config button on the Scope window, click on the desired layout, click on the window you want to use, and click on the Waveform RGB button.

For a multiple scope layout, click on the window in which you would like the Waveform RGB displayed.

Graticule checkbox – when selected, the graticule is laid over the Waveform RGB display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.
**Show Parade** checkbox – when selected, the display is from left to right. When not selected, the display is stacked top to bottom.

[Images of Stacked and Parade displays]

**Full Scale** checkbox – RGB, by default, will be sRGB. The range of each color will be from 16 to 240 (in 8 bit), so the scale will place white at 240 and black at 16 in normal scale. If in full scale, white will be placed at 255 and black at 0.

**Intensity** slider – Moving the Intensity slider brightens or dims the display of the video signal. The current setting is displayed above the slider, as a percentage, 0% providing no display and 100% being maximum intensity.

**Quality** slider - moving the Quality slider uses more or less of the data points to draw the video signal through the scope. The current setting is displayed above the slider, as a percentage, 0% being rather poor indeed and 100% drawing every pixel. Where system resources are less capable, it may be useful to reduce the quality to allow the system to keep up.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output

**8 bit Processing** checkbox - when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Graticule Brightness** slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Here is the Waveform RGB.

The RGB Waveform Monitor shows each of the red, green and blue signals as independent graphs, displaying the RGB, or chrominance/color values associated with the file.

At all times a minimum and maximum value for each of the channels (R, G and B and A) is displayed in 10 bit mode (0-1023).

For dual link RGB, the original RGB 10 bit values are used unprocessed. For single link YCbCr, they are first converted to RGB before being analyzed and displayed.
Histogram

To display the Histogram in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Histogram** button. To display the Histogram as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Histogram** button.

For a multiple scope layout, click on the window in which you would like the Histogram displayed.

Graticule checkbox – when selected, the graticule is laid over the Waveform RGB display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.

**Luma Histogram** checkbox – when selected, displays only the luminance portion of the signal.

**Show RGB** checkbox – when selected, displays the RGB portion of the signal.

**Quality** slider - moving the Quality slider uses more or less of the data points to draw the video signal through the scope. The current setting is displayed above the slider, as a percentage, 0% being rather poor indeed and 100% drawing every pixel. Where system resources are less capable, it may be useful to reduce the quality to allow the system to keep up.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output

**8 bit Processing** checkbox - when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Graticule Brightness** slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Histogram Display

Here is the Histogram window in RGB mode.

The Histogram view shows the distribution of red, green and blue within the signal as a series of discrete bars that make a continuous graph for each color. This display provides an overview of the tonal range of each color in the picture. Each bar is the count of the number of pixels for one of the 1024 possible colors. These totals are then auto ranged to fit within the graticule and represent the relationship between the shades of each color and between each other.

Each color has its own graph. The color's levels are represented from left to right, with the absolute left being 0 and the absolute right being 1024. The scale is presented as a percentage to allow for extremely bright or dark pictures to be analyzed without truncating.
Here is the Histogram with Luma Histogram selected, displaying only luminance information.
Chromaticity

To display the Chromaticity in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Chromaticity** button. To display the Chromaticity as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Chromaticity** button.

For a multiple scope layout, click on the window in which you would like the Chromaticity displayed.

---

**Graticule** checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

**Triangle 601** checkbox – when selected, displays the CCIR-601 triangle.

**Triangle 709** checkbox – when selected, displays the Rec.709 triangle.

**Triangle 2020** checkbox – when selected, displays the BT.2020 triangle.

**Triangle P3** checkbox – when selected, displays the P3 triangle.

**Invert** checkbox – when selected, displays the video signal over a black background instead of the Chromaticity hued background.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video output.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output.

**8 Bit Processing** checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Graticule Brightness** slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
**Chromaticity Display**

Here is the Chromaticity window.

The Chromaticity scope provides a visual representation of the color in a video across all the colors of visible light. For a particular YCbCr range (BT.2020, P3, Rec.709, CCIR-601) a triangle can be superimposed. This will delineate the colors that fall within the acceptable range and those that are outside it. The color of the video within the CIE 1931 color display can be white, black, or the chromaticity hued background.
Status

To display the Status in a single scope layout, press the Scope Config button on the Scope window, and press the Status button. To display the Status as one window of a multiple scope layout, press the Scope Config button on the Scope window, click on the desired layout, click on the window you want to use, and click on the Status button.

For a multiple scope layout, click on the window in which you would like the Status displayed.

Quality slider - moving the Quality slider uses more or less of the data points to draw the video signal through the scope. The current setting is displayed above the slider, as a percentage, 0% being rather poor indeed and 100% drawing every pixel. Where system resources are less capable, it may be useful to reduce the quality to allow the system to keep up.

Action Safe checkbox - when selected, the Action Safe graticule is displayed over the video output.

Title Safe checkbox - when selected, the Title Safe graticule is displayed over the video output.

Graphic Safe checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

Picture Frame checkbox - when selected, the Picture Frame graticule is displayed over the video output.

