



**Elecard Video QuEst**  
**(Quality Estimator)**  
**User Guide**

**Version 1.0**

## Notices

Elecard Video QuEst User Guide

First edition: January, 2006

Date modified: August 20, 2008.

For information, contact Elecard.

Tel: +7-3822-492-609; Fax: +7-3822-492-642

More information can be found at: <http://www.elecard.com>

For Technical Support, please contact the Elecard Technical Support Team:  
[tsup@elecard.net.ru](mailto:tsup@elecard.net.ru)

Elecard provides this publication “as is” without warranty of any kind, either expressed or implied.

This publication may contain technical inaccuracies or typographical errors. While every precaution has been taken in the preparation of this document, the publisher and author assume no responsibility for errors or omissions. Nor is any liability assumed for damages resulting from the use of the information contained herein. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Elecard may make improvements and/ or changes in the product(s) and/or the program(s) described in this publication at any time.

Other company, product, trademarks, and service names are trademarks or service marks of other companies or corporations.

Copyright © 2006-2008 Elecard. All rights reserved.

## CONTENTS

|   |          |
|---|----------|
| <b>1. INTRODUCTION.....</b>                   | <b>4</b> |
| 1.1 PREFACE.....                              | 4        |
| 1.2 DESCRIBING ELECARD VIDEO QUEST.....       | 4        |
| 1.2.1 Supported Media Types.....              | 4        |
| 1.2.2 Features.....                           | 4        |
| 1.3 USING THIS GUIDE.....                     | 4        |
| 1.3.1 Purpose.....                            | 4        |
| 1.3.2 Abbreviations and Terminology.....      | 5        |
| 1.3.3 Topics Covered.....                     | 5        |
| 1.4 SYSTEM REQUIREMENTS.....                  | 6        |
| 1.4.1 Hardware Requirements.....              | 6        |
| 1.4.2 Software Requirements.....              | 6        |
| 1.5 LICENSING AND TECHNICAL SUPPORT.....      | 6        |
| <b>2. GETTING STARTED.....</b>                | <b>7</b> |
| 2.1 INSTALLING ELECARD VIDEO QUEST.....       | 7        |
| 2.2 UNINSTALLING ELECARD VIDEO QUEST.....     | 7        |
| 2.3 RUNNING ELECARD VIDEO QUEST.....          | 7        |
| <b>3. USING ELECARD VIDEO QUEST.....</b>      | <b>8</b> |
| 3.1 INTRODUCTION.....                         | 8        |
| 3.2 DESCRIBING ELECARD VIDEO QUEST GUI.....   | 8        |
| 3.2.1 Settings dialog.....                    | 9        |
| 3.2.2 Hot Keys.....                           | 10       |
| 3.2.3 Streams Comparison.....                 | 11       |
| 3.3 BASIC ELECARD VIDEO QUEST OPERATIONS..... | 11       |

# 1. Introduction

---

## 1.1 Preface

The Elecard Video QuEst (Quality Estimator) is a powerful tool designed for professionals and prosumers in the video compression field.

Elecard Video QuEst allows the user to calculate video quality metrics, such as PSNR, NQI, VQM, SSIM, DELTA, MSE and MSAD. It has been designed and implemented for reverse engineering and analysis.

## 1.2 Describing Elecard Video QuEst

The following section defines the specifications and features of Elecard Video QuEst. It includes definitions and descriptions of the supported media types.

### 1.2.1 Supported Media Types

- *YV12*
- *UYVY*

---

*Note: Elecard Video QuEst allows the video quality metrics calculation for any video stream, if the corresponding DirectShow® compatible decoder supporting the YV12 or UYVY output is registered in the system.*

---

### 1.2.2 Features

- Displays the comparison results
- Calculates video quality metrics (PSNR, NQI, VQM, SSIM, DELTA, MSE, MSAD)

## 1.3 Using this Guide

### 1.3.1 Purpose

This guide is intended to help the user utilize the Elecard Video QuEst. It describes the Video QuEst GUI, settings and functions and provides instructions for using Video QuEst.

