GLEN SOUTHWORTH

CVI Quantizer (Colorizer), 1969
CVI Data Camera (Camera/scan processer), 1970

WHEN I TALKED TO RALPH Hocking last fall about this show, the name of Colorado Video popped up. "I am collecting Colorado Video stuff", said Ralph. That was it! Something I never consciously realized was there all the time. Now I am "collecting" Colorado Video from Los Alamos, the largest electronic and atomic junk pile known as the Black Hole, run by an eccentric Ed Grotus.

I have always loved junkyards. Europe after the war was a huge junkyard. I remember the thrill of the ultimate autopsy when the lid of the mysterious black box finally came off.

Glen Southworth, the founder of Colorado Video, would not like this talk. He ran the finest picture-making instrument-factory on this planet at one time. We could never afford one, they were of that class, but we always kept a fresh catalog on hand.

He was with us most of the time, or slightly ahead, in a different, slightly warped industrial dimension. However, he always talked about art.

We also liked his early associate, Windham Hannaway, one of the original "cosmic messengers" from the hippie era. He would show up in New York unexpectedly, have long talks throughout the night, fall asleep on the floor for a while and by sunrise be gone. —W.V.

GLEN SOUTHWORTH WAS educated in engineering at the University of Idaho and in the U.S. Army Southeastern School. He is Chairman and Treasurer of Colorado Video, Inc. in Boulder, Colorado where he lives with his wife and three children. He received numerous awards including the National Academy of Television Arts & Sciences Engineering Award in 1990. Southworth holds significant patents in the field. He was born in Moscow, Idaho in 1925.


Frame 202


INFO frame 25138 to 26585

INSTRUMENTS FOR VIDEO ART
by Colorado Video, Inc.

* Linear Patterns: 101, 120, 121, 122
* Computer Input: 201, 201A, 260
* Computer Output: 261A, 404A, 404D
* Hard Copy: 302-5
* Video Discs: 401A, 410
* Camera: 502
* Split Screen: 603
* Grey Scale Modification: 604
* Color Synthesis: 606, 606A, 606C
* Shading: 608
* Markers: 601C, 621

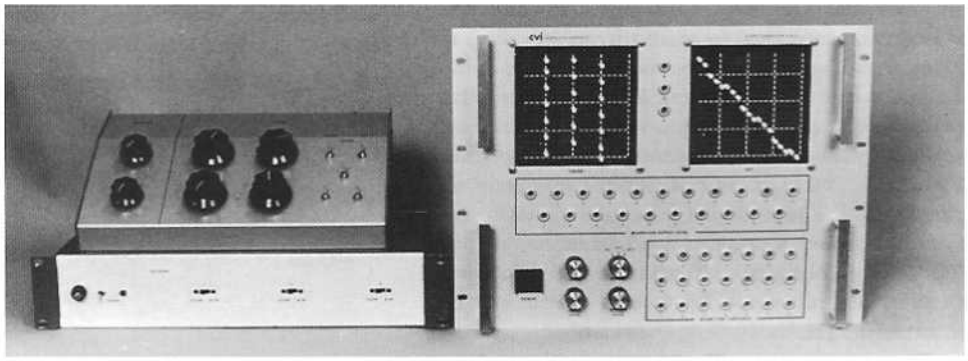
Paper and pencil are wonderful inventions, watercolors and oil are cheap. But let's look at it closely—these techniques are millenia old and we're in an electronic era. Video image creation and manipulation is fast, fascinating, and capable of effects never dreamed of by daVinci or Michelangelo.

Our business is primarily the design and manufacture of video instruments for research laboratories, but now and then we come up with a device that is sheer fun. Maybe we'll start a new division someday. But in the meantime, we enjoy talking to artists (engineers and scientists, too).

(continued)

Left: Glen Southworth, inventor and founder of CVI/ Colorado Video, Inc. Self Portrait with first experiments on direct CRT copying with original XEROX color machine.

Below: CVI Video Quantizer, 1969. Collection of ETC, Ltd. & The State University of New York, Binghamton.



CVI Data Camera, 1970. Collection of ETC, Ltd. & The State University of New York, Binghamton.

ABSTRACT PATTERN GENERATION VIA TELEVISION TECHNIQUES

A number of interesting and aesthetically pleasing patterns may be produced on a television screen in black and white or in color by pointing the lens of a television camera at the monitor screen. With a standard, unmodified television camera, this would result in an image similar to that produced by two parallel mirrors, with duplication of the image seen to infinity, depending upon the camera angle and proximity.

By introducing certain distortions in the video signal before it is applied to the television monitor, a much wider variety of interesting and pleasing effects may be achieved. The basic operation involved is the translation of the continuous range of grey scale values from the television camera output to a black or white only signal through means of a device such as a high-speed Schmitt trigger. In this instance, the sensitivity of the television camera is very greatly increased to small threshold values of video signal, and when the camera is pointed at the television monitor, a different form of regenerative process can take place when monitor brightness, contrast, and camera sensitivity exceed a certain threshold. The high gain of closed-loop operation can cause the reproduced television signal to assume a number of unusual configurations, including slowly changing patterns on the television monitor as influenced by factors which will be discussed later.