Active Region checkbox - when selected, the Active region graticule is displayed over the video output.

8 Bit Processing checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
**Status Display**

Here is the Status Window.

```
<table>
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<th>Y: Min</th>
<th>Low</th>
<th>Avg</th>
<th>Max 1020</th>
<th>High</th>
<th>12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>0</td>
<td></td>
<td>49%</td>
<td>Avg 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max</td>
<td>1020</td>
<td>High</td>
<td></td>
<td></td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Y-Gamut Under</td>
<td>8%</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y-Gamut Over</td>
<td>5%</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>U: Min</td>
<td>0 Low</td>
<td>10% Avg 466</td>
<td></td>
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<tr>
<td>Max</td>
<td>832</td>
<td>High</td>
<td>18%</td>
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<tr>
<td>U-Gamut Under</td>
<td>10%</td>
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</tr>
<tr>
<td>U-Gamut Over</td>
<td>4%</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>V: Min</td>
<td>0 Low</td>
<td>17% Avg 474</td>
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<tr>
<td>Max</td>
<td>1020</td>
<td>High</td>
<td>11%</td>
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<tr>
<td>V-Gamut Under</td>
<td>5%</td>
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<tr>
<td>V-Gamut Over</td>
<td>1%</td>
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<tr>
<td>S: Min</td>
<td>0 Low</td>
<td>100% Avg 0</td>
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<td></td>
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<tr>
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<td>High</td>
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<tr>
<td>MaxCLL</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>MaxFALL</td>
<td>0</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Line repetition</td>
<td>0 of 1080</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Illegal</td>
<td>12%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio Peak</td>
<td>A12 0000 0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio RMS</td>
<td>A12 0000 0000</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Audio Ebu</td>
<td>A12 100 100</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A34 100 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

The Status window displays:

- **Y**: Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values
- **U**: Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values
- **V**: Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values
- **S**: Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values
- **MaxCLL**: In HDR10 mode, Maximum Content Light Level
- **MaxFALL**: In HDR10 mode, Maximum Frame - Average Light Level
- Line repetition in number of lines over total possible lines
- Broadcast illegal in percentage
- Audio Peak per channel pair
- Audio RMS per channel pair
- Audio Ebu Loudness per channel pair
Audio Vector

To display the Audio Vector in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Audio Vector** button. To display the Audio Vector as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Audio Vector** button.

For a multiple scope layout, click on the window in which you would like the Audio Vector displayed.

[Image of Scope Config window]

**Graticule** checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

**Xylissajous** checkbox – when selected, displays the relative phase of the selected audio pair in Lissajous XY mode.

**Lissajous** checkbox – when selected, displays the relative phase of the selected audio pair in Lissajous mode.

**Polar** checkbox – when selected, displays the relative phase of the selected audio pair in Polar mode.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video output.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output.

**8 Bit Processing** checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Graticule Brightness** slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Audio Vector Display

Here is the Audio Vector window.

The audio vectorscope measures the difference between channels of a stereo pair. One channel drives the horizontal and the other the vertical deflection. This will show the relative phase of the two channels. This can be shown in Lissajous XY, Lissajous or Polar modes. Any pair may be selected in the setup.
**Audio Phase**

To display the Audio Phase in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Audio Phase** button. To display the Audio Phase as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Audio Phase** button.

For a multiple scope layout, click on the window in which you would like the Audio Phase displayed.

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**Graticule** checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video output.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output.

**8 Bit Processing** checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Graticule Brightness** slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Audio Phase Display

Here is the Audio Phase window.

The audio phase meter shows the relative density of two audio channels and the relative loudness as a line moving towards the louder channel.
Audio Histogram

To display the Audio Histogram in a single scope layout, press the **Scope Config** button on the **Scope** window, and press the **Audio Histogram** button. To display the Audio Histogram as one window of a multiple scope layout, press the **Scope Config** button on the **Scope** window, click on the desired layout, click on the window you want to use, and click on the **Audio Histogram** button.

For a multiple scope layout, click on the window in which you would like the Audio Histogram displayed.

![Audio Histogram](image)