### 1.3.2 Abbreviations and Terminology

The following section defines terms used throughout this document:

- **PSNR** - Peak Signal-to-Noise Ratio.
- **NQI** - New Quality Metrics.
- **VQM** - Video Quality Measurement Techniques.
- **SSIM** - Structural SIMilarity. This metric is based on measuring three components (luminance similarity, contrast similarity and structural similarity) and combining them into result value.
- **DELTA** - The value of this metric is the mean difference of the color components in the correspondent points of image.
- **MSE** - Mean-squared-error based metric.
- **MSAD** - The value of this metric is the mean absolute difference of the color components in the correspondent points of image.

---

*Note:* You can find some additional information about quality metrics at [http://www-ise.stanford.edu/class/ee392j/projects/projects/xiao\\_report.pdf](http://www-ise.stanford.edu/class/ee392j/projects/projects/xiao_report.pdf) (VQM), <http://www.cns.nyu.edu/~zwang/files/papers/uqi.html> (NQI) and <http://www.cns.nyu.edu/~lcv/ssim/> (SSIM).

---

- **YV12** - this is the format of choice for many software MPEG codecs. It comprises an NxM Y plane followed by (N/2)x(M/2) V and U planes.
- **UYVY** - YUV 4:2:2 (Y sample at every pixel, U and V sampled at every second pixel horizontally on each line). A macropixel contains 2 pixels in 1 u\_int32.

---

*Note:* For detailed definition of video formats please read Microsoft® DirectX® documentation or find the information at <http://fourcc.org/yuv.php>.

---

### 1.3.3 Topics Covered

- **Section 1: Introduction** – provides a general overview of Video QuEst and describes the purpose of the document and its contents.
- **Section 2: Getting Started** – describes how to install, uninstall and run Video QuEst.
- **Section 3: Using Video QuEst** – describes the Video QuEst GUI and provides instructions for comparing video streams, and viewing the results of comparison.

## 1.4 System Requirements

### 1.4.1 Hardware Requirements

- SSE-enhanced CPU (Intel® Pentium III, Celeron, AMD® Athlon, Opteron etc.)
- 128 MB RAM
- DirectX 7.0 (and higher) compatible VGA card

### 1.4.2 Software Requirements

- Windows® 2000/XP/2003 Server

## 1.5 Licensing and Technical Support

By installing, copying, or otherwise using the SOFTWARE PRODUCT or any UPDATES, you agree to be bound by the terms of the "Elecard" End-User License Agreement ("EULA"). This EULA is a legal agreement between you (either an individual or a single entity) and Elecard for the "Elecard" software product(s) accompanying this EULA, which include(s) computer software and may include "online" or electronic documentation, associated media, and printed materials ("SOFTWARE PRODUCT").

For technical support, please contact the Elecard Technical Support Team:  
[tsup@elecard.net.ru](mailto:tsup@elecard.net.ru)

For sales and licensing information contact the Elecard Sales Department:  
[sales@elecard.net.ru](mailto:sales@elecard.net.ru)

## 2. Getting Started

---

The following section details the procedures for installing and running Elecard Video QuEst.

### 2.1 Installing Elecard Video QuEst

The Elecard Video QuEst is supplied as part of the Elecard StreamEye Studio. The application is installed by means of the Elecard StreamEye Studio installer.

### 2.2 Uninstalling Elecard Video QuEst

The Elecard Video QuEst program can be uninstalled as part of the Elecard StreamEye Studio.

Click *Start* → *Programs* → *Elecard* → *Elecard StreamEye Studio* → *Uninstall Elecard StreamEye Studio* and follow the instructions of the uninstaller.

### 2.3 Running Elecard Video QuEst

To run Elecard Video QuEst click *Start* → *Programs* → *Elecard* → *Elecard StreamEye Studio* → *Elecard Video QuEst*.

