

CLOUD MUSIC

(stat of drawing/Caption: David Behrman, diagram and summary, ca. 1975))

Video camera (A) points at the sky.

Specially designed video analyzer (B) superimposes six electronically generated crosshairs upon the video image. Each cross hair may be positioned anywhere.

Composite image (sky plus crosshairs) is sent to the video monitors (C). 6

The video analyzer generates six control voltages. Each voltage is proportional to the instantaneous light value at the point where one of the cross hairs is positioned. As cloud surfaces pass these six crosshair points, the voltages vary in response to the clouds' light content.

Digital electronic music system (D) receives the six voltage outputs from the video analyzer. The music system senses voltage changes made by the analyzer and converts the changes into harmonic progressions and dynamic shifts.

Sound from the music system is sent to a six channel loudspeaker system (E). The loudspeakers surround the viewing space and the video monitors.

CLOUD MUSIC is intended for installation during times of the year when weather conditions favor a likelihood of high daytime cloud activity.

Statements by Bob Watts, Bob Diamond and David Behrman, ca. 1974

Bob Watts: I discovered when I first arrived in New York City in 1946, from the midwest, that I no longer had the same visual access to the sky. It was apparent that no longer could I judge the weather by checking out the sky morning and evening as was my custom. I considered this to be a handicap to my accustomed life style, and still do. This incident shocked me into the recognition that the sky was an important aspect of daily living and that it was important to me to be able to see it whenever I chose. Sometime later, some fifteen or twenty years, the sky (as clouds) made a more direct appearance in my work as an artists, in multiple exposures on movie film and photographic montage.

Since 1965 clouds, sounds, indeed the whole phenomenology of the natural environment has pervaded most aspects of my work. This present work has been evolving since 1966 when at Rutgers University we made some experiments with a sound device that reacted to changing light intensity on a movie screen. At that time, I saw applications to my interest in clouds and the changing light of the sky. Early experiments showed possibilities but my hunch was that i should explore more sophisticated electronics, hopefully the missing miracle ingredient. My hunch proved correct.

The assistance of Bob Diamond and David Behrman was enlisted to expedite this project. Without their contribution, realization of the Cloud Machine would have been quite impossible.

Bob Diamond: I began to see that to really correlate an (sound) environment with the clouds a *la* Bob Watts would involve a very sophisticated electronic system. We agreed that we needed some sort of video system that would scan the clouds as they moved by and produce a control voltage proportional to the brightness of the cloud of the scan point. This voltage could be used to vary environmental qualities of a space. The Method I developed to do this relies on the fact that a video signal has an associated time-base or sync signal. This signal synchronizes the sweeping movement of the electron beam in a TV picture tube with that in a TV camera. The beam sweeps across the screen in a 63.5 or so microseconds for 525 times to make the complete picture or frame in 1/30 second. I could take a "snapshot" of a particular point in the frame by timing how long the beam took to set to that point and taking a sample of the video signal at the time-out point. The amplitude of the video signal would be proportional to the brightness. Thus the voltage is held until the next frame when a new voltage is held, etc. By changing the time-out period, the sensitive point can be moved to any part of the picture. To facilitate finding this "point" another video signal is generated and superimposed on the incoming video signal. The total signal when displayed show the original image with six crosshairs superimposed, indicating where the sensitive points lie.

David Behrman: For the sound, the outputs from Bob Diamond's video analyzer are used to create an interweaving of slowly shifting,

multi-layered harmony that parallels the movement of the clouds. The technical means by which the passing of the clouds can be used to make music around a listener are of the 1970's - because only in the last several years have the sensory, logic, and video circuitry become easily accessible to individuals such as ourselves. But in spirit the project might be close to the old outdoor wind and water driven musical instruments of Southeast Asia and Polynesia.

Sound is produced by eight banks of audio-range function generators, four to a bank, each of which is tuned to a pre-selected four-part "chord" made up of pure modal or microtonal intervals. Six of the banks can each be detuned to four parallel transpositions by an output from the video analyzer. Any harmonic change corresponds to a minute change in light of crosshair in the video image.

Like sailing, the music is weather-dependent.

Bobb Watts Born 1923. Studied engineering and art history. Professor of Art, Rutgers University. Associated with Fluxus. Produced *Yam Festival* and *Monday Night Letter* with George Brecht. Died 1989, Bangor, Pennsylvania.

Bob Diamond Born 1946, New York City. Engineer. Developed computer system for WNET-TV (Channel 13), New York City, in association with Nam June Paik. Beginning in 1972 designed and produced custom video circuitry and patented several designs. Lives San Jose, California.

David Behrman Born . Well known electronic music composer, long time association with Sonic Arts Union. Performed with John Cage, David Tudor, Frederic Rzewski and the Merce Cunningham Dance Company. Producer, series of contemporary music recordings CBS. Lives New York City.

To: the Vasulkas - RE Ars Electronica

received
5-05-92

Hi guys,

Please forgive my slugggish reply! Edit this bio any way you see fit.

