Video wallpaper...special effects...computer art...high-tech video...image synthesis...image manipulation...image processing...are all terms that have been used to describe a type of video produced by artists who have been experimenting since the late 1960s with an assortment of electronic imaging tools. None of these terms are particularly useful; either they are too general, or too specific, of else they fall prey to the kind of value judgements and myths associated with "mindless," "imperisonal" technology.

Even the most common term, "image processing," is problematic. While in the commercial sector, image processing usually refers to signal-processing methods such as time-base correction, in the video art world "image processing" has been used to describe a type of videoproduced by artists who eschew the label. "But there are many works that straddle the two camps. We were all struggling together and we were all using the same tools."

Johanna Gill has observed that the desire to use communication tools to change, literally, the world took a number of forms—the most directly being to work with community and oppositional political groups. The goals of the alternative media groups were articulated in the first issue of Radical Software, the publication founded in 1970 by Beryl Korot and PhyllisCurrent that until 1974 was the mouthpiece of the movement.

Power is no longer expressed in land, labor, and capital, but by access to the information and the means to disseminate it. As long as the most powerful tools (not weapons) remain in the hands of those who would hold them, no alternative cultural vision can succeed. Unless we design and implement alternative information structures which transform the current game, other alternative systems will not be no less than the products of the existing procedures. Our species will survive either by totally rejecting or unconventionally redefining technology, or by humanizing it; by allowing people access to the informational tools they need to shape and reassert control over their lives.

The reformation of television did not manifest itself in direct social action alone. In fact, low-cost portable video equipment was so new that using it for any purpose at all was considered radical. As part of a new kind of "media ecology," video environments (the precursor of the "installation") were created. Some were interactive situations designed to explore the potential of the new medium in the context of the older medium. Other systems included video networks and image processing. Others—such as Marshall McLuhan and Norbert Wiener—explored work in cybernetics—reflected the utopian desire to use technology to "man and" environment. The idealism in this excerpt from Juan Downey's article "Technology and Beyond" is typical of what David Antin has called "cyberstic," the futurist, jargon-stark jokes, not only by Downey, but Frank Gillette, Paul Ryan, Paik, and many, many others.

Cybernetic technology operating in synthesis with our nervous systems is the alternative life for a disenchanted humanity. The process of reweaving ourselves into natural energy patterns is Invisible Art. It is a blueprint for a new communication in which one supercomputer mind will be telepathically linked to an electron.swinging oscilators. The cybernetic value system is a new conceptual system, a new aesthetic.
by performing some operation on an incoming signal; synthe-
sizers generate signals internally.
Raster manipulation devices allow one to interfere with the video
signal as it is displayed on a monitor during the scan-
ning process. Scanning refers to the continuous, regular, and
repeated movement of a beam of electrons across the video
screen— or raster—horizontally from left to right and from top

to bottom. The flow of electrons is controlled by a magnetic
field which "pulls" the image both horizontally and vertically to
produce a normal image. One can distort the image by apply-
ing additional magnetic force, the roughest way being simply to
hold a magnet in front of the monitor. A slightly more control-
able method is to modify a TV set by the permanent addition of
extra magnetic coils. Probably the most familiar examples of
magnetic distortion are Nam June Paik's wobbling images of
Richard Nixon and Marshall McLuhan. The "Wobbulator"—
one of Paik's prepared TV sets—was later named after the
effect. Another raster manipulation device is the Rutt/Etra
Scan Processor, a more sophisticated version of the Wob-
bulator that allows greater flexibility and control.
(3) Glary Hill's Videograms, for example, were produced using the Rutt/
Etra.) Neither of these devices have a recordable output, and
both are limited to black and white video.

The next type of imaging device involves processing the in-
coming signal. The results vary depending on the tool, but
they include the following: colorizing, in which a chrominance
(or color) signal is added to a black and white signal; mixing,
which involves the superposition of two or more images and


sembles photographic double exposure; keying, basi-
cally a masking process which allows one to insert an image
into specific areas of the frame; switching, in which two video
inputs are displayed one after the other at variable rates;
sequencing, a type of switching in which more than two in-
puts are displayed at once; fades and wipes, which are variations
of switching and mixing.