## 3. Using Elecard Video QuEst

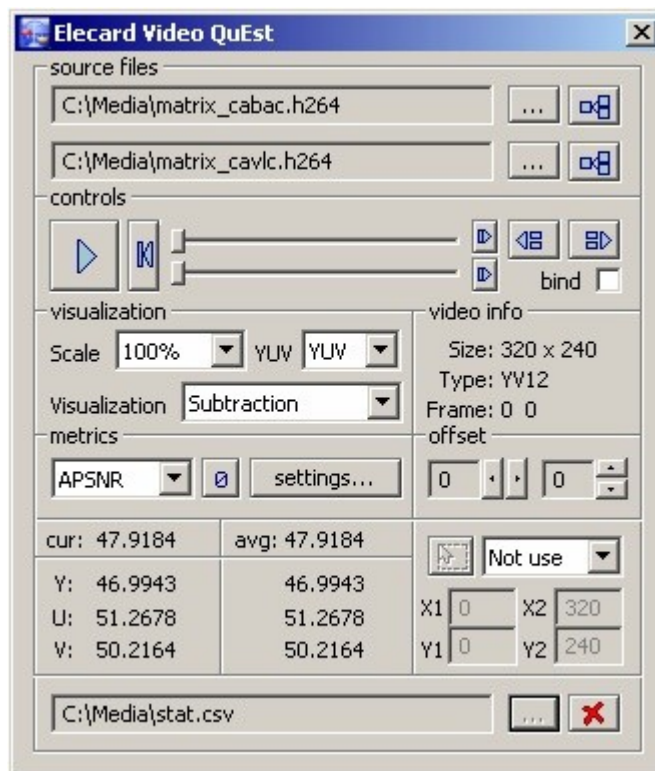
### 3.1 Introduction

The following section describes the Elecard Video QuEst GUI (graphic user interface), its features, and instructions for comparing video streams, and viewing the results of comparison.

### 3.2 Describing Elecard Video QuEst GUI


The following section describes the Elecard Video QuEst GUI.










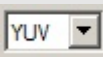


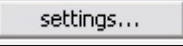



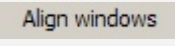


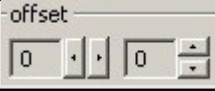
Figure 1. Elecard Video QuEst GUI



The following table describes the main window controls.

Table 1. Elecard Video QuEst Controls

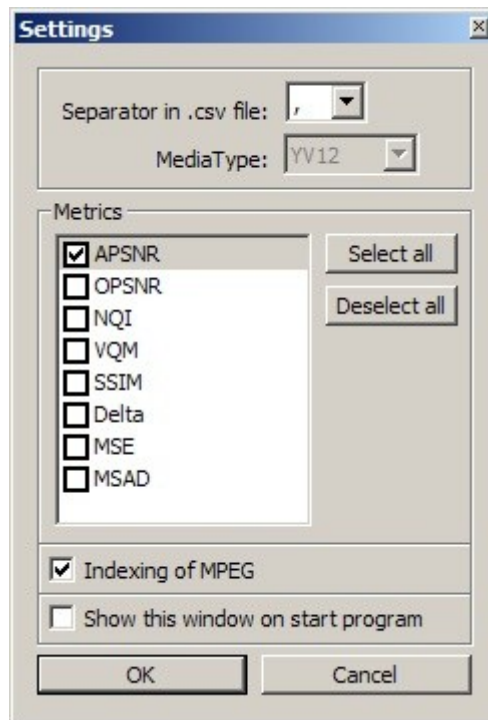
| Button  | Function  |
|---|---|
| <b>Open Stream</b> ...  | Opens a folder from which a file can be chosen. |
| <b>Show Graph</b>  | Shows the graph built for the selected stream.  |

