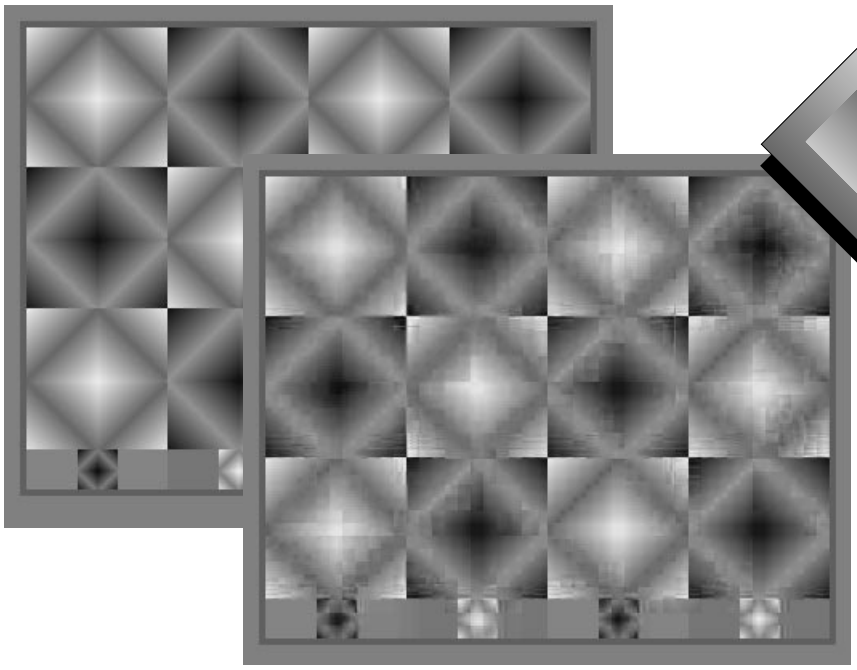
MPEG-2 Digital Video Encoder Stress Test Patterns

E6285A



A New Companion Encoder Test Tool for the E6277A MPEGscope Test System

Stress test patterns detect and visualize areas of potential encoder shortfalls. This example shows “blocking effects” stress test pattern before and after passing through an encoder.

Utilizing the expertise of its world-renown HP Labs research and development facility, HP has developed a simple, effective tool set for systems designers and engineers seeking to debug, test and optimize the performance of digital video encoding algorithms and encoders: the E6285A MPEG-2 Digital Video Encoder Test Patterns. The E6285A is a professional video tape containing a series of synthetically produced test patterns, designed specifically to provide a standardized and objective test methodology for digital video encoding.

Encoder testing is critical to ensuring acceptable system performance and equipment interoperability. While decoding follows defined standards, digital video encoding varies significantly as different encoder manufacturers attempt to develop proprietary algorithms that deliver optimal video quality with minimal bandwidth usage.

The reliable, deterministic testing methodology offered by the E6285A Test Patterns are valuable for a variety of applications, including:

- Optimization of encoder algorithms in systems under development
- Stress testing of digital video systems
- Comparative evaluation of competitive products
- Assessment and monitoring of relative digital video output quality

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Each of the E6285A's synthetic test patterns has been created to stress a single potential source of digital encoding problems, or artifacts, within a short sequence. This approach to encoder testing offers several advantages over the use of extended natural scenes or common video test patterns.

It allows users to stress specific encoding challenges in isolation, which enhances the visibility of individual artifact types and sources. In addition, the synthetically generated patterns– unlike natural scenes– are entirely deterministic, which increases the reliability of quality evaluation.

Finally, since the test patterns isolate specific stress situations in short sequences, tests are readily repeatable, and the time required for testing is significantly reduced.

The features of the E6285A include:

- Algorithmically generated synthetic patterns delivered on videotape in the format of your choice.
- Pattern selection which emulates basic features of natural scenes and brings out specific digital video artifact types.
- Completely deterministic patterns, for simple, reliable quality evaluation.

The test pattern suite includes:

- Luminance and chrominance rendition-moving colored bars allow testing of luminance and chrominance rendition, as well as examination for color clipping.
- Edge rendition-Alternating images of a rotating square and moving circle change color over time; contours are antialiased, to test the effects of quantization and mosquito noise.
- Blocking effects-A series of squares whose dimensions decrease with time. Each square is filled with a slowly varying function of luminance that favors the appearance of blocking affect due to the use of block DCT.
- Isotropy-White noise is added to a zone plate pattern for analysis of encoder isotropy in the presence of noise.
- Abrupt scene changes.
- Noise test-Noise is added as a function of time on a still picture, to examine the influence of increasing noise on the system.
- Text rendition-determines how well the system copes with text in different font sizes.
- Texture rendition-detects texture deviation due to encoding artifacts, by presenting a time-varying, texture-uniform scene.
- Time aliasing and motion tracking-Test patterns contain both linear and nonlinear motion at various speeds, and simulate zooming and panning. Used to test for artifacts arising from poor motion estimation and compensation.
- Buffer control-Complex images are inserted into a test sequence to evaluate the performance of the bit rate regulation algorithm, to detect artifacts caused by buffer overloading.

Together, these patterns offer a superior source for faster, easier and focused evaluation of encoder video quality, without the drawbacks and subjectivity inherent in use of natural scenes or other commercial test patterns. Whether the challenge is literative development and enhancement of encoding equipment, or selection of the best possible equipment for DV networks, HP's Encoder Stress Test Patterns can improve decision making and speed time-to-market.

Order Information

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For more information on Hewlett-Packard Test & Measurement products, publications or services, please call your local Hewlett-Packard sales office. A current listing is available via Web through AccessHP at http://www.hp.com. If you do not have access to the internet, please contact one of the HP centers listed here and they will direct you to your nearest HP representative.

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