

VQS1000
Video Quality Software Application
Online Help



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- Worldwide, visit www.tektronix.com to find contacts in your area.

Table of Contents

Getting Started

VQS1000 Overview	2
User Interface	4
License Management.....	7
Offline File Analysis	9
Real-time Analysis	10
Stream Selection	12
Stream Information.....	14
View Trend Graphs	15
Video Tests	16
Alarm Parameters.....	17
Event Log.....	19
Recording Streams	20
Source Image - Processing Area Selection	22
Processed Images	23

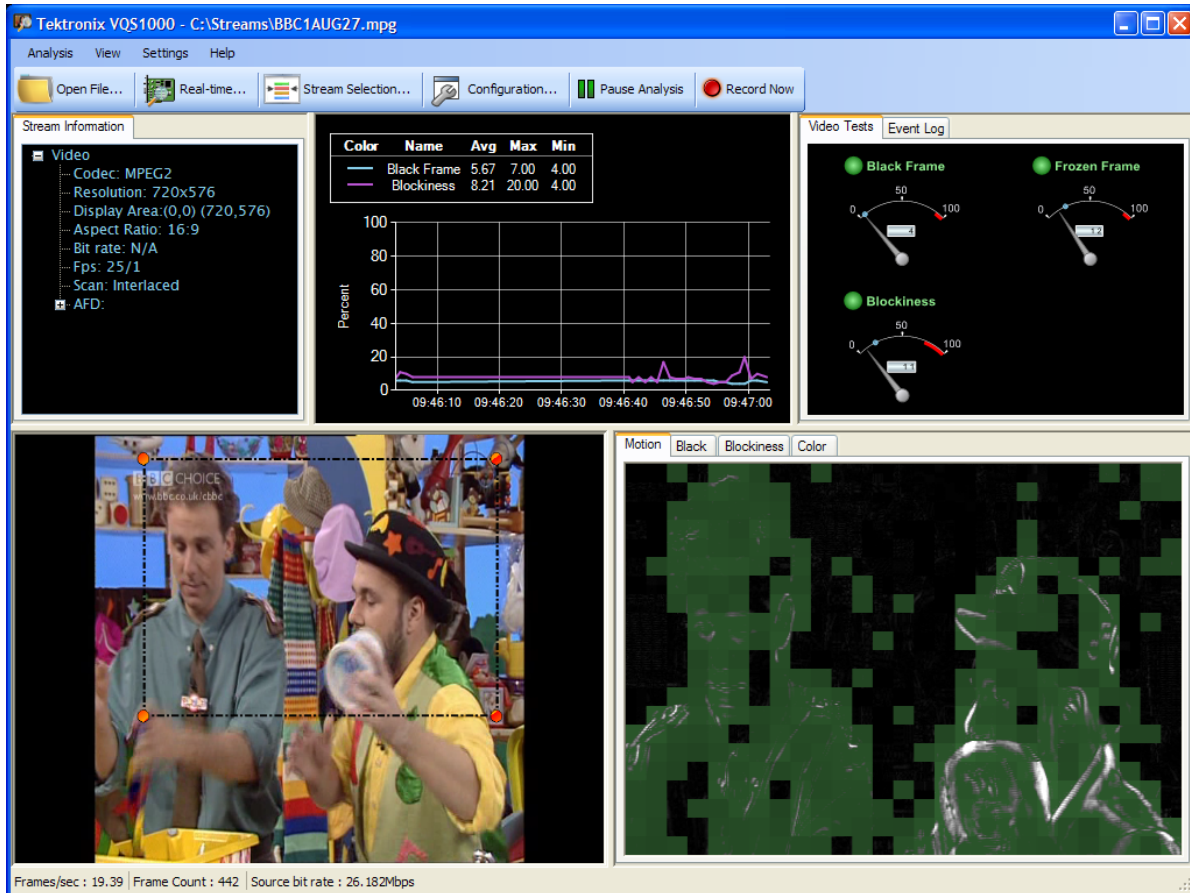
Functions and Features

Configuring the VQS1000	26
Motion Test.....	27
Black Test	29
Blockiness Test	31
Color Display	33
Frozen Frame	34
Video Bit Rate	35
Advanced Configuration	36
File Configuration	38
Log File Configuration.....	39
Polling	40
About Tektronix VQS1000	41

Index

VQS1000 Overview

The VQS1000 Video Quality Software application is used for single-ended QoE analysis of video content. It can be used with all current Tektronix DTV Monitor configurations using private backhaul video. The VQS1000 can also be used stand-alone for file analysis.



Related Documentation

The following table lists the product documentation supporting the VQS1000:

Table 1: VQS1000 Product documentation









Item (Tektronix part number)	Purpose	Location
VQS1000 Video Quality Software Application Quick Start User Manual (077-0489-XX)	Provides installation and high-level operational overviews	   www.Tektronix.com

Table 1: VQS1000 Product documentation (cont.)

Item (Tektronix part number)	Purpose	Location
VQS1000 Video Quality Software application online help (076-0223-XX)	Provides in-depth operating information	-
VQS1000 Video Quality Software application online help (077-0490-XX, printed)	Provides in-depth operating information	 +  +  www.Tektronix.com
VQS1000 Video Quality Software application Read This First (077-0492-XX)	Describes late breaking product information and operational issues	 +  www.Tektronix.com

Installation

The installation of the VQS1000 is described in the *VQS1000 Video Quality Software Application Quick Start User Manual*, Tektronix part number 077-0489-XX.

Requirements

The requirements for the VQS1000 are listed in the *VQS1000 Video Quality Software Application Quick Start User Manual*, Tektronix part number 077-0489-XX.

User Interface

This section provides brief descriptions of the screen display elements.

Table 2: VQS1000 screen display elements

Brief description	Detailed description
Title Bar	–
Menu Bar	–
Toolbar	–
Stream Information	Stream Information
Trend Graphs	View Trend Graphs
Video Tests	Video Tests
Source Image	Source Image Processing Area Selection
Processed Images	Processed Images

Title Bar

The title bar displays the application title and the source file name.

Menu Bar

Where available, shortcut keys are displayed in the screen display next to the menu option. The menu bar options are as follows:

[Analysis Menu Options](#); [View Menu Options](#); [Settings Menu Options](#); [Help Menu Options](#)

Analysis Menu Options.

- [Offline File Analysis](#)
- [Real-time File Analysis](#)
- [Stream Selection](#)
- **Recent Files:** Displays the names of the most recently opened files.
- **Exit:** Terminates analysis and closes the application.

View Menu Options.

- **Dashboard Layout:** Selecting this option hides/shows the dashboard panels - Stream Information, Trend Graphs, and Video Tests. This provides more screen space for the visual analysis panels - Source view and Processed Image.

Settings Menu Options.

- [File Configuration](#)
- [Recording Streams](#)
- **Use Polling:** When enabled, the VQS1000 will poll services within an MPTS. See also [Real-time File Analysis](#).
- **Reset All Peak Markers:** Select this option to reset the peak markers on the [test meters](#).

Help Menu Options.

- **Help:** Opens the VQS1000 online help window. Access your area of interest using the navigation pane of the help window. Context sensitive help is also available by selecting a screen display element and pressing F1 key on your keyboard.
- [License Management](#)
- **About:** The Tektronix VQS1000 Video Quality Test Suite information box displays the test suite version number. You will need this number if you call Tektronix for technical support.

Toolbar

The buttons displayed on the Toolbar provide links to set-up dialog boxes used to set up and run the application.

See also [Open File](#); [Real-time File Analysis](#); [Stream Selection](#); [Configuration](#).

Pause/Resume Analysis. Select this button to pause or resume analysis.

Record Now. Select this button to start recording immediately. See [Recording Streams](#).

Stream Information

This panel provides a summary of the video stream information, including the codec being used and the current bit rate.

Trend Graphs

This panel shows trend graphs for video measurements. You can select which measurements are displayed, and the time period over which data is displayed.

See also [Black Frame](#); [Blockiness](#); [Frozen Frame](#); [Video Bit Rate](#)

Video Tests

This panel contains test related meters which give a visual indication of the test status.

See [Black Frame](#); [Blockiness](#); [Frozen Frame](#); [Video Bit Rate](#).

For each test, thresholds can be set which can generate an alarm. Where a stream is being received from a DTV Monitor, the alarm state will be passed back and flagged in their respective screen displays.

Event Log

The event log panel records alarm activity that has occurred since the last time that the log was cleared. The log file can be exported in CSV (comma separated values) format for detailed inspection.

Source Image

This panel displays the source image; the selected video stream. You can select the area of the source image to be processed and displayed in the processed image panel.

See [Source Image Processing Area Selection](#).

