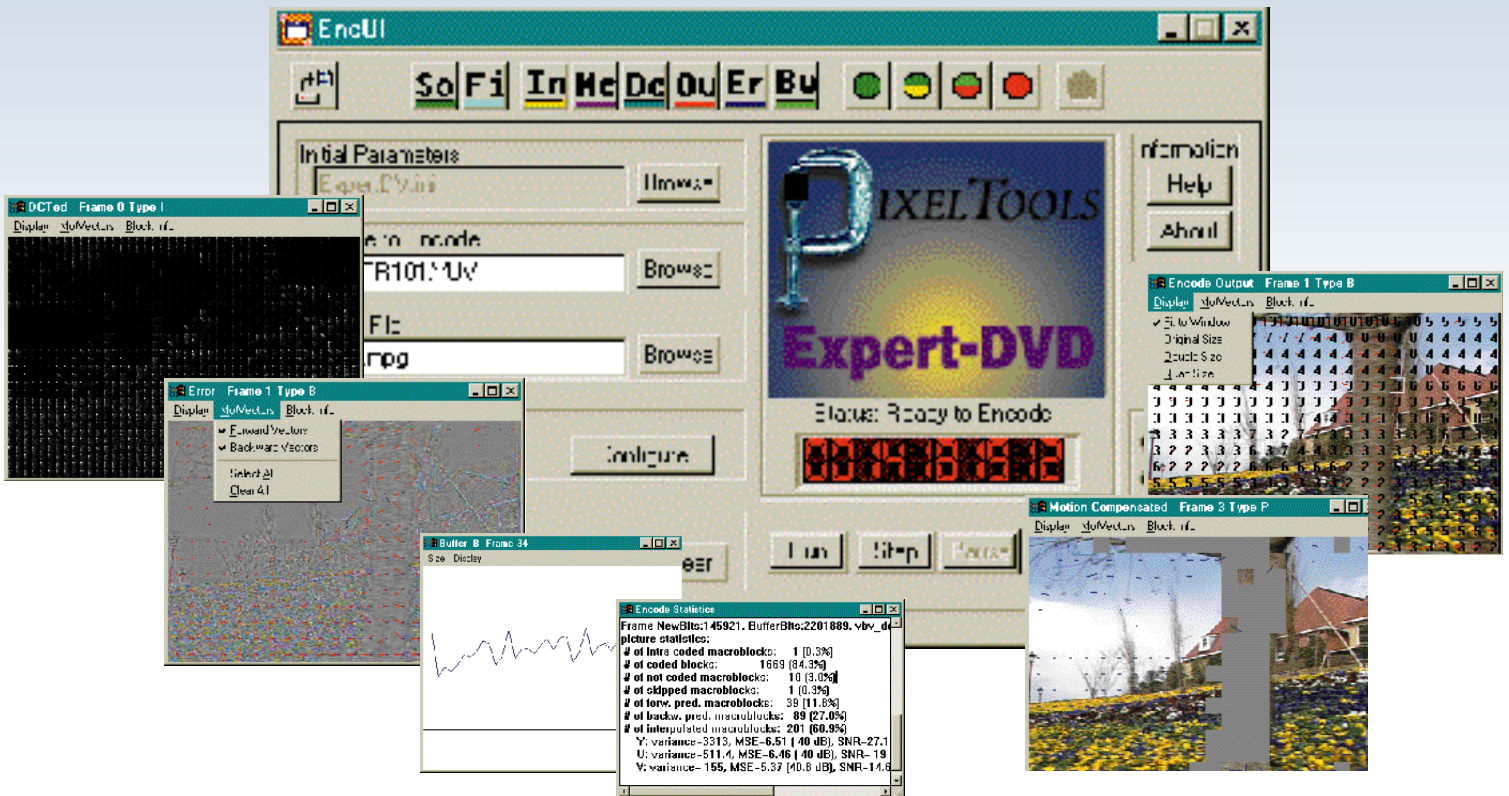


DVD Software Video Encoder

Expert-DVD is a **multi-pass** ultra high quality MPEG-2 software video encoder that creates **variable bit-rate** content for DVD authoring. Captured or animated video frames and digitally edited clips can be compressed without leaving the computer.