Bob Diamond has spent most of his life involved in simulations of one form or another. Besides getting into trouble for simulatng, rather than doing, his laboratory class experiments in school, Bob developed the Rocket-Drop simulations for NASA Project Apollo.

Formerly, Bob was Chairman of Analog Design, a San Jose consulting firm specializing in Analog/Digital Signal Processing. As Principal Scientist at Commodore, he pioneered Computer Aided Engineering in the development of the C-64 computers. Bob was also the Rockefeller and Ford Foundations recipient for Video Special Effects, WNET, New York, and pioneered the development of broadcast digital video synchronizers at Consolidated Video Systems.

As an artist :

Founder and former technical director of the WPA theater in New York City

With Bob Watts and David Behrman, the multi-media event piece "Cloud Music".

Selected exhibitions:

Whitney Museum of American Art, New York City
Academie der Kunst, Berlin

His more recent accomplishments include developing the Extend simulation package for the Macintosh.

When he isn't simulatng something, Bob is the President of Imagine That, Inc. in San Jose, California.

Thanks,

Bob Diamond

~~AMERICAN SKY~~ / Cloud-driven music

A weather-dependent sound environment utilizing video scanning, custom electronic sound, 4/6 channel sound output, and video display.

INSTALLATION A: As a demonstration/environment suitable for colleges and universities for a period of two days or longer. Basic fee \$2000 plus expenses.

INSTALLATION B: An environment/performance suitable for any audience. One day installation required, performance one or more days. Basic fee \$1500 plus expenses.

INSTALLATION C: Permanent installation. A continuously operating system suitable for museums, parks, public and private buildings. Quotation and details on request.

BOB WATTS has been an exhibiting artist since 1951. He has degrees in engineering and art history, and is presently Professor of Art at Rutgers University, where he has received many research grants for work in electronic media and film. He has been associated with Fluxus since the early days, and together with George Brecht produced Yam Festival and Monday Night Letter. His work has been shown and performed around the world and is in many museums and private collections.

BOB DIAMOND is an engineer who has recently been involved with applications of electronic systems for artists. He has developed a computer system for NET-TV 13, N.Y.C., in association with Nam June Paik. Since 1972 he has designed and produced custom video circuitry and holds several patents.

DAVID BEHRMAN is a well known electronic composer. He has long been associated with the Sonic Arts Union and has performed around the world with John Cage, David Tudor, Frederic Rzewski, and the Cunningham Dance Co. He was the producer of a series of contemporary music recordings with CBS. In recent years he has designed his own custom equipment for electronic music.

~~PLEASE ADDRESS ALL INQUIRIES TO:~~

~~Robert Watts, RD 3, Bangor, Penn. 18013. Phone: 215-588-2721~~

~~This project is made possible in part by support from the CREATIVE ARTISTS PUBLIC SERVICE PROGRAM (CAPS)~~

Cloud Music

~~CLOUD MUSIC / SOUND AND SKY~~

(a work in progress)

ROBERT WATTS, Artist.

Consultants: Bob Diamond (Video Solid State)

David Behrman (~~Audio~~^{Audio} Solid State)

I discovered when I first arrived in New York City in 1946, from the midwest, that I no longer had the same visual access to the sky. It was apparent that no longer could I judge the weather by checking out the sky morning and evening as had been my custom. I considered this to be a handicap to my accustomed life style, and still do. This incident shocked me into the recognition that the sky was an important aspect of daily living and that it was important for me to be able to see it whenever I chose. Sometime later, some fifteen or twenty years, the sky (as clouds) made a more direct appearance in my work as an artist, in multiple exposures on movie film and photographic montage.

Since 1965 clouds, sounds, indeed the whole phenomenology of the natural environment has pervaded most aspects of my work. This present work, (which I call "Cloud Machine") has been evolving since 1966 when at Rutgers University we made some experiments with a sound device that reacted to changing light intensity on a movie screen. At that time, I saw applications to my interest in clouds and the changing light of the sky. Early experiments showed possibilities but my hunch was that I should explore more sophisticated electronics, hopefully the missing miracle ingredient. My hunch proved correct.

The assistance of Bob Diamond and David Behrman was enlisted to expedite this project. Without their contribution, realization of the Cloud Machine would have been quite impossible. I shall let them speak for themselves:

Bob Diamond: Video Solid State

"I began to see that to really correlate an (sound) environment with the clouds a la Bob Watts would involve a very sophisticated electronic system. We agreed that we needed some sort of video system that would scan the clouds as they moved by and produce a control voltage proportional to the brightness of the cloud of the scan point. This voltage could be used to vary environmental qualities of a space. The method I developed to do this relies on the fact that a video signal has an associated time-base or sync signal. This signal synchronizes the sweeping movement of the electron beam in a TV picture tube with that in a TV camera. The beam

sweeps across the screen in 63.5 or so microseconds for 525 times to make the complete picture or frame in 1/30 second. I could take a "snapshot" of a particular point in the frame by timing how long the beam took to get to that point and taking a sample of the video signal at the time-out point. The amplitude of the video signal would be proportional to the brightness. Thus voltage is held until the next frame when a new voltage is held, etc. By changing the time-out period, the sensitive point can be moved to any part of the picture. To facilitate finding this "point" another video signal is generated and superimposed on the incoming video signal. The total signal when displayed shows the original image with six crosshairs superimposed, indicating where the sensitive points lie."