Processed Images

The processed image panels display analyses of the area that you have selected in the source image. See [Source Image Processing Area Selection](#).

See [Motion](#); [Black](#); [Blockiness](#); [Color](#).

License Management

The VQS1000 application and its constituent functions are enabled using a USB security [dongle](#) and an [option key string](#).

When you start the VQS1000 application, the software compares a serial number stored on the dongle with the encrypted option key string. The option key string also contains code which enables specific functions in the application.

When you start the application for the first time, the License Management dialog box is opened automatically to allow you to enter the option key string that you were issued with.

If you purchase an upgrade, that is, permission to access and use more functions, a new option key string will be issued to you.

Dongle

A USB device that, with the option key string, unlocks and enables software functions in the application.

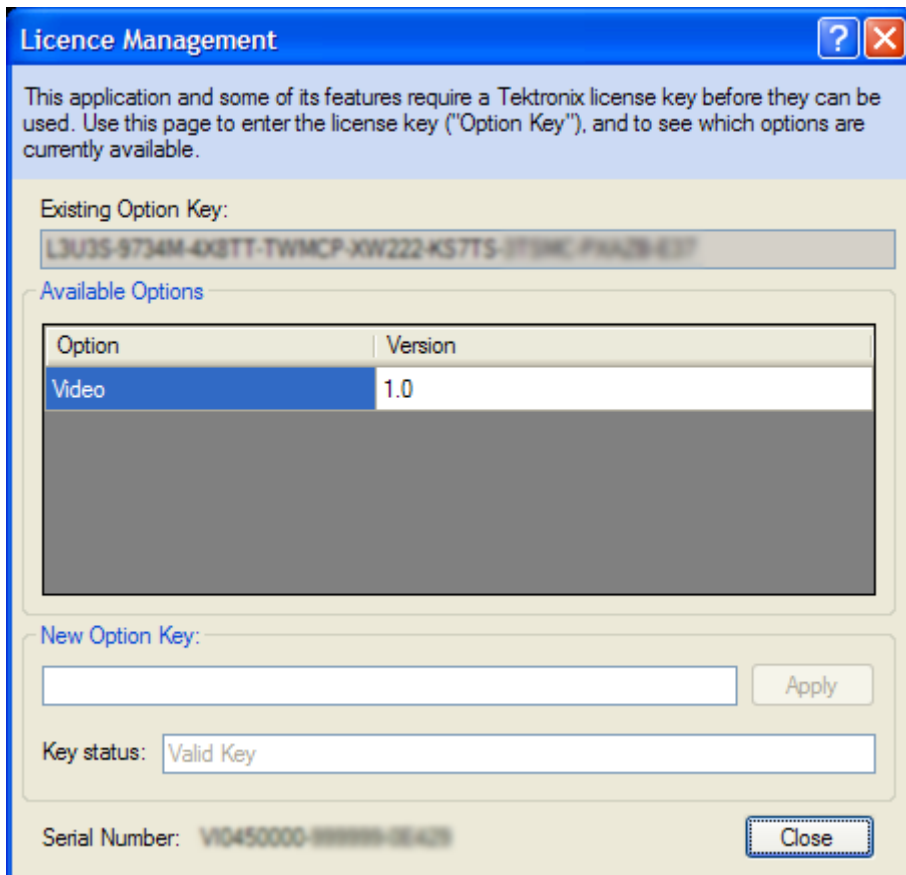
Option Key String

The option key string is an encrypted code that, with the dongle, unlocks and enables software functions in the application.

Applying an Option Key String

1. Ensure that the dongle is present in a USB port of the client PC.
2. Select **Help** > **License** to open the License Management dialog box.

NOTE. *If there is an option key already installed, it will be shown in the **Existing Option Key** field. The enabled options will be shown in the **Available Options** panel.*



3. Enter your new option key string in the **New Option Key** field.
4. Select **Apply**.

The status of the key is displayed in the **Key status** field. **Valid Key** indicates that the option key string is valid. The enabled options will be shown in the **Available Options** panel.

5. Click **Close**.

Offline File Analysis

You can select [MPTS](#) and [SPTS](#) files for analysis off-line.

The selected stream can be locally stored, on the PC hard drive for example, or accessed over the network. Elementary streams can contain either 188 byte or 204 byte packets. To modify the speed of analysis, select **Settings > Configuration > File** and adjust the **Analysis Speed** slider. See [File Configuration](#). The adjusted analysis bit rate is displayed in the status bar, **Source Bit Rate**.

To loop streams, use the **Settings > Configuration > File** dialog box. Looping a recorded stream will almost certainly produce artifacts, and may generate errors, at the loop point; this will not invalidate the analysis, but you should be aware of it happening.

Opening a File

1. Select **Analysis > File Analysis (Toolbar > Open File)**.
2. In the **Select a File** dialog box, highlight the file to be analyzed and select **Open**.
3. The dialog box will close and analysis will start immediately.

When a stream has been selected, and analysis has started, you can select individual flows (program, or video) using **Analysis > Stream Selection**. See [Stream Selection](#).

MPTS

Multiprogram Transport Stream

SPTS

Single Program Transport Stream

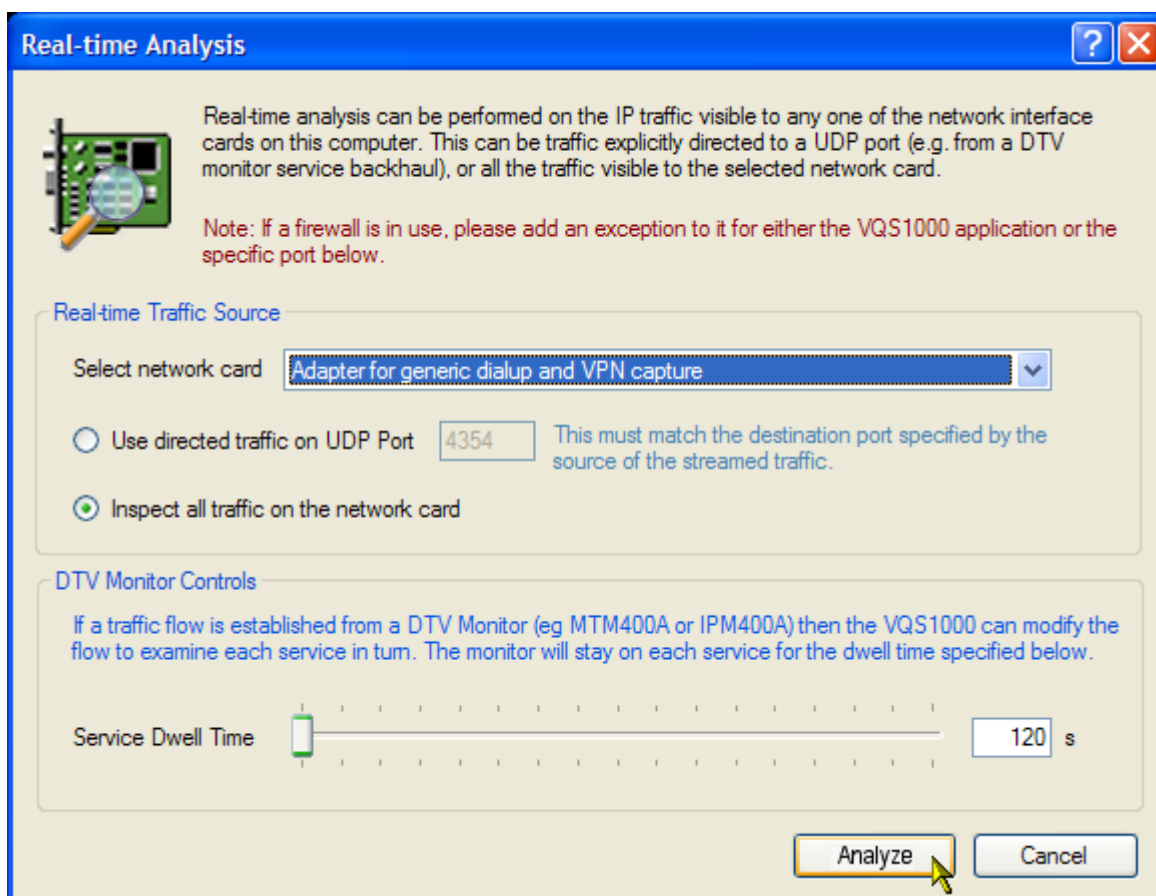
Real-time Analysis

The VQS1000 provides real-time video analysis of content [backhauled](#) from a DTV Monitor (including MTM400A, IPM400A, QAM400A, and RFM300). The VQS1000 player must be selected in the DTV Monitor; refer to the DTV Monitor product documentation. See [Related Documentation](#).