**Graticule** checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

**Amp Linear** selector – clicking in the Amp Linear checkbox sets the Amp to linear.

**Amp Log** selector – clicking in the Amp Log checkbox sets the Amp to logarithmic.

**Scale Linear** – clicking in the Scale Linear checkbox sets the scale to linear.

**Scale Sqrt** – clicking in the Scale Sqrt checkbox sets the scale to sqrt.

**Scale Cbrt** – clicking in the Scale Cbrt checkbox sets the scale to cbrt.

**Scale Log** – clicking in the Scale Log checkbox sets the scale to logarithmic.

**Scale RLog** – clicking in the Scale Rlog checkbox sets the scale to R logarithmic.

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video output.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output.

**8 Bit Processing** checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Graticule Brightness** slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Audio Histogram Display

Here is the Audio Histogram window.

The audio histogram displays a bar chart of the levels of the components of an audio signal. This can be displayed as linear or logarithmic. The scale can be set as linear, square root, cubed root, log or reverse log.
Audio Wave

To display the Audio Wave in a single scope layout, press the Scope Config button on the Scope window, and press the Audio Wave button. To display the Audio Wave as one window of a multiple scope layout, press the Scope Config button on the Scope window, click on the desired layout, click on the window you want to use, and click on the Audio Wave button.

This opens the Audio Wave Setup section of the Scope Config window, which offers the following controls:

- **Graticule** checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.
- **Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video output.
- **Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.
- **Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output.
- **Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.
- **Active Region** checkbox - when selected, the Active region graticule is displayed over the video output.
- **8 Bit Processing** checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.
- **Graticule Brightness** slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

Pressing the x in the upper right corner will close the Scope Config window.
Audio Wave Display

Here is the Audio Wave window.

The audio waveform of any pair of channels can be displayed in real time.
The **Data** display may be selected by clicking on the **Data** button in the side menu.

The **Data view** allows access to the raw pixel values being monitored on the HDMI or SDI input. Values are captured and displayed in their raw values, with no manipulation by the software. Capture card ranging is maintained, supporting both 0..255 and 0..1023 (inclusive).

For YCbCr signals, the Y/Cb and Y/Cr pairs are displayed next to each other with no interpolation. For dual link RGB, the 0..1023 components are also displayed directly. This mode is perfect for checking vertical blank signaling and metadata, as well as picture issues like inner line sync markers or out of range colors.

Pixel starts can be selected, along with lines, in the edit boxes above the data area. Pixels can also be 'picked' by clicking on the video image to set both pixel and line start. Hanging the mouse over the picture, will pop up a tool tip with the R, G and B percentage as well as the pixel X and Y position.
Video Markers

Here are the video markers displayed over the picture.

![Video Markers Diagram](image)

**Action Safe** checkbox - when selected, the Action Safe graticule is displayed over the video output.

**Title Safe** checkbox - when selected, the Title Safe graticule is displayed over the video output.

**Graphic Safe** checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

**Picture Frame** checkbox - when selected, the Picture Frame graticule is displayed over the video output.

**Active Region** checkbox - when selected, the Active region graticule is displayed over the video output.

**8 Bit Processing** checkbox – when selected, 8 bit processing will be applied, otherwise it is 10 bit. 10 bit processing allows for finer analysis of the signal, and even detection of 8 bit signals in a 10 bit path. Smooth scopes on true 10 bit signals display every possible level in the signal. An 8 bit processing mode is also available in 10 bit mode, to allow for mixed mode scopes.

**Graticule Brightness** slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

**Mag** control – use the control to set the level of magnification.

**PanX** control – use the control to set the pan to the left or right.

**PanY** control – use the control to set the pan up or down.

Pressing the x in the upper right corner will close the **Scope Config** window.
Scope Layout

Along the top of each scope config is the layout selector.

The options are: a single scope, two scopes side by side, four scopes in a 2x2 grid, and six scopes in two rows of three scopes.
Single Scope Layout

A single scope may be selected for display. This example shows the Vectorscope.
Double Scope Layout

Two scopes may be selected for display. This example shows the Vectorscope and the Audio Waveform monitor.
2 x 2 Grid Scope Layout

Four scopes may be selected for display, in a 2x2 grid. This example shows the Vectorscope, the Audio Waveform Monitor, the Waveform YCbCr, and the Histogram.
3 x 2 Grid Scope Layout

Six scopes may be selected for display, in two rows of 3 scopes. This example shows the Vectorscope, the Audio Waveform Monitor, the Waveform RGB, the Waveform YCbCr, the Histogram and the Chromaticity scopes.
Export Media

Export button - opens the export window, which allows the user to take the file or source they are viewing and export some or all of it. The position slider may be clicked on and repositioned to set in and out points.

The Export Window offers the following controls and displays:

- **TC Type** – displays the type of time code being used, and clicking on this control will allow the user to select between other available types of time code.
- **In Point** – displays the current In Point. A new In Point can be set, by pressing the **Set In** control. Once an In Point other than the first frame has been set, the Position slider lets the user dynamically move the In Point by grabbing with the mouse and moving the control. Sliding to a new location in the file and pressing the **Set In** control will update the In Point.