White such processor tools require an external video input.
video_mixers do not. Video synthesizers have become common
with audio synthesizers, for both are descendants of analog
computers. In both video synthesizers use oscillators
to generate electronic waveforms such as sine, square,
triangle, and ramp that become audible as tones, video syn-
thesis systems include some visible elements which
tem can then be encoded with color, and, depending
on the tool, subjected to the same operations that processors
perform. While not speaking, the Paik/Abe Video Synthesizer
which was completed in 1970 is not a synthesizer at all, but a
more colorizer. The Paik/Abe has seven inputs, which
means that up to seven live cameras or recorded signals
can be mixed and colorized.13

These first tools are very crude by the standards of the
commercial industry. However, what all they share is a de-
sign approach in which the artist is afforded an enormous
amount of control. Unlike most commercial production de-
VICES— in which a specific button is pushed to achieve a spe-
cific effect— these tools were designed as interactive instru-
ments whose possibilities could only be thoroughly known
through use.

I thought I was thinking of something new and original all by myself. I didn't know other people were doing the same thing.
— Eric Siegel

The genesis of the synthesizer goes pretty far back in my mind. Almost exactly in parallel with Paik's development of the synthesizer, I was working on my own version of electronic graphic arts.
— Stephen Beck

In my mind, the design was so completely obvious—and it still is to me. It's as if all the things were going to be so obvious. And I was going to be the first to do it all over the world.14
— Dan Sandin

Anybody who knew anything about electronics always became a genius—brilliant and a genius.
— Steina Vasulka

For artists who were just beginning to learn electronics in the late 1960s, there were many candidates for "genius" status—
Eric Siegel, for instance, who by the age of 14 had built his first TV set. Born in Bombay in 1944, Siegel was a student at Samuel Gompers Vocational and Technical High School when he built a black and white TV camera which he com-
pounded at the age of 15.15 According to Siegel, "I just wanted to gather up all the pieces to produce my own video, and in theory I could do it. Unfortunately you were supposed to buy your TV camera for any amount of money, especially if you were a kid." In the early and mid-60s, Siegel held various jobs des-

cribing and repairing closed-circuit TV equipment, all while experimenting with video effects. In 1966, he went to
London to work in the Educational TV Department at the Uni-


Both frames from Einstein, by Eric Siegel.

versity of London, Goldsmith's College. On his return, he re-
built a two-inch videotape from records.
I was working for a man who owned an audio recording studio who got a whole bunch of Ampex 660 machines in parts—heads, drums, boards, and chassis. I fell in love with them, and he said, "Look, if you do these, I'll give you all the other parts and you can build your own." It took Siegel six months to complete the record. He was 22.

He continued his experimentation with the new machine, producing what he called "psychedelicvision," distorted black
and white images. He also began to collaborate with artists.
In May 1968, he designed and built the special effects com-


components for Siegolouture's Teleavenue, an impres-
sional dance piece choreographed and performed by Susan
Blume. Also around 1968, Siegel met Stan VanderBeek, who
had been experimenting with magnetic distortions of a color
TV. According to VanderBeek:

... we [Siegel and VanderBeek] immediately became friends and started working together on his tape experiments. The idea was that I was an artist who knew a little about electronics and he was an en-

gineer who knew a little about art. Actually, he didn't need much help, but at times, he needed a little encouragement. He usually didn't need any of that other. But we were both very broke and scavenging nets from discarded radios and oil wells were pizza.16

Siegel recalls that it was through Thomas Tatlock, who
had been making light sculptures, that he met Howard
Wise. Wise's 57th St. gallery had specialized in kinetic and

electronic art, and he was looking for work for an upcoming
show. Siegel says that when Wise saw Einstein, it "really
turned on him. He said: "Is there any way you can make this in
color?" And I said: "Well, there is, but I need $200 to buy a
color TV set to do it."" Wise gave Siegel the money, and he set
he to work building the circuitry that would add color to a black
and white video signal. This was accomplished through the
use of a phase modulator, a device which measures the vol-
tages of the incoming black and white signal and assigns them
color frequencies according to the gray values that those
voltages represent. Several months later, Psychoelectriclvision
in Color was installed at the now closed celebrated show. "TV as
a Creative Medium," ran from May 17-June 14, 1969.19

The overlooked tape took a photograph of Einstein and used
video feedback and the colorizer to break down and distort the
image, producing colorful oscillating patterns.
Siegel's first colorizer was a crude device that allowed for
little control. Furthermore, one had to send the signal out directly, but had to be recolored with a color camera—an ex-


pensive proposition at that time. Consequently, no tape exists from the original installation, but Siegel later remade
Einstein and several other tapes which are now housed at
Electronic Arts International. In the late 1960s— the not too different-consumer and production facility that Wise founded in 1971.