You can initiate stream analysis directly from a DTV Monitor thumbnail screen by pressing the play button or by causing IP traffic to be present on your PC's network interface.

Opening a Stream Flow

1. Select **Analysis > Real-time Analysis**.



2. In the Real-time Analysis dialog box, select the network card that is connected to the flow and/or DTV Monitor you want to work with.
3. Select **Analyze**.

Analysis will start on the first program encountered and the dialog box will close. If you later select **Analysis > Stream Selection**, the **Stream Selection** dialog box opens and you will be able to view all of the available traffic flows and select an alternative flow. See [Stream Selection](#).

When packets are dropped from the streamed content due to performance or network issues, the application recognizes it from any discontinuity in the RTP sequence numbers. When dropped packets are detected, the VQS1000 measurements are disabled to avoid false alarms being generated.

DTV Monitor Controls. Where a traffic flow is established temporarily from a DTV Monitor and you enable [Polling](#), you can specify for how long each service should be monitored for by adjusting the Service Dwell Time slider. The range is from 120 s to 600 s.

Backhaul

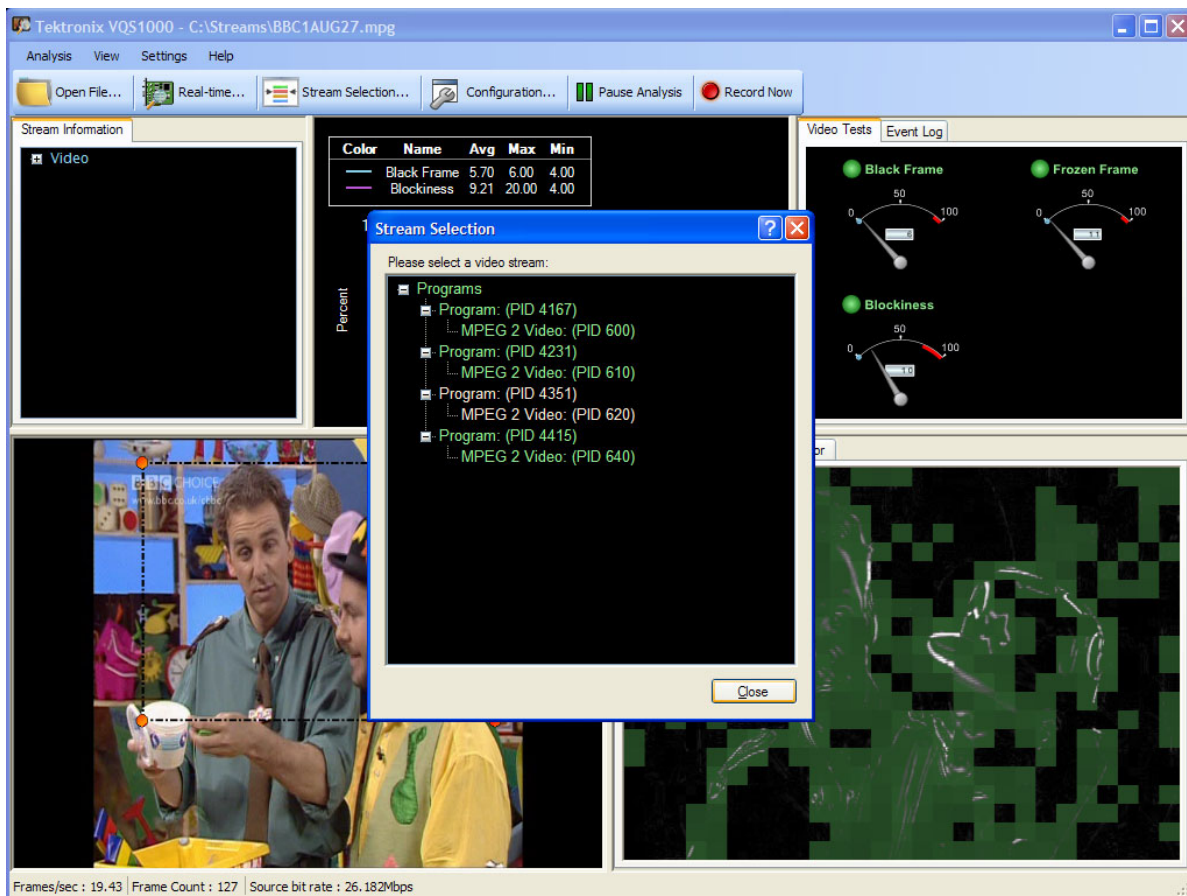
Refers to a video stream received directly from a DTV monitor.

Stream Selection

Menu bar: **Analysis > Stream Selection**

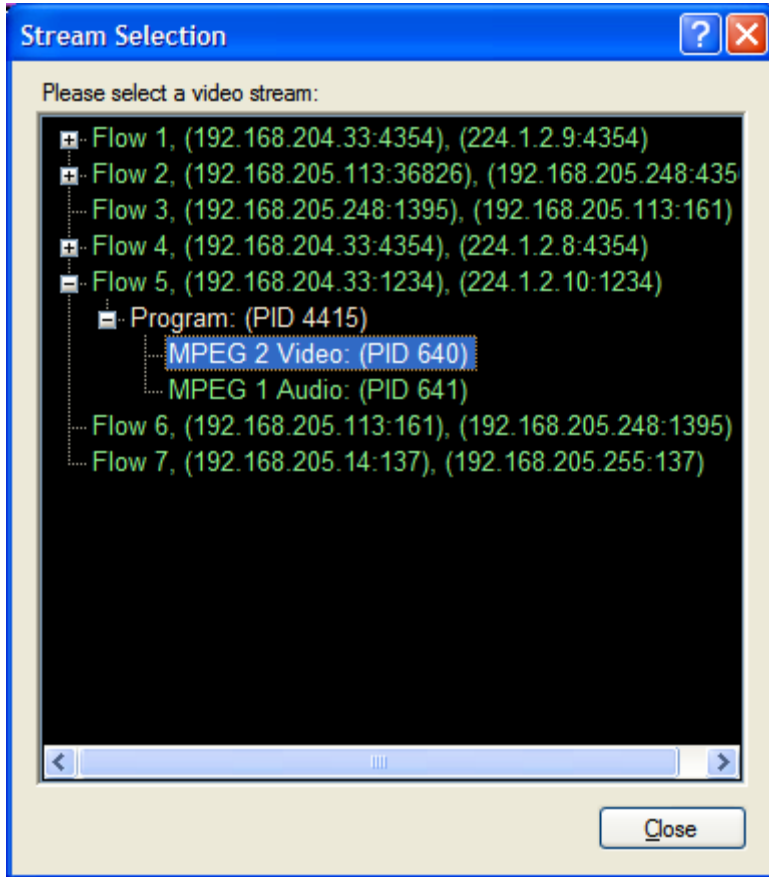
Using Directed Traffic on a UDP Port

When directed traffic is first selected for analysis, the application displays video content of the first elementary stream encountered. In the case of MPTS, the remaining elementary streams may be selected in the Stream Selection dialog box; the current elementary stream is highlighted. To change the displayed stream, highlight the video PID in the new stream and select **Close**.



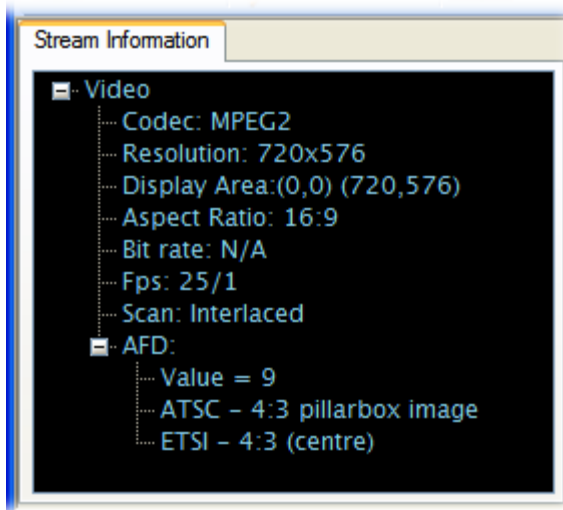
Inspecting All Traffic on the Network Card

If all traffic on the network card is being inspected, all IP traffic is displayed in the Stream Selection dialog box. If the IP flow contains video traffic, it has a plus sign and can be expanded so that a video service can be selected for analysis.