Expert-DVD includes extensive observability and controllability features that facilitate the generation of feature length compressed video for DVD production at a quality level that is indistinguishable from the original video source. An **analysis** pass evaluates encoding complexity and scene changes. The final encoding pass can be customized for scene complexity and entry points.



The Expert-DVD

Accepts field and frame images in all common file formats including:

BMP, YUV, Y-U-V, TGA, AVI, DIB, D1, ABEKAS, and PPM file formats

Optimized for speed on Pentium Processors

SIF format (352x240) 24 frame/sec encoding at 4x real time on Pentium II 333

D1 format (720x480) 24 frame/sec encoding at 17x real time on Pentium II 333

Produces IPB MPEG-2 bit streams fully compliant with ISO-13818-2

Also produces IPB MPEG-1 bit streams fully compliant with ISO 11172-2

Provides functions for user enhancement of an area within a frame or over a set of frames

Enables user access to most MPEG-2 encoding control parameters

Includes extensive pre-processing of frames including filtering and downsampling

Dynamically modifies pre-processing and encoding parameters per Edit Decision List (EDL) file

Includes batch mode to provide for automatic encoding and inter-operation with PixelTools' companion products



Expert-DVD is a simple point and shoot product that produces exceptionally high quality MPEG compressed video using the default parameter settings. Encoding is accomplished by pointing the file browser to the first file of a sequence of frames to be compressed and pressing start. The extensive set of pre-processing and encoding controls found in Expert-DVD coupled with the comprehensive visibility into the actual encoding process permit even difficult sequences to be compressed with a minimum of compression artifacts.

Motion picture complexity varies by several orders of magnitude and Expert-DVD can adapt to all video scenery. Since Expert-DVD is not constrained by real-time encoding requirements, it takes as much time as required per frame to provide precise video compression.

Expert-DVD's analysis pass coupled with the Expert-DVD's Edit Decision List (EDL) file utilization permit optimization of encoding bits throughout an entire DVD disk. The optional preliminary analysis pass provides detailed graphical and textual information into the encoding complexity of the subject content on a frame by frame and scene by scene basis. Expert-DVD's EDL control and analysis features enable optimization of MPEG encoding on a scene by scene basis. Multiple passes can be made on the same difficult scenes to produce the highest visual encoding quality. The visual and quantitative data, recorded by Expert-DVD, can be utilized to compare relative encoding quality. Optimum encoding parameter settings can then be reused.

Intra-frame encoding enhancements are also available with Expert-DVD. Regions within a frame or within a group of frames can be selected prior to encoding with the EDL file and/or interactively during encoding using the mouse. The encoding quantization, that determines how much of the video data is kept for that region, can then be modified. Sharp edged text can retain its sharp edges after encoding. Expert-DVD also includes capabilities to apply pre-defined or user-defined filters inside or outside of these regions. Using the above two tools, difficult but important areas within a group of frames can be enhanced by lowering the quantization and adjacent less important areas can be filtered to reduce MPEG artifacts.

Expert-DVD is optimized for speed on all Pentium processors resulting in the fastest DVD video software encoding possible.

Features

Variable bit rate encoding:

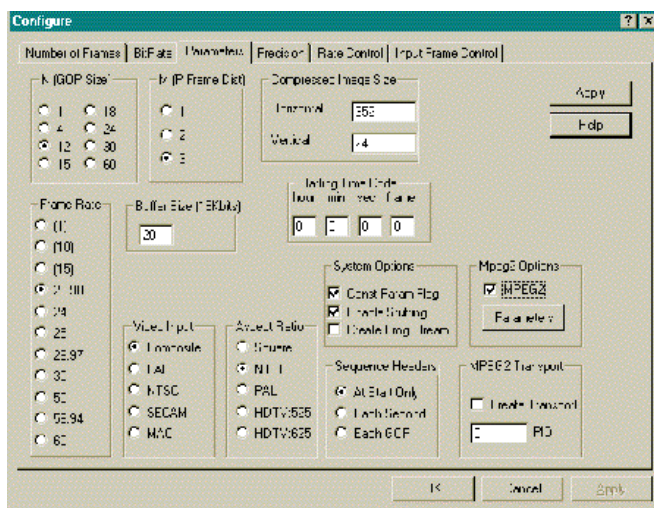
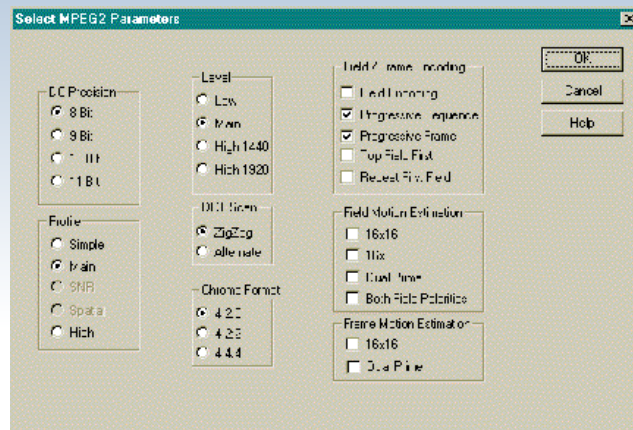
Expert-DVD provides the ability to change the encoding bit-rate scene by scene throughout an encoding session. This capability provides more bits (resulting in higher quality) in scenes that are more difficult to encode, and less bits in those scenes that are easy to encode.

Variable quantization encoding:

The quantization values, which determine the amount of compression per encoding block, can also be modified on a scene basis, frame basis, or sub-frame basis. Pre-defined or user-defined quantization tables can be changed on scene or GOP boundaries. Quantization tables customized for specific bit-rates and encoding complexity are provided with Expert-DVD. These tables can also be used as templates for building complete custom tables for specific encoding situations. In addition, the quantization within each frame can be modified to increase or decrease the amount of data that is discarded in that region.

Bit Rate Analysis:

The optional analysis pass details the actual encoding difficulty of video content. The resultant bit-rate profile and scene change analysis is printed in a text file and plotted on a chart. It is not often obvious which scenes are more or less difficult to encode, and so the analysis pass provides the encoding complexity information. Encoding complexity, combined with knowledge of the relative importance of each scene, provides a good guideline for the allocation of bits for the video and graphics components of a DVD disk.



Automatic Scene Change Detection:

Expert-DVD can, when selected, detect scene changes throughout a video and force the start of a new encoding block (GOP) coincident with the new scene. This produces the highest quality video by keeping the I blocks (MPEG key frames) as far apart as possible. I blocks consume the largest number of bits.

Scene Adaptation:

An Edit Decision List (EDL) file, containing parameters that will be changed throughout the encoding session and the frames at which the changes occur is read by Expert-DVD. Variable GOP structures can be specified in this file to support frame accurate GOP entry points for DVD authoring. Slight or significant quantization adjustments can be made to user defined areas within user defined frames. Expert-DVD EDL operations include a powerful set of preprocessing options as well. User defined filters can be applied to selected scenes, frames, or user defined regions within a selected frame!

Spliceable Segment Encoding:

Expert-DVD can encode a segment or a scene with specified starting and ending buffer states. Segment sizes can be of any length. This allows scenes or segments to be removed, moved, and re-inserted to create legal MPEG video without re-encoding. This also prevents buffer over-flow or under-flow in DVD jumps between segments.

Region or Field Filtering:

User defined or included standard filters can be applied to a designated region of a specified sequence of frames. The Expert-DVD preprocessing engine can apply the selected filter inside or outside the user selected region. This feature is used to enhance a region of interest within frames or to minimize artifacts outside of the region of interest.

Pre-Processing:

Expert-DVD includes extensive frame down-sampling and frame conversions in a pre-process operation prior to MPEG encoding. Expert-DVD inputs frames directly from digital disk recorders and frame grabbers. Pre-processing options include chroma down-sampling from 4:2:2 to 4:2:0, D1 to SIF, VGA to SIF, and SIF or QSIF format conversions. The output of the pre-process operation can be saved to files or just viewed without encoding.