| Button   | Function   |
|--|--|
| <b>Pointer</b>    | Marks the current playback and analysis position.  |
| <b>Go to the Start Position</b>   | Sets the pointer to the start position for playback.   |
| <b>Play</b>   | Starts playback of a file from the current position.   |
| <b>Pause</b>    | Pauses playback of a file.   |
| <b>Step</b> <br> | Steps forward by frame for selected stream.  |
| <b>Step</b> <br> | Steps forward by frame for both streams.   |
| <b>Scale</b> Scale 100%   | Scales all video windows.  |
| <b>YUV</b> YUV    | Selects the color component for visualization: <ul style="list-style-type: none"> <li>● <i>YUV</i> – full color is visualized</li> <li>● <i>Y</i> – only Y component is visualized</li> <li>● <i>U</i> – only U component is visualized</li> <li>● <i>V</i> – only V component is visualized</li> </ul>  |
| <b>Visualization</b><br>Comparison   | Selects the visualization mode: <ul style="list-style-type: none"> <li>● <i>No visualization</i> – video windows are not shown</li> <li>● <i>No result window</i> – <b>Result</b> window is not shown</li> <li>● <i>Subtraction</i> – <b>Result</b> window displays the pixel subtraction result for two pictures</li> <li>● <i>Comparison</i> – <b>Result</b> window displays the grade of pictures diversity using the different colors (black-blue-green-yellow-red)</li> </ul> |
| <b>Reset</b>    | Resets all metrics.  |
| <b>Settings</b> settings...   | Opens <b>settings...</b> dialog.   |
| <b>Dump file</b> ...    | Sets the .CSV-file for results dumping.  |
| <b>Stop results dumping</b>   | Stops results dumping.   |
| <b>Set cropping rectangle</b>   | Sets cropping rectangle using a mouse.   |
| Align windows   | This command in system menu aligns the all video windows positions with the position of the first video window.  |
| <b>Close</b>    | Closes the application.  |
| <b>Bind</b> bind <input type="checkbox"/>   | Synchronizes navigation in both streams. When the certain frame in the first stream is selected, the second stream is positioned to the correspondent frame.   |
| <b>Offset</b> -offset 0   | Shift of the second frame respectively to the first one.   |

### 3.2.1 Settings dialog

To open the **Settings...** dialog, right-click the title bar of the Elecard Video QuEst window and select the **Settings...** command or click the **settings...** button on the Elecard Video QuEst window.

Figure 2. Elecard Video QuEst GUI: Settings Dialog



This dialog allows the user to select data delimiter (commas or semicolons) for saving of the statistic information into .CSV–file. You can also select the preferable media type for connection with the “metrics calculator” component. The metrics selection for the video streams comparison is available too.

The **Indexing of MPEG** option allows the MPEG stream indexing, when the stream is opened. The indexing is useful for the precision positioning and is available, if the following components are installed:

- Elecard MPEG Demultiplexer
- Elecard Indexator
- Elecard IndexReader.

If the input stream contains the YUV raw data, the **Parameters** dialog box appears. You are required to specify the input stream format and frame size.

### 3.2.2 Hot Keys


The following table describes the Elecard Video QuEst hot keys.

Table 2. Elecard Video QuEst Hot Keys

| Hot Key | Description  |
|---------|--|
| ALT+1   | Switches the video display to the first video stream.  |
| ALT+2   | Switches the video display to the second video stream. |
| ALT+3   | Switches the video display to the result window.       |
| ALT+4   | Switches to the main application window.               |

### 3.2.3 Streams Comparison

In the **Visualization** area there are two list boxes. One of them allows the user to specify which color components should be displayed in the video window: YUV, Y, U, or V. Another list box allows selecting the display options for the comparison result with the: **None**, **Subtraction**, **Comparison**. The comparison result is displayed in the **Subtraction** window.

The controls in the **Crop** area allow the user to specify whether the crop function should be used. There are three options: **NotUse** – statistic data is collected for the whole frame, **NormalCrop** – statistic data is collected for the selected rectangle of the frame, and **InverseCrop** – statistic data is collected for the whole frame, except for the selected rectangle. You can set cropping rectangle using a mouse (**Set cropping rectangle**  button).

The statistic information is displayed at the bottom of the main window: current playback values arranged by color space components (left column), average playback values arranged by color space components (right column), and the average values of the left and right columns.

## 3.3 Basic Elecard Video QuEst Operations

To compare the streams and estimate the quality:

1. Start the Elecard Video QuEst by clicking “*Elecard Video QuEst*” from the **Start** menu.
2. Select the streams for comparison.
3. Select video quality metrics (APSNR, OPSNR, NQI, VQM, DELTA, MSAD, SSIM, MSE) for streams comparison and adjust all the required settings using the **Settings** dialog. Select the **Indexing of MPEG** option, if the indexing is needed and available.
4. If cropping is required, activate and adjust it using controls in the **crop** area.
5. Click the **Play** button to start playback and analysis.