Stream Information

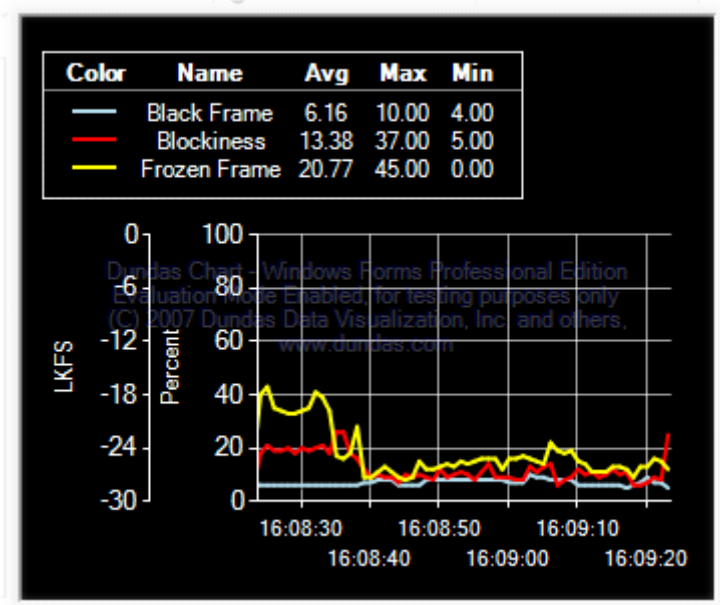
This panel provides a summary of the video stream information, including the codec being used and the current bit rate.



The Active Format Description (AFD) node shows a standard set of codes that can be sent in the video stream to convey information about the intended display aspect ratio. The codes have similar effects and descriptions in different regions.

View Trend Graphs

This panel displays selected measurement trend graphs. You can select which graphs are displayed, and the time period over which the measurements are displayed.



1. Right-click in the graph panel and select **Selected Measurements** from the context menu.

See also [Black Frame](#); [Blockiness](#); [Frozen Frame](#); [Video Bit Rate](#)

2. Select the required graph from the list.

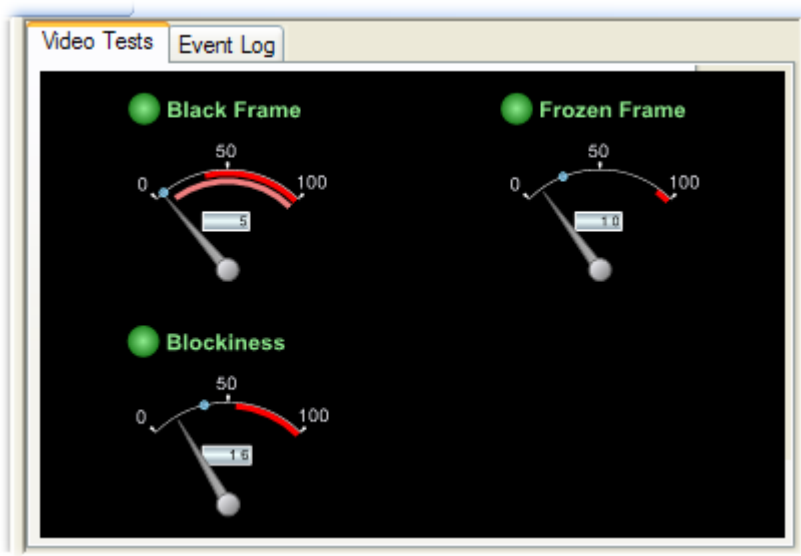
A legend panel displays the color that will be used to draw the graph, the selected measurement name, and the average, maximum, and minimum values over the displayed timespan.

3. Right-click in the graph panel and select **Time Intervals** from the context menu.
4. Use this menu to select the time scale range to be used for the selected graph measurements.

Select the required time scale.

Video Tests

This panel displays meters that give a visual indication of the status of analysis measurements; Black Frame; Blockiness; Frozen Frame; Video Bit Rate (real-time analysis only).



For each test, thresholds can be set which, when exceeded, will generate an alarm. Where a stream is being received from a DTV Monitor, the alarm state will be passed back and flagged in their respective screen displays. See [Setting Alarm Parameters](#)

Each meter consists of the following indications:



Meter dial: Provides a dynamic indication of the current measurement level.

Peak markers: A blue bead indicates the maximum measurement level since the levels were last reset.

Consecutive frame indicator: A red arc indicates the limit set on consecutive frames before an alarm is raised.

Event count indicator: A pink arc indicates the limit set on the event count before an alarm is raised.

In addition to the value displayed in the gauge, you can set thresholds that, when exceeded, generate an alarm. The alarm state will be shown by the LED icon above the gauge. The LED colors are as follows:

-  – Green: The measurement has not exceeded the set threshold.
-  – Red: The measurement is currently exceeding the set threshold.

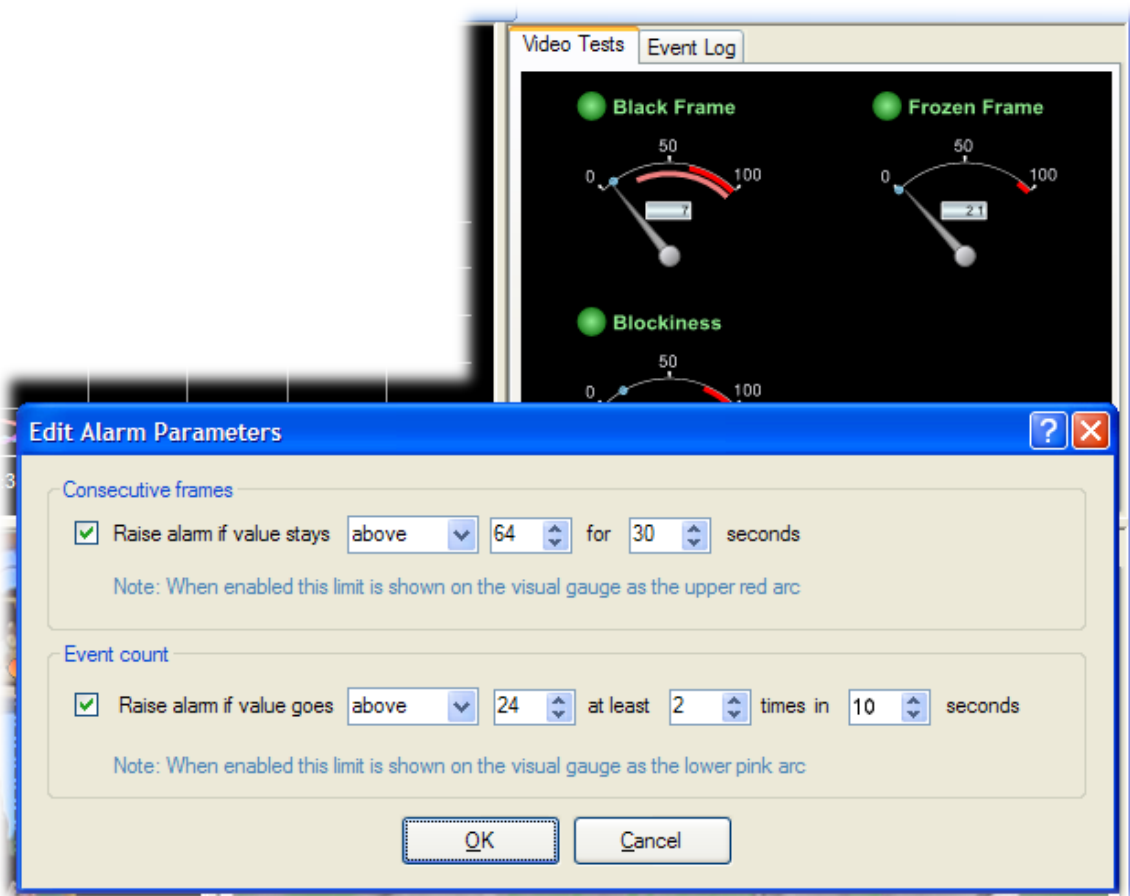
See also [Black Frame](#); [Blockiness](#); [Frozen Frame](#); [Video Bit Rate](#) (real-time analysis only).

Alarm Parameters

You can set alarm threshold parameters for each of the video tests: Black Frame, Blockiness, Frozen Frame, and Video Bit Rate (real-time analysis only). The alarm parameters are the same for each test.

Setting Alarm Parameters

1. With the cursor over a video test dial, double-click to display the Edit Alarm Parameters dialog box. You can also select **Edit Alarm Parameters** from the right-click context menu. Note that the dialog box format is the same for all tests; however the settings that you make are unique to the test. The settings shown in the following screen capture are applicable to the Black Frame test.