- **Position Slider** – displays the entire clip as blue when the clip is first loaded. Once a new In or Out point has been set, displays the amount of the clip that will be exported in blue, and the portions that will not be included in the export will be displayed in black.
- **Preview** – pressing this control will play the portion of the clip set to be exported.
- **Process** – pressing this control begins the export process by opening the **Create Profile** Window.

- Typing a name into the profile name field, and pressing the **OK** button, opens the Export Options window.
• The Export Options window offers a **Profile** pulldown menu which allows the user to select between profiles that have been created. Clicking the **Master Copy** checkbox opens a browser which allows the user to set where the master copy of the export should be saved. Clicking on the + control opens a further **Export Options** window, which allows the user to set up the export.

• Pressing the + by the **Select a Client** field opens the **Enter a New Address** window. This allows the user to set the client for the export. Where more than one client has been set up, the field becomes a pulldown menu, allowing the user to select between available clients.
• Pressing the **Select a Profile** pulldown menu allows the user to select between available file format types for the export.
• Pressing the **Browse** button at the right of the **Select a Location** control opens a standard browser, which allows the user to set the location the exported file will be saved in. Once all the parameters have been set, pressing OK closes the Export Options window. The user can then press the **Process** control to reveal the **Profile Test** (see if Net-X-Base is present), and the **Edit Profile** (go back to the Export Options window).
Audio Meters button - Open the audio meters display. This display shows relative audio levels during source passthrough or file output. The line 0 corresponds to -24 decibels.
Audio Routing

**Audio Routing** button - Opens the audio routing window. This window allows the user to reroute the output of up to 16 channels of audio.
QC Analysis

**QC Analysis** button - Open the Analysis window, which displays information about the file's levels. Hovering over a location provides track info. The red vertical line follows playback. The Auto Start checkbox sets the analysis to display upon opening the window. The Connect checkbox allows the frame analysis to be performed on a stream source.

Prior to loading the open file, Analysis offers an opportunity to load a file.

The Analysis process will then begin to analyze the current file.
Several components of the file are displayed in the analysis window:

The top row offers the following controls:
**View Data** option – opens the View Data window.

This window details all the parameters measured by the Analysis process, and displays the values in an easy to read window.
View Events option – opens the View Events window.

The View Events window looks for events such as line repetition, and describes the following for each event: Start time code, Time code string, Start frame, End frame, I Value, and F Value.

Pressing the Export Data control allows the user to select between report types. Once selected, a report will be generated for the analyzed file in the same directory as the file.

The data may be exported in the following formats: CSV, XML, PDF, HTML, and ALL [generate a report in each of the (CSV, XML, PDF, and HTML) formats].

The Connect checkbox causes the lines in the graphs to be connected. Otherwise, they are just the actual data dots.

The Auto Start checkbox cause the analysis to start as soon as file is loaded. If it is not set, then the analysis won’t start until the analysis window is brought up.

The second row details the video size and the video type

The third row details the Maximum, the Minimum, the Average, the Low and the Minimum for the Y component of the video.
The fourth row details the **Maximum**, the **High**, the **Average**, the **Low** and the **Minimum** for the **Saturation** level of the video.

![Saturation Level Details](image)

The fifth row details the **Maximum**, the **Minimum**, the **Average**, the **Low** and the **Minimum** for the **U** component of the video.

![U Component Details](image)

The sixth row details the **Maximum**, the **Minimum**, the **Average**, the **Low** and the **Minimum** for the **V** component of the video.

![V Component Details](image)

The seventh row looks for **Vertical Line Repetition**, and **Broadcast Illegal** (levels).

![Vertical Line Repetition and Broadcast Illegal](image)

The eighth row looks at the audio in the file, and details the **Loudness Left**, **Loudness Right**, **RMS Left**, **RMS Right**, **Peak Left**, and **Peak Right**.

![Audio Details](image)

Along the bottom there is a position slider and markers for frame locations.
Compare Files

**Compare Files** button - Opens the file compare window, which allows the user to compare a file with another file. This is useful for example in comparing an original source file to its exported/transcoded/compressed version, to check that the exported version is not overly degraded, or too different from the source.

- **Enable** – enable the visual compare mode
- **Comp File** – the compressed file being compared
- **Comp Offset** – the frame offset into the compressed file to match the original file
- **Orig File** – the original file that the compressed file came from. The ‘...’ brings up the file browser to select the original file
- **Orig Offset** – the frame offset into the original file to match the compressed version
- **Mode** – see the Basic Compare Settings below
- **Wipe Type** – see the Wipe Settings below
- **Mix Value** – some of the compare settings (like dissolve) allow for a percentage mix value that is set by this slider
- **Threshold** – some of the compare settings (like A-B and difference) require a threshold value that is set by this slider
- **Split Vertical** – for seamless split, vertical, this sets the location of the split
- **Split Horizontal** – for seamless split, horizontal, this sets the location of the split
