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Quality Explorer™ R&S® DVQ-B1

Comprehensive analysis of MPEG-2 elementary streams and quality levels

- ◆ Comprehensive content analysis of MPEG-2-coded video elementary streams in any format
- ◆ Automatic detection of coding errors
- ◆ Quality Monitor: logging of quality levels with graphical display and storage to data media
- ◆ Elementary Stream Analyzer: clear presentation of elementary stream analysis results
- ◆ User-friendly operation
- ◆ Use without the R&S®DVQ

**ROHDE & SCHWARZ**

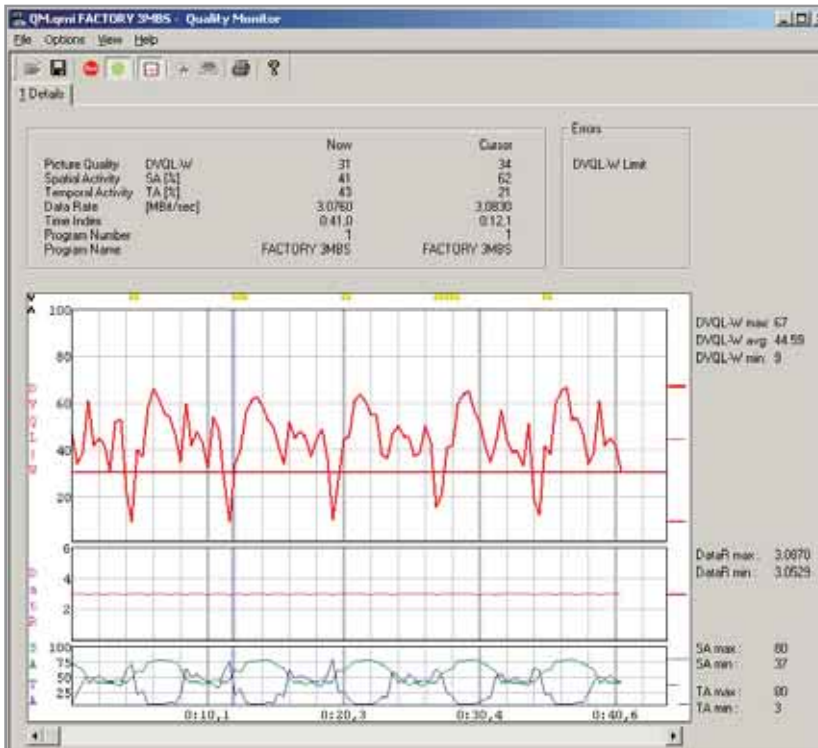


FIG 1: Quality Monitor for realtime logging and graphical display of quality levels determined by the R&S®DVQ

The **Elementary Stream Analyzer** analyzes the content of MPEG-2-coded video elementary streams. To make this possible, the R&S®DVQ has a 32 Mbit internal buffer for storing the elementary stream to be analyzed. The elementary stream buffered in the R&S®DVQ can also be stored as a file.

Alternatively, elementary streams in file format can be analyzed. Therefore, Quality Explorer™ R&S®DVQ-B1 can be used without the R&S®DVQ on other platforms that provide an elementary stream.

A standard user interface is used to remote-control the R&S®DVQ. The software runs on 32 bit Windows operating systems on any PC or laptop. The RS-232-C interface or Ethernet is used to connect to the R&S®DVQ. The easy-to-operate software as well as the clear presentation of results ensure speed and success right from the start.

Quality Explorer™ R&S®DVQ-B1 is a software package that performs comprehensive analysis of MPEG-2-coded elementary streams. It can be used together with the R&S®DVQ on an external PC. Or it can analyze elementary streams from data media (e.g. hard disk, CD-ROM) on its own without the R&S®DVQ.

R&S®DVQ-B1 consists of two independent tools:

The **Quality Monitor** reads the quality levels provided by the Digital Video Quality Analyzer R&S®DVQ in realtime via the remote-control interface. It displays the quality levels graphically as a histogram. Archiving on data storage media is also possible.