Edit Alarm Parameters dialog box

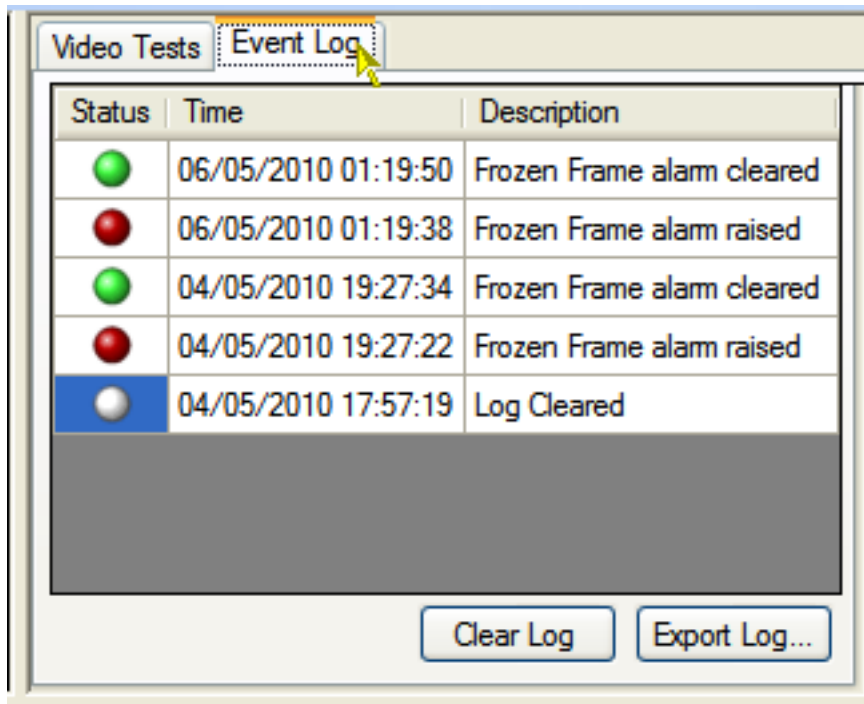
2. Enable and set the consecutive count parameters, if required.
3. Enable and set the event count parameters, if required.

An event is counted each time that it occurs, not the as the time spent in the event failed state.

See also [Black Frame](#); [Blockiness](#); [Frozen Frame](#); [Video Bit Rate](#) (real-time analysis only).

Event Log

The event log records errors and events with a corresponding timestamp.



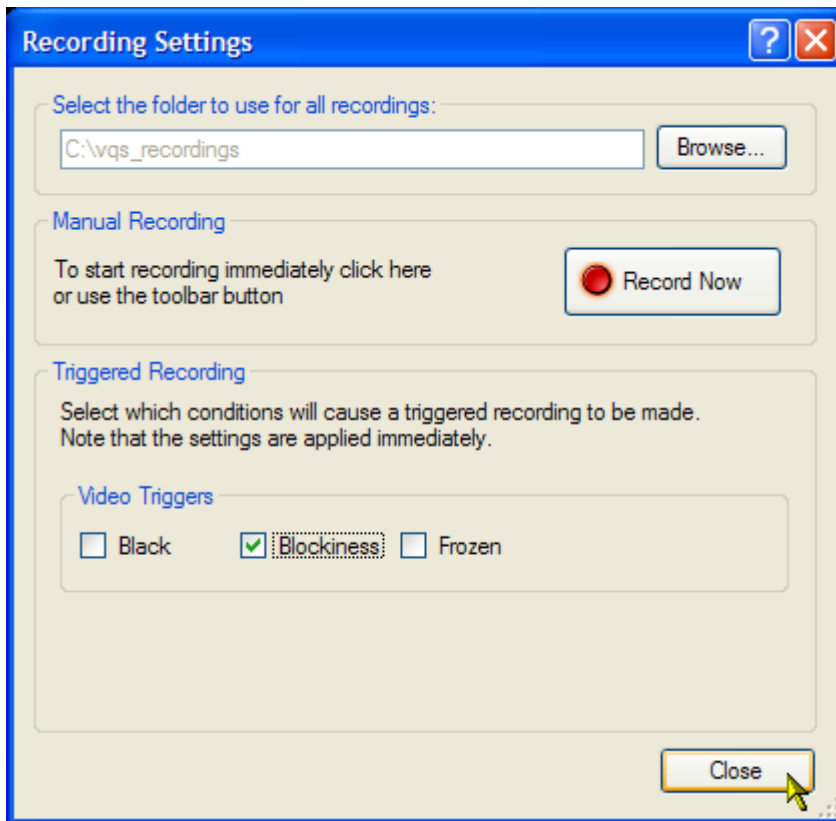
Select **Export Log** to export the contents of the log in CSV (comma separated value) format.

Select **Clear Log** to clear the log.

Recording Streams

By specifying a destination file and one or more recording triggers, you can initiate recording of a stream to be able to analyze it in more detail, for example, using the Transport Stream Compliance Analyzer, part of the Tektronix MTS400 Series MPEG Test Systems.

Recording can also be initiated immediately.



Setting up a Recording

1. Select **Settings > Recording**.
2. In the Recording Settings dialog box, select a folder to use for all recordings.
Initiate manual recording immediately by selecting the **Record Now** button. The dialog box closes.
Set up triggered recording as follows:
3. Select one or more video measurements to trigger recordings: Black, Blockiness, Frozen, and Video Bit Rate. The last, Video Bit Rate, is only available during real-time analysis.

Set the trigger threshold, which must be set and exceeded before recording occurs, in the video measurements panel. See [Video Tests](#).

Recorded files are automatically named <time>_<trigger>.trp, where <time> is the time of recording (hh.mm.ss), and <trigger> is the name of the action that triggered the recording activity, for example, “14_7_53_BlackFrame.trp”. Recording ends when the recorded file it is 64 MB long. During recording, new trigger events are ignored.

Pre-trigger Buffer. The stream is recorded in memory at all times, with the available memory being used as a circular buffer, which is filled and written over continuously until a trigger event occurs. The pretrigger setting allows the proportion of data saved before a trigger event to be specified as a percentage of the final recorded file. The VQS1000 pre-trigger buffer is set at 90%. This means that when a recording is made, triggered by an event, the stream prior to the event can also be examined.

Source Image - Processing Area Selection

The Source Image panel displays the result of decoding the currently selected elementary video stream. The decoded image is displayed, whether derived from off-line or real-time analysis.

You can also select the area to be processed, tested, and subsequently displayed in the [Processed Images](#) panels.



1. With the cursor over the source image, select **Show Graticule** from the context (right-click) menu.
The graticule displayed outlines the approximate area that you want displayed in the processed image panels; the application will select the nearest rectangle that can be successfully tested.
2. Adjust the size and shape of the graticule by dragging the corner handles of the graticule.
The processed image display is adjusted immediately.
3. Select **Show Graticule** again to hide the graticule. The processed image continues to display the selected area.
4. Select **Reset Graticule** to reset the graticule to its default size.

Processed Images

The processed image panels display analyses of the area that you have selected in the [Source Image Processing Area Selection](#).

See [Motion](#); [Black Frame](#); [Blockiness](#); [Color](#)

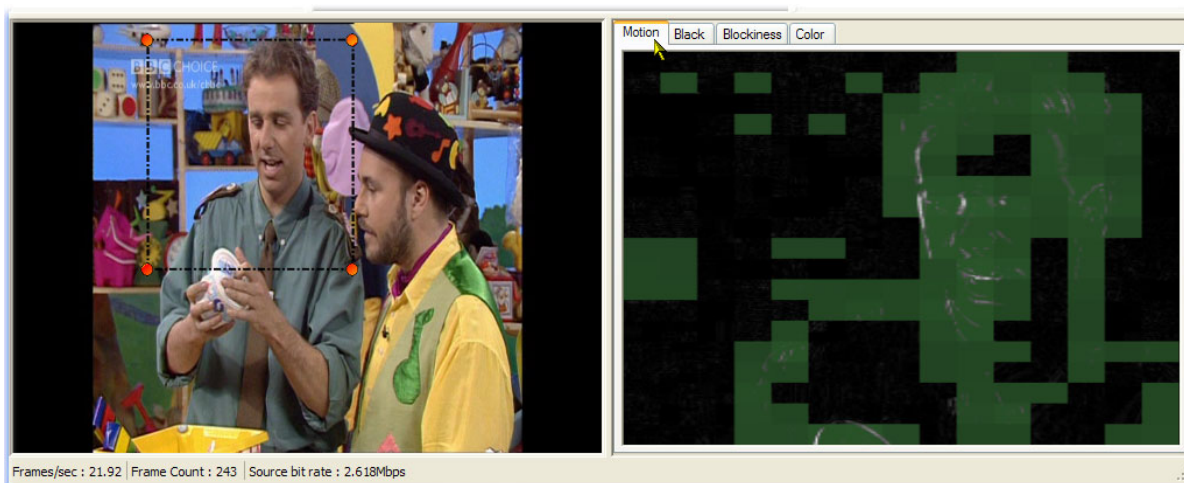
Configuring the VQS1000

Using the tabbed screens in the configuration dialog box, you can configure the VQS1000:
[Motion](#); [Black](#); [Blockiness](#); [Advanced](#); [File](#); [Log File](#).