Two or more Schmitt triggers or slicers set to different amplitude levels will generate more complex patterns, and the outputs of such slicers or quantizers can be fed to the inputs of a color television monitor or color encoder or produce colored images. Color greatly enhances the beauty of the patterns. A block diagram of a typical system, usable with either black and white or color, is shown on the other side.

Pattern generation is influenced by the following factors:

1) Camera distance and lens focal length as compared to the diameter of the picture monitor.

2) Angle of the camera position as related to the monitor screen.

3) Angular rotation of the camera scanning plane.

4) Optical and/or electrical focus of the television camera.

5) Lens aperture and/or video gain of the camera.

6) Setting of the quantizer thresholds.

7) Introduction of secondary light patterns on the television monitor screen by optical means.

8) Introduction of secondary video images on the monitor screen through electronic mixing.

9) Modulation of the feedback path by external signals such as might be derived from an audio source (music, speech, etc.) as applied to any element in the chain, including brightness modulation of the television monitor screen, changes in gain of the television camera, changes in quantizer threshold levels, etc.

10) Utilization of vidicon or other camera pickup tubes having substantial target "lag" characteristics which tend to produce more slowly changing patterns.

11) Secondary modulation techniques involving variations in color intensity or hue shift.

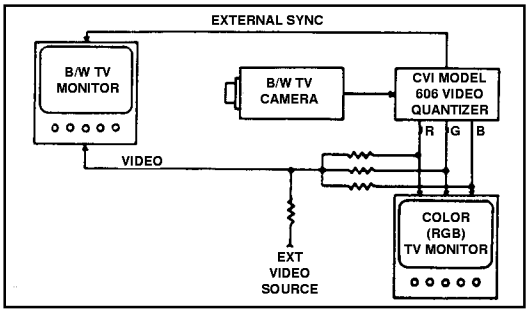
The Colorado Video Models 606, 606A, and 606C Video Quantizers may be used to create the above effects. The 606 incorporates 16 slicing channels, the 606A 8 channels, and the 606C 21. All units have provision for very flexible programming, including interaction between slicing channels.

—G.S.

VIDEO QUANTIZER

The CVI Model 606C Video Quantizer is a commercial example of a threshold based colorizer. It processes a monochrome video signal to "achieve radical alterations in output linearity or . . . synthesize color signals from different shades of grey" (From the CVI 606C manual). It identifies intensity regions and then displays them in color to make them more visible. X-ray, medical and thermal analysis are some examples where regions are tinted with color to reveal swollen bone tissue or heat emissions.

The input is a monochrome video signal that is "thresholded" into 21 grey regions and "level sliced" by a bank of comparators. The outputs of the "grey slice" generators are run to gain control potentiometers that route to a patch panel, for assignment to Red, Green and Blue levels. A "key" patch panel is used to assign the overlap of colored regions and to isolate the interaction between quantized regions. A quantized region can be patched to KEY OFF or inhibit other regions. Without "key inhibition" the intensity of a region's dialed RGB values will add together. A monochrome mix is formed through using equal values of Red, Green and Blue. This allows the superimposition of color into the grey contours of a black and white image. —J.S.



THE CVI DATA CAMERA

Colorado Video Inc (CVI), founded by Glenn Southworth, developed an externally lockable video camera called the CVI 502 Data Camera. It contained a one inch pickup tube and was intended for use in laboratory research and the scanning of non-standard video formats. To permit operation with slow scan television, provision was made for external horizontal and vertical sweep signals and a beam blanking signal.

CVI had foreseen unusual scan patterns for driving the camera deflection yokes: radial, circular as well as pseudo-random patterns. The unusual scan patterns are formed by externally supplied sweep signals, to deflect the camera image beam. By modulating the sweep signals with analog processing modules, the inverse of a CRT based scan processor is formed. The camera scan processor has the advantage of directly developing the intensity information from the surface of the camera tube, without having to re-scan the modified raster off a CRT screen.

The camera can be pointed at graphics or images while it's horizontal and vertical ramp signals are modulated. No matter how crazy or distorted the sweep patterns that drive the camera, the resulting output is a monochrome video signal. An external sync adder is used to convert the camera intensity into a composite video signal. External H and V drives are supplied to form a signal to blank the camera tube. The adjustment of Focus, Beam, Target, Horizontal and Vertical Center controls are through knobs placed on the Camera Control Unit. The video gain can be externally voltage controlled or corrected with the twist of a knob.

A disadvantage of the camera scan processor method is that the source image must be present for pickup, otherwise the desired source image is "re-scanned" with the data camera pointed at a monitor driven from a video tape. Correction of shading error, reduced brightness in small scanned areas, and beam protection to prevent "burning" the pickup tube surface, requires circuitry external to the data camera.