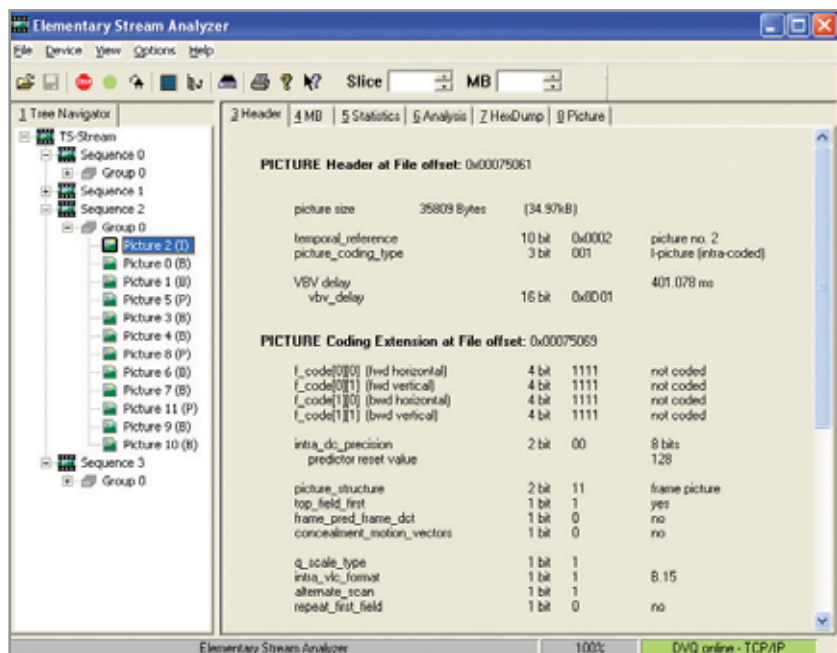


FIG 2: Clear display of header information with Elementary Stream Analyzer, shown here by the picture header

Quality Monitor

The following quality levels determined by the R&S®DVQ are simultaneously displayed as a graph over time (FIG 1):

- ◆ Spatial activity (SA)
- ◆ Temporal activity (TA)
- ◆ Data rate in Mbit/s
- ◆ Subjective quality level DVQL-W (digital video quality level weighted) to SSCQE

Distortions such as picture freeze, picture and audio loss or loss of sync are shown by different colour labels above the diagram.

The diagram shows a time-limited section of the read-out data. The displayed time section can be changed at any time.

While on screen, all results can also be stored to any data media, e.g. hard disk. Data is output in the universal *.CSV format (comma-separated values), making further processing with common software packages extremely easy.

Elementary Stream Analyzer

Video elementary streams are analyzed in conformance with the guidelines laid down by the Motion Picture Experts Group in the MPEG-2 standard. Coding errors are clearly marked at the appropriate position. A red bar in the status bar at the bottom of the window alerts the user.

The graphical user interface consists of well-designed windows. The following display panels are available:

Tree navigator

All elementary stream contents are displayed as a tree. Two choices are available for picture sequence: coding or playback sequence (see Figs. 2 and 3).

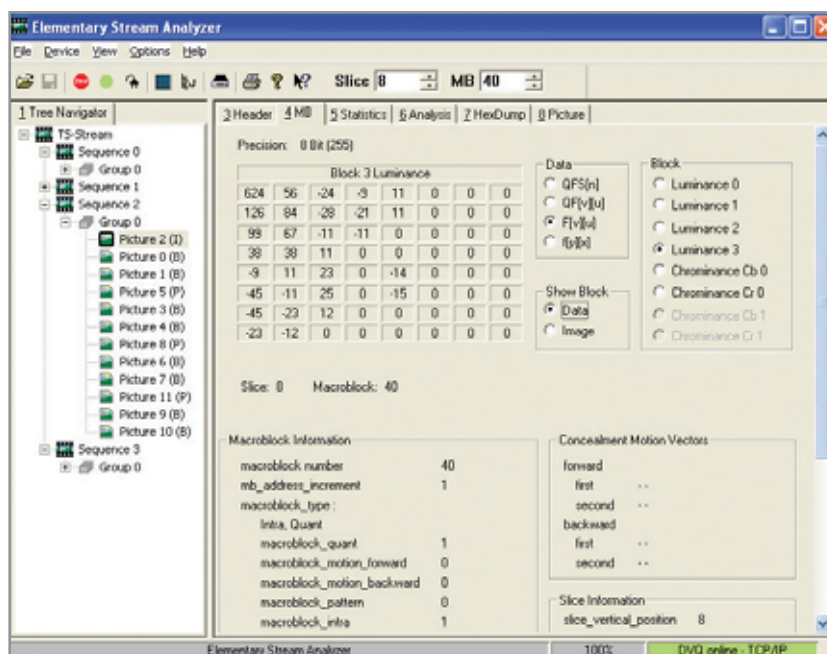


Fig. 3: Comprehensive display of all macroblock data satisfies any information requirement