Motion Test

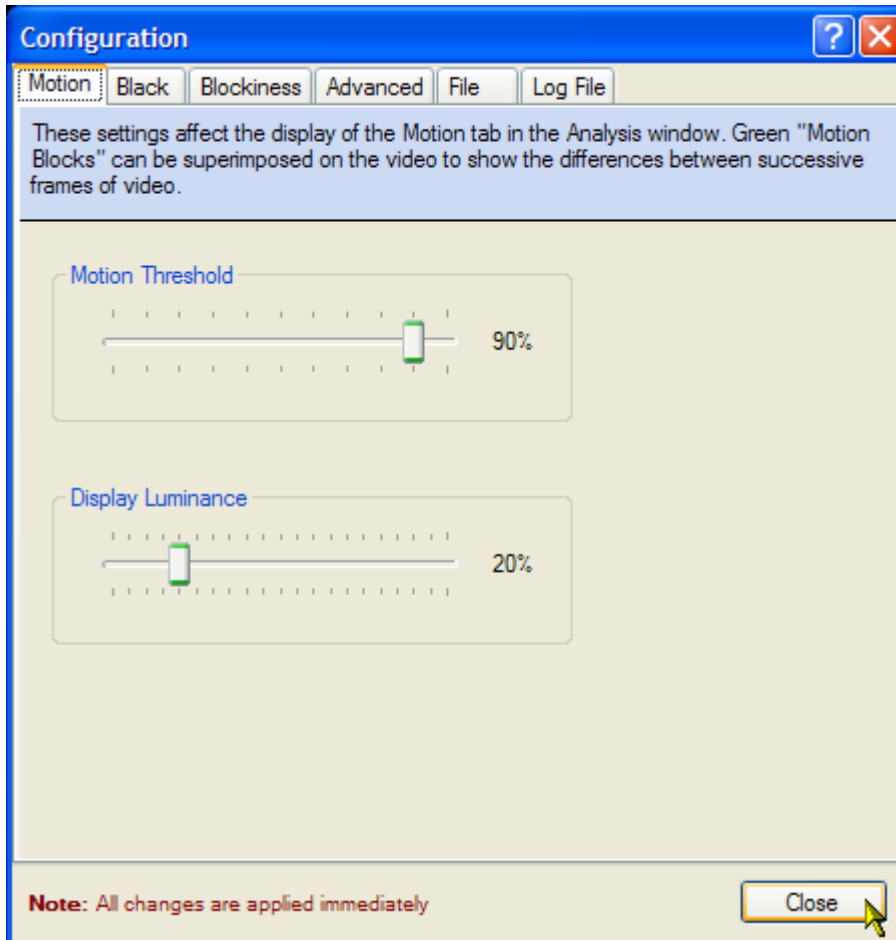
NOTE. The Motion test is referred to as Frozen Frame in the [Video Tests](#) panel.

By superimposing green blocks on the processed image view, this display shows the differences between successive frames of video. The extent of the processed image view is governed by the graticule selection made in the [source image](#) view. Adjust the motion detection and display luminance thresholds for the display of motion differences from the Configuration dialog box.



Configuration

Settings > Configuration > Motion tab: Use the controls on this tab to adjust the motion detection and display luminance thresholds.



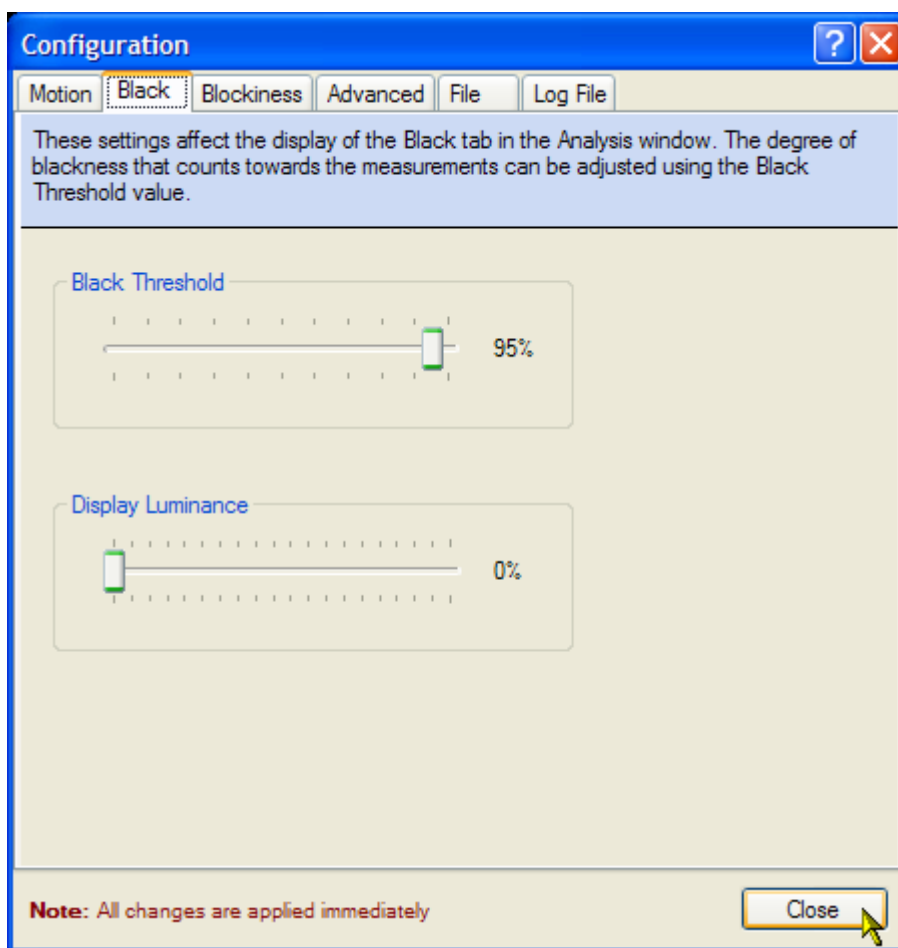
- **Motion Threshold:** Changes the sensitivity of the motion detection. Higher values require greater differences between frames before they are marked as motion between frames. Motion is marked by superimposing green blocks on the picture displayed in the Processed Image Motion tab.
- **Display Luminance:** Increases the luminance of the picture displayed in the Processed Image Motion panel. This allows detail in the darker areas of the picture to be examined more closely. Note that the motion calculation is not affected by this value.

Black Test

By superimposing green blocks on the processed image view, this display shows the amount of [blackness](#) in each [macroblock](#). The extent of the processed image view is governed by the graticule selection made in the [source image](#) view. Adjust the black and display luminance thresholds for the display of blackness from the Configuration dialog box.

Configuration

Settings > Configuration > Black tab: Use the controls on this tab to adjust the black and display luminance thresholds.



- **Black Threshold:** Changes the sensitivity of the blackness detection feature. Higher values make the detection feature less sensitive to blackness in a macroblock
- **Display Luminance:** Increases the luminance of the picture displayed in the Processed Image Black panel. This allows detail in the darker areas of the picture to be examined more closely. Note that the blackness calculation is not affected by this value.

Blackness

Pixels with luminance below a level defined as black for this test.

Macroblock

Square shaped groups of neighboring pixels.