Closed Caption Insertion:

Closed caption data (or any other data) can be inserted into designated sections of the video stream in the user data MPEG field.

Overlay Mixing:

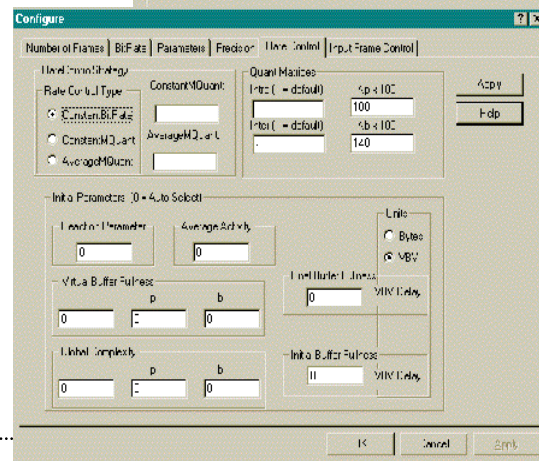
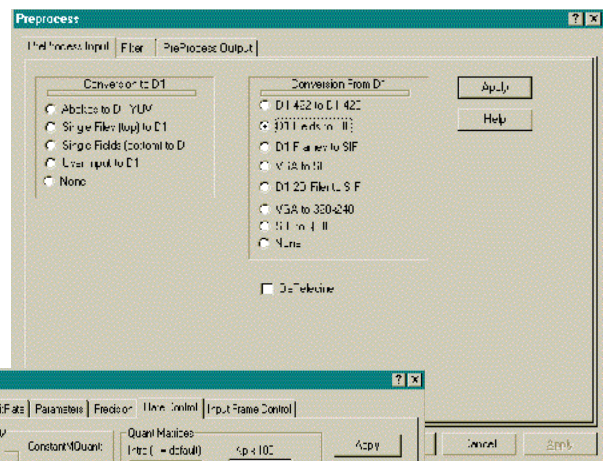
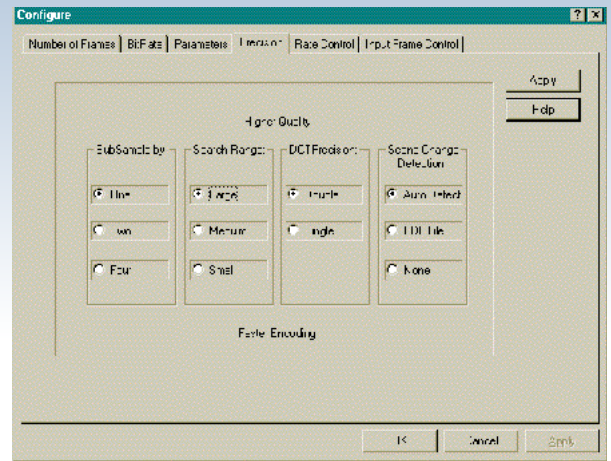
Expert-DVD can mix a logo bitmap or an animation with the underlying MPEG. The logo can be placed in any location within the MPEG video frame and with any mix level.

Enhanced for speed on all Pentium Processors:

Computationally intensive components of Expert-DVD are written in low level code that is optimized for speed on any Pentium processor and utilizes the dual processing pipes that exist in all Pentium processors. Expert-DVD recognizes workstations that support the MMX instruction set and utilizes the eight parallel processing pipes in MMX machines. Expert-DVD high level control is written as threads that take advantage of multi-processor environments.

Batch Mode Operation:

Batch mode operation of Expert-DVD provides for automatic encoding of multiples files and allows interactively with PixelTools companion products.