After the show, Siegel—on a trip to Sweden—began to
work on a design for a video synthesizer. While there, he was

offered $1,000 and his plane fare home by David Cort of the Video-
tree—one of the first video collectives—to build them a colorizer for their work on an ill-fated series for CBS.20 Siegel
returned to the U.S. and designed a completely new set of circuits—which in the original modified TV set—
took one modified black and white video input. However, using two phase modulators instead of one, the new colorizer
provided more control. It also produced a recordable output.

While Siegel was working on the colorizer, Wise began
talking about marketing it, but Siegel was more interested in
developing the synthesizer. According to Wise, "He came home from Europe and said he had a new idea he wanted to
work on, but that he didn't want to stay in New York."21 As
Siegel recalls, "I told him if he wanted to support me to do
something, let me do the synthesizer." So with Wise's finan-
cial backing, Siegel went to San Francisco and built the pro-
totype. Of the experience, Siegel—who, like many other early
tool builders, is basically self-taught—said: "I never thought I'd see the end of it. It was one of those projects that
was a little too big and it was a heavy trip because I was taking
on a level of sophisticated electronics that was just a little bit
above my head."

Although Siegel finished the synthesizer in 1970,22 he
and Wise differed on how it should be marketed. Wise explains: "I wanted to get a manufacturer to build it under license from us.
But Eric was leery that someone would steal his design, and
so he wanted to do it all himself." Siegel describes Wise's proposition as "not financially viable." The synthesizer was never manufactured, but Siegel did manage to market the colorizer. About 10 units were sold for approximately $2,400 each.23

In 1972, Siegel spent six months in India and produced a
30-minute black and white tape based on his experiences there. When he returned, he was untreated in the direction he
saw video taking. For the fact that he'd been active in
the video scene, and had contributed articles to Radical
Software, he felt that after India "everything was passe. I did
not have the will or desire to make videotapes anymore,
especially because it was becoming the "in" thing. A whole
sub-culture was forming and it turned me off." He eventually
formed Siegel Electronics in San Diego, Calif., and has been
designing and manufacturing equipment—including a pro-
cessor amplifier and an image enhancer—since 1978.

Summarizing his development, Siegel commented:
It had to do with the timing... It was a whole frame of mind that the country was in, where any sort of thing that was a part of men was more than just technology. There was a humu1 element, a human spirit. We were using the technology. It was our servant, not our god... But-


cially my evolution has been from video artist back then to hardware manufacture now. There are better things I'd rather be doing.

... Although they have never met, Stephen Beck has much in

Left: from Video Synthesis. Right, from Video Weavings, both by Stephen Beck.
common with Eric Siegel: a whiz kid who completed work on the Direct Video Synthesizer at the University of Illinois at Champaign-Urbana from 1967-1970.

During this time, Beck was using sound to generate graphic images on an oscilloscope, and in 1968, began thinking of ways he could control light more precisely. "I was obsessed with the visual world—I wanted to project. I wanted to see the process of how things came together," Beck said.

It was during this period that Beck had the idea of developing a device that could combine sound and light. He called this device the Digital Video Weaver. In 1973, the Etrasparticipated in WNET’s residency program at the Center. By 1976, the project had folded. Meanwhile, Beck had started work on a digital version of the synthesizer, which he called the Beck Video Weaver. To Beck, weaving was a structural metaphor for the television raster. By 1975, he had finished the digital circuits for the Weaver and incorporated them into the original synthesizer. He then produced a series of tapes called Video Weavings.

Of all the tools designed and built specifically for artists, none has achieved the level of actuality that the Sanin Image Processor (I.P.) has. While 25 units may not seem like much, it's impressive when one considers that Sanin rejected the idea of marketing the device commercially, choosing instead to give the plans away to anyone who wished to make their own.

Sanin was doing graduate work in physics at the University of Wisconsin at Madison (earning an M.S. in 1975) when he realized that "I wasn't doing all that other stuff anymore."

He was also doing color photography, and he was interested in light and kinetic events. He was producing skylights for those shows. I was interested in using radio-frequency technology to create images I found interesting and it occurred to me that I could do it electronically.

While doing the light shows, Sanin became familiar with the work of Brice Marden, and around 1968, began thinking about what the visual equivalent of the Moog might be. Sanin recalls an early conversation with a friend, Russell Dobkin.

"He said: 'You know, I've been trying to find someone who was going to take over with those kind of ideas. I'm not interested in that.'"

"I said: 'Well, you're in the process of doing it. Why don't you look into that? Why don't you look into that?'

"He said: 'I'm not interested in the art world. I'm quite happy with the art world.'"
I DECIDED THAT I WOULD LIKE TO TAKE A COPY OF THIS

Of course enforcing such a request is too difficult to be bothered with. But let it be known that I consider it to be morally binding.

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