Header

The header and extension information of the following elementary stream elements is displayed in a well-organized and easy-to-understand manner:

- ◆ Sequence
 - Header
 - Extension
 - Display extension
 - Scalable extension
- ◆ Group of pictures header
- ◆ Picture (as shown in Fig. 2)
 - Header
 - Coding extension
 - Quant matrix extension
 - Display extension
 - Spatial scalable extension
 - Temporal scalable extension
 - Copyright

MB (macroblock)

Display of all data in a selected luminance or chrominance block (Fig. 3):

- ◆ All coefficients from coded, quantized form (QFS) in the frequency domain back to the time domain (f(x,y))
- ◆ Quantization table
- ◆ Slice information
- ◆ Motion vectors (with predicted blocks)

There are two ways to select the macroblock: by numeric entry in two fields of the toolbar (Fig. 3; slice, MB) or by clicking the mouse in a separate window that automatically displays the decoded picture in the background (Fig. 4).

Statistics

Further statistics about the four luminance blocks of the previously selected macroblock can be displayed here.



Fig. 4: Directly selecting the macroblock in the decoded picture is extremely easy

Analysis

This panel shows the distribution of the following properties of individual macroblocks:

- ◆ Value of the DC coefficient (averaged luminance)
- ◆ Number of bits used per macroblock
- ◆ Number of coded blocks per macroblock
- ◆ Type of macroblock
- ◆ Number of motion vectors per macroblock
- ◆ Motion vectors (Fig. 5)

Three different display modes are available:

- ◆ Squares of differing brightness correctly positioned at the picture level

- ◆ Motion vectors as arrows of different lengths with direction of motion (Fig. 5)
- ◆ Distribution in the form of a histogram

HexDump

This panel displays the raw values of the selected header and macroblock in hexadecimal notation.

Picture

This panel displays the decoded content for I-, P- and B-coded pictures via a software decoder for individual pictures (SDTV: see title figure).

Applications

The Quality Monitor is an ideal add-on to the R&S®DVQ. Without the Quality Monitor, the R&S®DVO's built-in display and the on-screen display (OSD) in the decoded video picture offer only limited resolution for displaying quality levels.

Thus, when it is essential to record, store and analyze parameters determined over an extended period of time, the Quality Monitor is the ideal choice.

The R&S®DVQ quality data can be analyzed on any PC platform. The Elementary Stream Analyzer is an indispensable tool when video coding and its effect on picture quality have to be evaluated. This is particularly true for development and design but also when using MPEG-2 video encoders.

The Elementary Stream Analyzer can quickly localize any coding detail and perform value and correctness checks in a reproducible, transparent and clear manner.

Comprehensive statistics can be generated at the macroblock and picture level, making it possible to detect further MPEG-2 coding trends.



Fig. 5: Display of motion vectors of predicted frames (B, P), superimposed on decoded picture

Specifications

Elementary Stream Analyzer	
MPEG-2 formats	MP@ML (SDTV) 422P (SDTV) MP@HL (HDTV)
System requirements	
32 bit operating system (Windows)	Windows 95/98/NT/2000/XP
PC or laptop	min. Pentium I/100 MHz
RAM	min. 32 MByte
Free hard disk space	approx. 20 MByte
Drive	CD-ROM
Interfaces	serial RS-232-C Ethernet (10BaseT) parallel printer interface

Ordering information

Designation	Type	Order No.
Quality Explorer™	R&S®DVQ-B1	2079.7151.02

Equipment supplied

CD-ROM with setup program, serial cable for connecting the R&S®DVQ to the PC, dongle for parallel printer interface, manual



More information at
www.rohde-schwarz.com
(search term: DVQ-B1)



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