- **Split Vert/Horiz** – for compare modes like seamless splits and mirror, this sets the split either vertically or horizontally
- **Invert** – this inverts the compressed and original video in the compare display
• **Add Guide** – for compressed/original sets that are very close, it can be difficult to find the split between them. This setting puts a single pixel line at the split point
• **Flip Horz Left** – flip the left/compressed video horizontally
• **Flip Horz Right** – flip the right/original video horizontally
• **Flip Vert Left** – flip the left/compressed video vertically
• **Flip Vert Right** – flip the right/original video vertically
• **Grid Type** – set the grid overlay to percent, pixel of off
• **Grid Percent** – the percent size for the grid
• **Grid Pixel X** – the number of pixels horizontally between grid lines
• **Grid Pixel Y** – the number of pixels vertically between grid lines
Basic Compare Settings:
Left Eye Only:

This shows only the left, or the compressed, video signal.

Right Eye Only:

This shows only the right, or original, video signal.
Anaglyph Red-Blue:

For 3D glasses.

Anaglyph Red-Cyan:

For 3D glasses.
Anaglyph Amber-Blue:

For 3D glasses.

Anaglyph Green-Magenta:

For 3D glasses.
Interlaced Eyes:

Show both signals on alternate lines, good for some 3D monitors.

Onion Skin:

Show 50% of each signal.
Difference with Threshold Multiplier:

Subtract the each pixel to show 50% gray when they are the same, and bright/dark where different. Threshold can be set by the threshold slider.

Over Under:

Show the compressed video and original scaled vertically.
Side by Side:

Show the compressed video and original scaled horizontally.

Seamless Split – Vertical:

Show one half of the compressed and the other half of the original video.
**Seamless Split – Horizontal:**

Show one half of the compressed and the other half of the original video.

**Side By Side – Full Picture:**

Show both compressed and original video full image scaled to fit.
Side By Side – Same Side:

- Show the same side of the compressed and original signal, movable.

**Mirror:**

- Mirror the compressed and original so they meet in the middle (vert or horiz)
**A-B with Threshold:**

Subtract the two videos and show only the differences within a threshold.

**Dissolve with Mix:**

Dissolve back and forth between the compressed and original video.
Checkerboard 3D:

Show every other pixel from each video, useful for some 3D displays.

Boxes Sized by Mix:

Create sizable, interleaving boxes with both videos.
Wipe with Mix Settings

The wipes provide less common ways of showing both video signals that may be useful under special circumstances.

Dissolve Wipe:

Dissolve between the two video signals depending on the mix slider.

Horizontal Wipe:

Horizontal wipe between the two video sources based on the mix slider position.
Vertical Wipe:

Vertical wipe between the two video sources based on the mix slider position.

Upper Left Wipe:

Upper left wipe between the two video sources based on the mix slider position.
Upper Right Wipe:

Upper right wipe between the two video sources based on the mix slider position.

Lower Right Wipe:

Lower right wipe between the two video sources based on the mix slider position.
Lower Left Wipe:

Lower left wipe between the two video sources based on the mix slider position.

Four Corners Wipe:

Four corners wipe between the two video sources based on the mix slider position.
Four Square Wipe:

Center square wipe between the two video sources based on the mix slider position.

Barn Doors Vertical Wipe:

Barn doors vertical wipe between the two video sources based on the mix slider position.
Barn Door Horizontal Wipe:

Barn doors horizontal wipe between the two video sources based on the mix slider position.

Top Center Wipe:

Top center wipe between the two video sources based on the mix slider position.
Right Center Wipe:

Right center wipe between the two video sources based on the mix slider position.

Bottom Center Wipe:

Bottom center wipe between the two video sources based on the mix slider position.
**Left Center Wipe:**

Left center wipe between the two video sources based on the mix slider position.

**Box Wipe:**

Box wipe between the two video sources based on the mix slider position.
Slide Up Wipe:

Slide up wipe between the two video sources based on the mix slider position.

Slip Left Wipe:

Slide left wipe between the two video sources based on the mix slider position.
Slide Down Wipe:

Slide down wipe between the two video sources based on the mix slider position.

Slide Right Wipe:

Slide right wipe between the two video sources based on the mix slider position.
QC File Check (Full Reference)

**QC File Check** button - Opens the file check window, which allows the user to load a file and compare it to their original source media, with track info being highlighted when a difference is detected.

![QC File Check Window](image)

**Show Tips Context Menu**

A series of tips may be displayed on the VGA screen before the user has loaded a clip. Right clicking on the Transport Controls reveals a **Show Tips** option. Click this option to toggle between showing the tips or not showing the tips. Here is a list of the tips:

- **Use the Scroll** button on the mouse to zoom in and out.
- **Left Click** on the mouse and drag the pointer to move the image around the screen.
- **Right Click** on the mouse to reset the picture to fit the application.
- **Middle Click** on the mouse to set the picture to a 1:1 pixel size.
- videoQC supports a full set of keyboard commands. Visit [www.drastic.tv](http://www.drastic.tv) for more information.
- There are configuration files for the Contour Shuttle Pro available at [www.drastic.tv](http://www.drastic.tv).
- Files can be added to videoQC by dragging them from a file explorer and dropping them on videoQC.
- Clicking on the main time code allows you to type a time code and press **Enter** to cue that time code location.
- Pressing `<CTRL>-C` will copy the current time code to the system clipboard.
- Pressing F will set videoQC to full screen.
- Going full screen (F) and unlocking the transport will show only the image, so long as the mouse is not moved.