David Behrman: ~~Audio~~^{Audio} Solid State

"For the sound, the outputs from Bob Diamond's video analyzer are used to create an interweaving of slowly shifting, multi-layered harmony that parallels the movement of the clouds. The technical means by which the passing clouds can be used to make music around a listener are of the 1970's - because only in the last several years have the sensory, logic, and video circuitry become easily accessible to individuals such as ourselves. But in spirit the project might be close to the old outdoor wind and water driven musical instruments of Southeast Asia and Polynesia.

Sound is produced by eight banks of audio-range function generators, four to a bank, each of which is tuned to a pre-selected four-part "chord" made up of pure modal or microtonal intervals. Six of the banks can each be detuned to four parallel transpositions by an output from the video analyzer. Any harmonic change corresponds to a minute change in light of a cross hair in the video image.

Like sailing, the music is weather-dependent.

FOR IMMEDIATE RELEASE

Visitors to The Electric Gallery on Saturday, November 16, 1974 will have the opportunity to meet artist Robert Watts, composer David Behrman and videographer Bob Diamond, at the opening of their very exciting sound-environment exhibition.

~~CANADIAN/AMERICAN SKY~~
(a work in progress)

CloudMetrics

©
1976

Robert Watts: Born in 1923, lives and works in Bangor, Pa. Since 1946 he has exhibited widely throughout Europe and the United States. The focus of his artistic endeavors has ranged from abstract expressionistic painting to mixed media performance to his present exploration in the area of sound and light.

"Since 1965, clouds, sounds, indeed the whole phenomenology of the natural environment has pervaded most aspects of my work. This present work (which I call 'Cloud Machine') has been evolving since 1966 when at Rutgers University we made some experiments with a sound device that reacted to changing light intensity on a movie screen."

At that time Watts saw applications to his interest in clouds and the changing light in the sky. He enlisted the help of David Behrman (audio solid state) and Bob Diamond (video solid state) to expedite his project.

Bob Diamond was able to produce a video system that could scan the clouds as they move by and produce a control voltage proportional to the brightness of the cloud at the scan point. This voltage is used to vary the environmental qualities of a space. Sound by David Behrman is produced by eight banks of audio-range function generators, four to a bank, each of which is tuned to a pre-selected four-part chord made up of pure modal or microtonal intervals.

The outputs from Bob Diamond's video analyzer are used to create an interweaving of slowly shifting, multi-layered harmony that parallels the movement of the clouds. Any harmonic change corresponds to a minute change in light of a cross hair in the video image.

According to David Behrman: "The technical means by which the passing clouds can be used to make music around a listener are of the 70's but the spirit of this project might be closer to the old outdoor wind and water driven musical instruments of Southeast Asia and Polynesia."

Like sailing, the music is weather-dependent.

This fascinating exhibition will continue until Sunday December 1, 1974. Gallery hours are 10:30 to 5:30, Tuesday through Saturday, Sunday 1:00 to 4:00, closed Monday.

CLOUD MUSIC

Robert Watts, David Behrman and Bob Diamond

Cloud Music was an installation developed collaboratively by the three artists during the years 1974 to 1979. It consists of a video camera (black & white 1974-78, color thereafter), which scans the sky; a video analyzer, which senses the changes in light produced by passing clouds; and a home-made electronic sound synthesizer, which responds musically to the passage of clouds overhead.

Technical Description

The signal from the color video camera is passed into the video analyzer. The video analyzer generates six crosshairs (graphics elements) which can be manually positioned anywhere on the color video screen.

At each cross hair center point, the video analyzer reads the instantaneous grey scale produced by the sky as seen by the video camera. The analyzer translates the grey scale value into an analog voltage. This analog voltage is fed to the music synthesizer. There are six of these analog voltages, one for each crosshair center point.

The music synthesizer uses the six control voltages to produce harmonic chord changes in a set of 18 digital oscillators. The music synthesizer also reacts to the overall rate of change from moment to moment; a stormy, fast-moving cloud-scape will produce a musical environment distinguishable from that produced by a calm sky with few clouds.

Exhibition History

1974 Canadian/American Sky. Electric Gallery, Toronto, Canada.

1977 The Annual, San Francisco Art Institute at Fort Mason, California

1979 Re-visions. Whitney Museum of American Art, New York.
Curated by John Hanhardt

1980 Fur Augen und Ohren. Akademie der Kunst, Berlin, Germany.
Curated by Rene Block.

1981 New Music America '81 Festival, San Francisco, California.