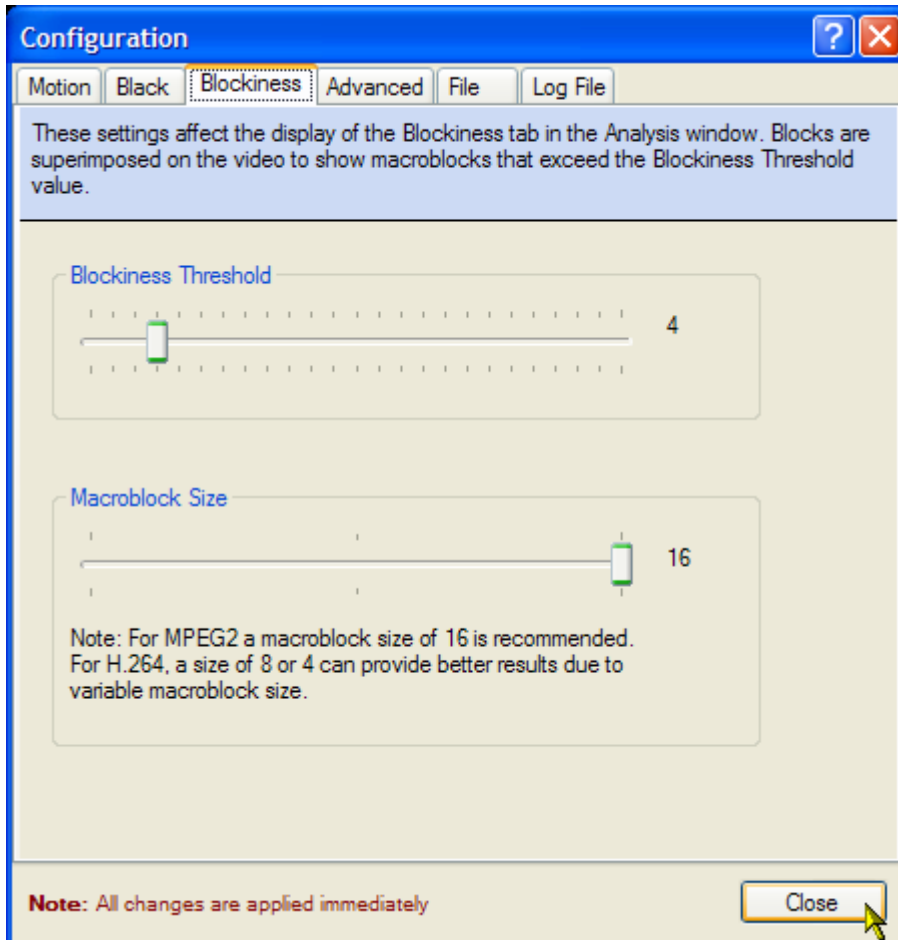
Blockiness Test

Blockiness or macro-blocking is evidence of limitations of the throughput of compression. It can be seen in the fine details of quickly moving images, where the video information requires more bandwidth to convey than has been allocated, forcing the encoder to discard detail. It may also happen when source material has suffered a transmission data loss and the resultant video has been re-encoded. Occurrences of blockiness are outlined with red in the processed image panel. The extent of the processed image view is governed by the graticule selection made in the [source image](#) view. Adjust the blockiness and macroblock size thresholds for the display of blockiness from the Configuration dialog box.



Configuration

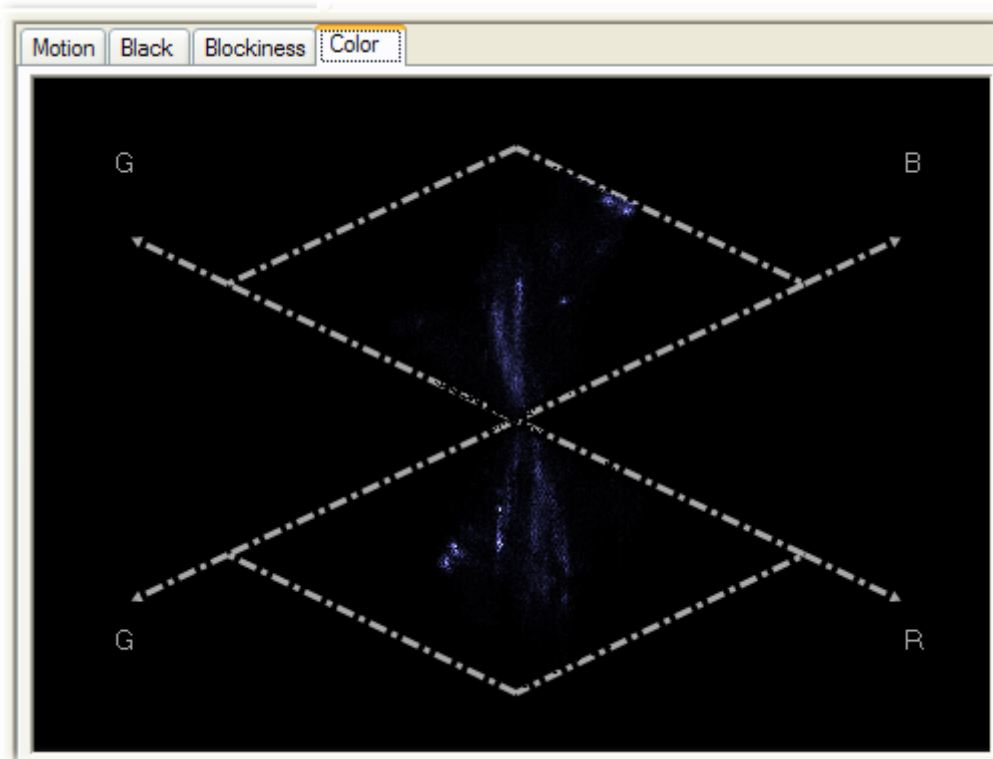
Settings > Configuration > Blockiness: Use the controls on this tab to adjust the blockiness and macroblock size thresholds.



- **Blockiness Threshold:** Changes the sensitivity of the blockiness detection feature.
- **Macroblock Size:** Changes the size of the macroblock that is used in the blockiness detection feature.

Color Display

The color display uses a diamond display to plot color data in terms of RGB (red, green, blue) relationships and limits. The upper diamond plots Green plus Blue versus Green minus Blue. The lower diamond plots Green plus Red versus Green minus Red. For a signal to be in gamut, that is, to predictably display all three color components, all signal vectors must lie within the G-B and G-R diamonds. If a vector extends outside the diamond, it is said to be 'out of gamut'. The extent of the processed image view is governed by the graticule selection made in the [source image](#) view.



There are no configurable settings for the color processed image.

Frozen Frame

See [Motion](#).

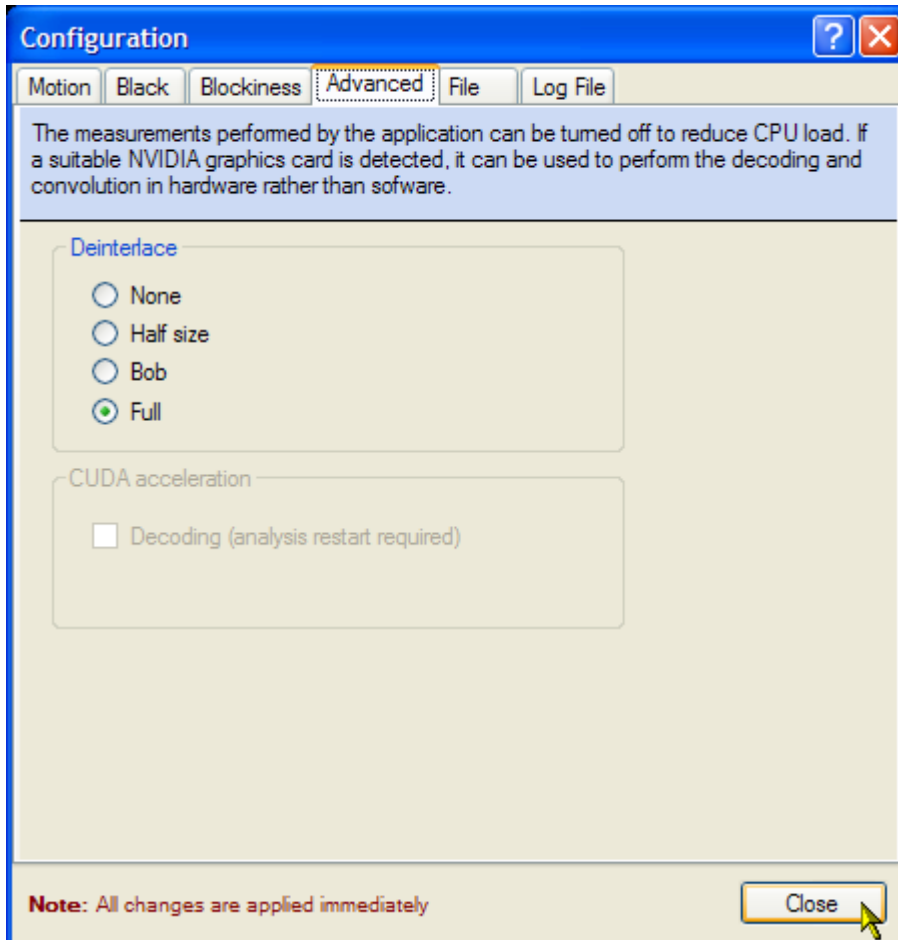
Video Bit Rate

NOTE. *Video bit rate tests are only available during real-time analysis.*

The bit rate is calculated as a running average over ten seconds. It is displayed in the status bar and monitored by one of the video test meters.

Advanced Configuration

Use the controls on this tab to control the load on the processor.



Deinterlace

Deinterlace: Each frame in a television picture consists of two consecutive fields (odd and even) interlaced. The option buttons in this panel allow you to choose the interlacing method used in displaying the [source image](#).