- Double Click the video display to toggle full screen to hide the controls.
- To enable/disable the time code overlay in full screen press the 'T' key.
- videoQC supports the J-K-L keys for basic transport control.
- The MODE button toggles the playback mode through: normal, loop or palindrome.
- Clicking on TC/VITC/LTC will cause the main time code to display that time code source.
Clicking the CC button allows the user to select different closed caption sources, or disable closed caption overlay.
The `<SPACE BAR>` will switch between pause and play.
Tips can be deactivated by right clicking on the control area and selecting the menu item **Show Tips.**
How to Use videoQC

Setup

Connect Hardware

videoQC software will run on most available computers, but to support real time playback of specific file types, typically a powerful, fast system will be required. For this reason videoQC is offered as a demo so the user can qualify their system for the types of files they need to play.

To install and take advantage of some of the features of videoQC the system will need to be connected to various other hardware devices.

The system will need to be supplied with a dependable source of power. The user would do well to consider installing a UPS (uninterruptable power supply) device to provide power to the system so that signal analysis is not affected by any surge or drop in the power level.

The system will need to be set up with a monitor, keyboard and mouse. The monitor is required to view the interface, and the mouse and keyboard allow the user to input commands. The use of 2 monitors, if you can, is recommended.

To view the output using an AJA, Bluefish444 or Blackmagic board, a supported board will have to be installed on the system, along with the required drivers. Typically the manufacturer will be the best source for a list of recommended hardware environments for their boards.
Installing the Software

How you will install videoQC on your system depends on your operating system:

**Windows**
- Run the installer and follow the prompts. The installer will install it and make links in under the Start Menu and on the desktop. An uninstaller will also be created.

**OS-X**
- The OS-X version is a single executable that does not require installing. Normally it should be unpacked and copied into the Applications folder. It can then be run by double clicking on it.

**Linux**
- The installer's executable bit may need to be set (chmod a+x <installer>) to run it. Follow the install prompts and the videoQC executable link will be placed in the applications menus.
License the Software

videoQC must be licensed in order to run without demo limitations. Open the Settings window, and click the License button at the upper left. This opens the licensing window:

To license the software:

- open the licensing application and enter a user name into the field to the right of the User Name label.
- enter an email address into the field to the right of the Email Address label.
- press the Generate button. This creates a Site Code (a string of alphanumeric characters) in the field to the right of the Site Code label.
- copy the Site Code to the clipboard using the Copy button. (or you can select it and use Ctrl+C)
- send the Site Code to us at authorization@drastictech.com. (if the system is set up with email, pressing the Send button should open a new email you can send containing the Site Code) We will send back an email containing a Site Key (another string of alphanumeric characters).
- copy the Site Key and paste it in the field to the right of the Site Key label using the Paste button. (or you can select it and use Ctrl+V).
- press the Register button.
- restart the system.
videoQC How To

How to Play Video
The video can be loaded by using the File | Open menu or by dragging and dropping the file on the interface. Once loaded, it can be controlled by the transport controls, the keyboard commands or by the optional http, serial or network interface.

Controlling videoQC
videoQC can be called by external applications with command line parameters, keyboard/mouse, cut/paste, and via a full REST/HTML command set. If there is already an instance of the application running, the parameters will be transferred to the running instance, and the called one will exit. This is especially useful where the workflow requires the system to display particular aspects of a clip in an automated fashion.

Command Line Parameters
videoQC -t <timecode> -c <framestart> -f -o -h -m -a -x -v -d -p -g -b -s [filename] [compare-filename]

-t 01:00:00:00 - Seek point in time code, based on the time code track in the file
-c 1800 - Seek point in frames, based on the absolute position in the file
-f - Start in full screen mode
-o - Disable time code overlay in full screen mode
-h - Disable hardware (AJA/Bluefish444/Blackmagic) output.
-m - Do a file comparison
-a - Do a file analysis
-x - Reserved for running under Net-X-Code
-v - Enable validation - validate a file against a profile
-d - Type to check for plugin validation - IMF, DCP, XDCam, iTunes, etc
-p - User validation profile name - "videoQC Demo"
-g - Target directory for files that pass validation - "E:\good files"
-b - Target directory for files that fail validation - "E:\bad files"
-s - Source file for validation - "E:\Record\Media\qc\bars1080\"

Configuration Files
For selected time code source, display page (metadata, time code, etc.), audio meter type and other settings, they will be remembered between runs from the last selection. To modify these settings programmatically, the registry (Windows) or prefs (OS-X) must be changed. The basic settings are:

Windows (registry)
HKEY_CURRENT_USER\Software\Drastic\videoQC
OS-X (~\Library\Preferences\)
com.drastic.videoQC.plist
Linux (~\.config\)
videoQC.conf

Settings:
actionsafe - what overlays, if any, are shown on the video
filter - the default file filter
filtercc - the default closed caption file filter
fullscreen - set for full screen mode
loadpath - last path a file was loaded from
loadpathcc - last path a closed caption file was loaded from
metertype - which audio meter type is displayed
 scopemode - what video scope is displayed, if any
sdoutersafe - show the SD action safe
dsdsafe - show the SD title safe