Specifications:

Operating Systems:

Runs under Windows-NT, Windows95, Windows98, and Silicon Graphics Irix 6.2
Manages files larger than 2Gbytes under the NTFS and XFS file systems

Input:

BMP, YUV, Y-U-V, TGA, AVI, DIB, D1, ABEKAS, and PPM formats
Fields and frames in sizes from 16x16 to 8192x8192 pixels
Single frame or frame sequence to produce a longer stream
Frame sequences stored on multiple drives
Files output from other programs or drag and drop
Initialization file containing session specific parameters
EDL file describing scene by scene parameters
Scene Change file containing known scene changes

Preprocessing:

Standard or user defined 7x7 kernel filters
Full frame or regional filtering
D1, VGA, or SIF downsampling
Logo or graphic animation mixing with video

Analysis

Bit rate profile plot and text
Scene change frame list
Graphical overlays over decoded frames of motion vectors, quantization values, block and frame decision types. Buffer fullness plot.
Statistical details of detected encoding parameters

Encoding:

High, Main, and Low Level encoding.
High, Main, and Simple Profile encoding.
Optional MPEG-2 transport packetizing.
8-11 bit selectable DC precision.
Zig-Zag and Alternate DCT scan.
Dual Prime, 16x16, and 16x8 field and frame search
Temporal down-sampling to 1 frame per second
Adjustable IPB frame patterns (ie, M and N values).
Selectable sequence header insertion rates
Modifiable start time code.
Target decoder buffer sizes from 1 to 1000 vbv

Constant bit rate or constant quantization
4:2:2 and 4:2:0 Chroma formats
Compresses from 16x16 to 8192x8192 pixel frame sizes
Supports all 18 HDTV formats
Scene by scene bit rate change capability
Automatic or manual GOP forcing
Segment encoding to specified buffer states
Encoding precision control
Operator control of regional quantization within selected frames
Closed caption text insertion
Compete control over encoding precision to optimize session for highest quality or highest encoding speed
Variable GOP structure
Frame Accurate GOP Entry points

Output:

Bit-rates from 1Kbits/sec to 30Mbits/sec.
Frame rates from 1 frame/sec to 60 frames/sec.
IPB, IP, or I-frame only streams.
Results of pre-procession without encoding
Recommended bit-rate to log file in Analysis mode
List of detected scene changes to SceneChange file
Encoding statistics to log file
Current parameter configuration

Frame Viewing:

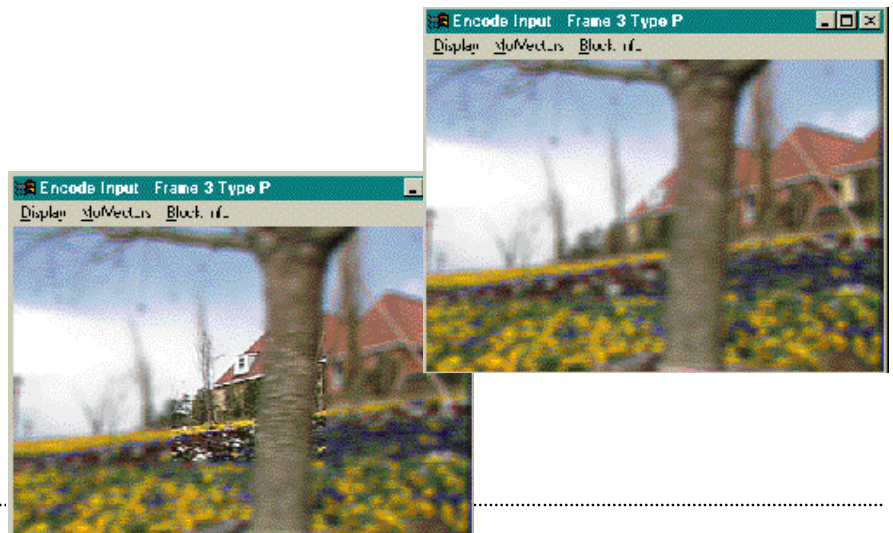
24-bit color frame windows with zoom and roam
Frames and fields visible at Input, Motion Compensated, DCTed, Compressed, and Error states
Graphic windows displaying buffer fullness and encoding statistics

Frame Overlays:

Motion Vectors, Block Decision Types, Quantization Values, and Block Activity

User Help Facilities:

Fly-over Hints
Context sensitive help for each dialog and menu item
Comprehensive Users Manual with Expert encoding hints
Includes sample D1 and SIF un-encoded source frames



PIXEL TOOLS

408 - 374 - 5327 • www.pixeltools.com