- **None:** No video interlacing is performed.
- **Half size:** Displays only one field; odd only or even only. The image is stretched to fill the image area in the interface.
- **Bob:** Displays and interlaces one field - odd only or even only - to create a normal sized frame.
- **Full:** Full interlacing is performed giving a 'normal' picture.

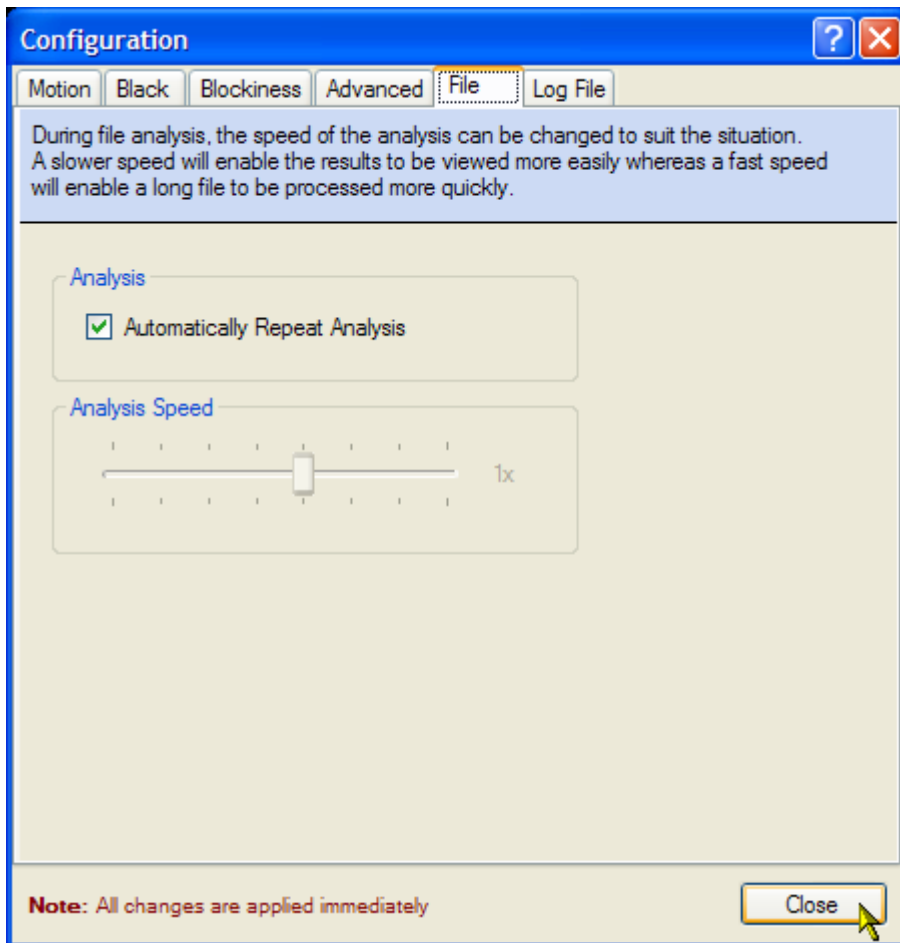
CUDA acceleration

This check box is enabled when a CUDA enabled NVIDIA graphics card is detected. The card performs the video decoding and reduces the load on the client PC.

Select the check box to enable decoding by the graphics card. Restart analysis for this setting to take effect.

File Configuration

Use the control on this tab to change the speed of analysis.



Analysis Repeat

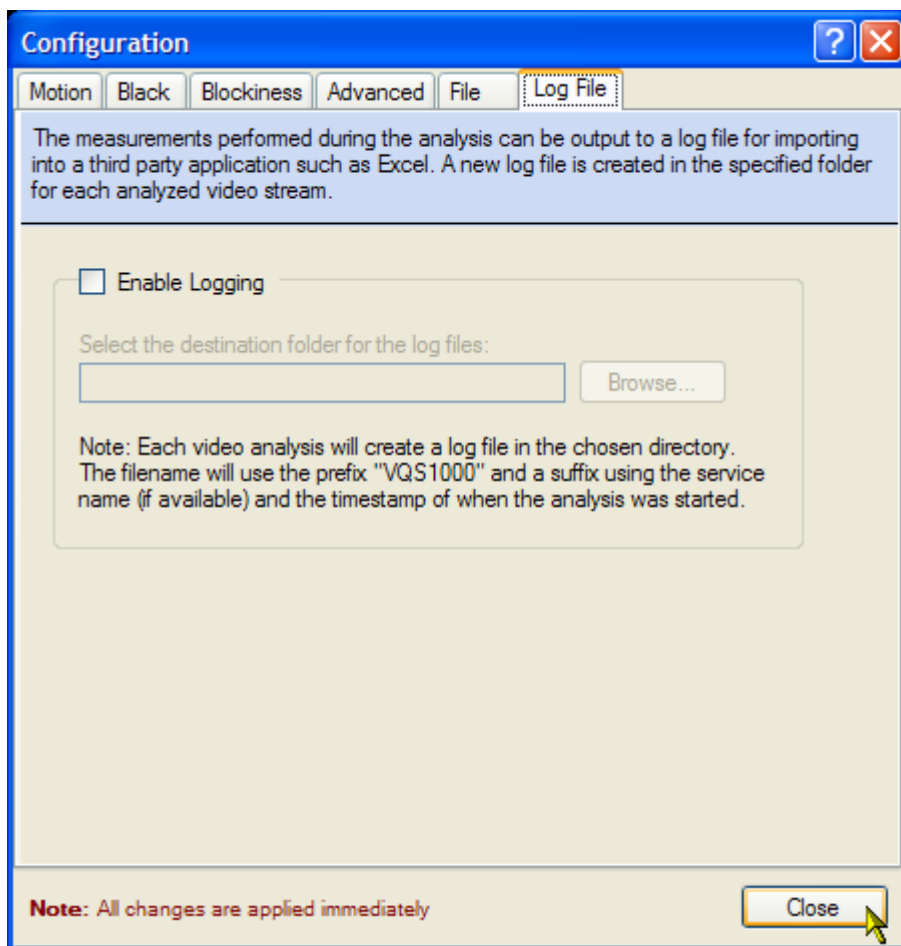
Select the Automatically Repeat Analysis check box to loop the analysis of offline files.

Analysis Speed

A slow speed enables the results to be viewed more easily; a fast speed enables long files to be processed more quickly. Analysis can be paused from the toolbar.

Log File Configuration

When the **Enable Logging** check box is enabled, a log file in xml format is created during analysis. This log file can be later opened in Microsoft Excel or similar product that can interpret the xml format. Browse to or enter the name of the folder or directory where the log file is to be stored. The file name will be prefixed with *VQS1000* and include a timestamp of when the log file started recording, for example 'VQS1000.201005071328.xml'.



A new log file is created each time that a new program is selected. See also [Stream Selection](#).

Polling

During real-time analysis of [MPTS](#) files backhauled from DTV Monitors, select **Settings > Use Polling** to analyze each service for between two and ten minutes.

DTV Monitor Controls. Where a traffic flow is established from a DTV Monitor, specify for how long each service should be monitor by adjusting the Service Dwell Time slider in the Real-time Analysis configuration dialog box. See [Real-time File Analysis](#).

About Tektronix VQS1000

The Tektronix VQS1000 Video Quality Test Suite information box displays the test suite version number. You will need this number if you call Tektronix for technical support.

Index

A

alarm parameters, 17

B

backhaul *See* file analysis,

real-time

black, 29

blockiness, 31

C

color, 33

configuration

advanced, 36

black, 31

file, 38

log file, 39

motion, 27

D

deinterlace, 36

dongle *See* license management

E

event log, 19

F

file analysis

offline, 9

real-time, 10

frozen frame *See* motion

G

graphs

trend, 15

I

installation, 3

L

license management, 7

log file, 39

M

motion, 27

O

option key string *See* license

management

overview, 2

P

parameters

alarm, 17

PC requirements, 3

polling, 40

pre-trigger buffer, 20

processed images, 23

area selection, 22

black, 29

blockiness, 31

color, 33

motion, 27

R

recording, 20

requirements, 3

S

screen display, 4

analysis menu, 4

event log, 6

help menu, 5

menu bar, 4

processed images, 6

settings menu, 5

source image, 6

stream information, 5

title bar, 4

toolbar, 5

trend graphs, 5

video tests, 6

view menu, 5

source image

graticule, 22

stream information, 14

stream selection, 12

T

tests

meters, 16

video, 16

trend graphs, 15

U

user interface *See* screen display

V

video bit rate, 35

video tests, 16