show_mini - show the mini transport controls, instead of the full set
show_tips - enable tip display while idle
titlesafe - show HD title safe
viewmode - information panel to display
SDAspectRation16by9 - if 0 then 4:3
last_altaudiopath - last alternate loaded audio path
last_ccpath - last alternate loaded closed caption path
net_source - list of recent network a/v sources (RTP, HTTP, RTSP, SMPTE2110, tr01)
settings/Color Space - color space to use for 4K and greater playback (Rec 709, BT2020)
settings/Color Transfer - color transfer to use for 4K and greater playback (HD, 2084/HDR, HLG)

**Keyboard/Clipboard Commands**
videoQC has a full set of keyboard commands available. Key press events can be sent to control playback like:
c = play
v = pause
b = reverse play
z = fast reverse
x = fast forward

A full set of keyboard commands is available here:


videoQC also supports using the system clipboard. A cut/copy on the application (via keyboard or programmatically) will pull the current time code in a `##:##:##:##` format. Pasting a time code into the application will cause it to seek to that absolute (0 based) point in the file. If the pasted buffer contains a file URL, then that file will be loaded into that application.

**Mouse Control**
videoQC also features extended mouse controls. These include:

- `<MouseWheel>` - zoom in and out
- `<CTRL><MouseWheel>` - volume up and down (0..200%)
- `<CTRL><LeftClick>` - volume to 100% (unity)
- `<CTRL><SHIFT><MouseWheel>` - change background luminance
- `<LeftClick>Drag` - pan and scan the video image in the app
- `<ALT><LeftClick>` - view magnifying window
  - `<LeftClick>` - bring up color selector with color under cursor
  - `<RightClick>` - exit magnify mode
- `<DoubleLeftClick>` - enter and exit full screen mode
- `<T>` - enable or disable time code display in full screen
Making Marks/Guides (cross, line and box)

SHIFT+LeftClick - Make a point/cross
SHIFT+ALT+LeftClick - Undo last
SHIFT+CTRL+LeftClick - Drag to make a line
SHIFT+CTRL+ALT+LeftClick - Drag to make a box
SHIFT+RightClick - Clear all markers/guides

RESTful HTML AJAX API

videoQC supports a full set of control and status requests via a built in HTML REST/Ajax command set. This powerful API allows full control over a videoQC instance from anywhere on your network. Commands include: transport control, time code and play status, audio metering, video preview retrieval and an optional full set of disk contents display and loading commands. There is an HTML page sample included in the install that uses the most common commands and can be used as a base for custom UIs.

The documentation for the REST API is available here:

VWW REST Command API
**How to Play Video**

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**How to Export a File**

Press the Export control. This opens the Export window. The In and Out points can be edited by cueing, and pressing the Set In and Set Out controls. The profile can be selected or a new profile can be set up by pressing the Process control and selecting the Edit Process control. This opens the Export Options window. If the profile has already been set up, the user should be able to select it using the Profile pulldown menu.

To set up the current profile, press the + on the Export Options window. This opens up a further Export Options window.

To select an HTTP client, press the + button under Select a Client, and enter a known good IP address into the field.

To set the type of file that is being created in the export, press the pulldown menu under Select a profile.

To set the location in which the export will be saved, press the browse button to the right of the field under Select a location.

Press OK to accept these choices and return to the original Export Options window.
The edit can be previewed by pressing the **Preview** control.

To add a closed caption file to the exported file, press the browse button to the right of the **CC Source** field, and browse to the file then select it. If a closed caption file has been added erroneously, the user can reset by pressing the X to the right of the **CC Source** field, and this will empty the field.

To add a separate audio file to the exported file, press the browse button to the right of the **Alt Audio** field, and browse to the file then select it. If an audio file file has been added erroneously, the user can reset by pressing the X to the right of the **Alt Audio** field, and this will empty the field.

Once the settings are correct, the user may review the edit by pressing the **Preview** button. To export the selected media, press the **Process** button.

### How to Use Video IP Stream Sources

Drastic software supports a number of IP video standards in videoQC, Net-X-Code and other products. To access these streams, a URL style string is used to describe them. For some sources, like RTSP, this string is fairly standard. For others, like NDI, a URL style has been developed to allow those streams to be specified. Currently, udp://, rtp://, rtsp://, ndi://, s2022:// and s2110:// are supported. This document describes the URLs' format in more detail.

#### Basic IP Video URLs

An IP video URL will always start with the type of stream you are expecting. Some of the types include udp://, rtp://, rtsp://, ndi://, s2022:// and s2110://. This will be followed by an IP address or resolvable name for the address of the stream. For some streams there will be a port value, and then a description of the stream on that device.

UDP and RTP

UDP and RTP streams can be elementary video or audio streams, or more commonly a transport stream with PMT/PAT and a number of streams within it. For UDP and RTP, you can specify a TCP (direct) address, but normally it will be a multicast group address, and also a port is normally specified. Here are a few examples:

- udp://239.254.40.40:5004
- rtp://239.100.20.20:50004
- rtp://239.100.30:31:1234
RTSP

RTSP streams require not only the device address, but also the description of the source of the stream you are accessing on that device. RTSP are also often user/password protected, so you may have to send a user/password in the form "<user>:<pass>@" just before the device identifier. Here are a few examples, and their sources:

- rtsp://192.168.100.10/axis-media/media.amp (an Axis camera)
- rtsp://192.168.199.11/user:pass@/video1+audio1 (a Marshall camera, with password)
- rtsp://192.168.160.20:/onvif/media.amp (an OnVIF source)
- rtsp://192.168.150:11/video1?videocodec=h264 (a Marshall camera, video only, force h.264)

NDI

NDI is NewTek's video over IP protocol. It requires a device name and a source name to access NDI sources. NDI source may also be searched on the local network. To enable the search, run DDRConfig and select the Advanced tab. Go to /VVW/Config and change EnableNDISearch = 1. If it does not exist, then create a new Numeric value for it.

To specify an NDI stream, use the device name, followed by a space, and then the source name within brackets.

- ndi://USER-PC (Desktop [2])
- ndi://TestCameraSource (ISO_1)
- ndi://PC2 (Google Chrome [1])

S2022 and S2110

The SMPTE 2022-6 and SMPTE 2110 protocols can be accessed via SDP or manual setup. To access an SDP source:

- s2202://192.168.101.200/channel1.sdp
- s2110://mainsources.drastic.ca/crosspoint10.sdp

For some Drastic software, the source can be set up manually. For S2022, this is a single set of Source IP, Source Port, Destination IP, Destination Port and Interface address. One or any combination of these can be used to describe the source of the SMPTE 2022-6 stream, which contains all the video, audio and HANC/VANC channels. For SMPTE 2110, up to three sets of the same information are required to describe the video, audio and anc streams, which are all separate. A PTP grandmaster may also be specified. Here is the configuration dialog from 4KScope:
Full Reference Analysis

A full reference analysis is when you analyze both the original video material and the compressed video material. The original video provides the full reference for the compressed material.

Load the Compressed File

To get the analysis started, load the compressed version of the video into videoQC normally, either by the File Open menu, or by dragging and dropping the file on the interface.

Enable Compare Mode

Once it is loaded, bring up the view Compare dialog from the menu.
This opens the **Compare** dialog.

![Compare dialog](image)

Click on the **Enable** checkbox at the top of the dialog to enable full reference mode.

<table>
<thead>
<tr>
<th>Enable</th>
<th>Disabled</th>
</tr>
</thead>
</table>

**Load the Original Reference File**

To load the original, or reference video, click on the ... button next to the **Orig File** label.

| Orig File | ... |

This opens a standard browser, which allows you to navigate to your file, and load it.

**Synchronize the Files**

Once it is loaded, click the **Mode** pulldown menu and select **Seamless Split**.

| Mode | Seamless split |

You can drag the position bar on the transport controls to check that the two files are in sync. If they are not, either file can be adjusted by dragging the slider next to its **Offset** label.
The DT3D File

Once both files are in videoQC, it will save a *dt3d file so that it can remember the file pair and its offsets. This file will be saved with the same name as the compressed file, in the same directory. This file can be loaded in the future for quick access to the file pair.

Analysis

Normally the next step would be to run an analysis. However if you are only doing visual comparison, this is not necessary. To run an analysis, select the analysis types you are interested in (PSNY, SSIM, MS-SSIM checkboxes), and click the Launch Analysis button. This will launch the MRAnalyse process to create a database of the analysis.

View the Full Reference Graph

Once it is complete, bringing up the Analysis dialog via the menus will display a graph of the results under the Full Reference tab. Clicking on the graph will cause videoQC to seek to that position for visual inspection.

Comparison Modes

To view both the original and compressed video at the same time, a large number of modes are available in the compare dialog. There are a number of 3D modes for 3D file viewing, including anaglyph, interlaced, over/under, side by side, and checkerboard 3D. There are also a group of wipe modes that are useful in special cases. The remaining modes are designed for comparison. These include:

- **Side by side** which scales both images horizontally by half
- **Side by side Same Side** which shows half of each image either vertically or horizontally. The half can be moved with the split vertical or split horizontal slider to show any part of the picture
- **Side by Side Full Picture** does a scale of both images fully, scaled down by half horizontally and vertically
- **Seamless Split** combines both images vertically or horizontally with a positional split point between them. To make the split easier to see, the Add Guide checkbox can be clicked to make a one pixel line at the split point. To change the split between horizontal and vertical, click the Split Vert/Horiz checkbox. To move the split, use the Split Vertical or Split Horizontal slider bars. To change which image is on which side of the split, click the Invert checkbox.
- **The Mirror Mode** inverts one of the images and joins them at the center of the frame. This is also known as Butterfly Mode.
- **Dissolve with Mix** can cross-dissolve between the two images based on the Mix Value slider. This allows you to go back and forth between the two images or do an Onion Skin View by setting the slider at 50%.
- **Difference with Threshold Multiplier** creates a difference value for each pixel that can then be multiplied to accentuate small differences when the two files are very similar.
- **A Minus B with Threshold** subtracts the inverse of the second image, and shows you only the points of difference. Here too a threshold can be applied to look for smaller errors.

The visual modes also support inverting, flipping, and overlaying a grid on any of the comparison modes.
Save Analysis

Finally, the analysis can be saved as a CSV, XML, or PDF file, as well as being usable from our standard SQLite database. There's also an HTML export that supports proxying of the original and compressed files for demonstration, and display on the internet, where videoQC may not be available.