Vidium period

Well, you caught it fairly late when I was at the Exploratorium. I was a curator there and I had designed before I went there a really large console that made complex color lissajous patterns. Multiple locked oscillators and pseudo-three dimensional shapes. I always thought they were quite beautiful. They'd been used in a couple of different applications. But I made a large console that would generate great families of them. You saw that.

I was working on the peninsula at Sygnetics and I had developed a . . . for a long time prior to that, I had been working on this color lissajous display, x-y . . . essentially a wide band x-y color oscilloscope.

Yes I did but I had to go back even further. I got the idea . . . somebody else in New York had done it long before me, and I saw what he had done.

Larry Shaw was the person who was instrumental.

When I developed it I improved the deflection amplifiers to give a really good response and I developed a system of color modulation which I have a patent on. What it did it painted color on the surface according to the convolution of the surface. You get these very beautiful . . . You saw it when I had it.

In fact, the synthesizer that I built is now over at the Exploratorium. I donated it.

Yeah, it was monochromatic. The thing is that the monochromatic versions were beautiful. They were very lacy and sharp. They had a very sharp trace on the electromagnetic CRT. And if you can deflect the beam, which is very difficult, it takes a lot of power and very good amplifiers to deflect an electromagnetic CRT, when you can do that it turns out . . . when you really try to equalize the amplifiers you can get beautiful patterns. Even from voice or recorded music or anything like that.

I'd say it's an x-y lissajous display with color modulation designed to follow the contours of the pseudo-three dimensional image. It forms patterns sometimes which are like Escher pictures which are impossible objects.

Objects which are even impossible in terms of their contraries. I tried to . . .

Very powerful amplifiers.

Well, deflection amplifiers.

You see, the basic trick is that the color is a function of the velocity of the trace as it moves on the screen. As the trace moves the color stretches toward the red end of the spectrum. You know

what the spectrum looks like. It starts at red and goes through orange, yellow, green, blue and then it gets into violet. OK? I assigned colors according to the actual velocity of the trace on the screen. I had circuits which could measure the velocity and change the color of the dot as it was moving, and in doing that it made the contours of the image stand out in a really interesting way.

It was R-G-B at the guns of course, but I had . . . I used several techniques to trace a circle in the chrominance. Now I know much more about it and I'm kind of embarrassed at the way I did it. But I did simply make a vector that rotated and it gave R-Y, B-Y axes rotated as the vector rotated in that plane of R-Y, B-Y. And there was a luminance component which I wasn't too careful about. But the vector would rotate as a function of the speed of the trace. The absolute velocity. To measure the absolute velocity was very simple. I had the x velocity which was the equivalent of the differentiated signal into the X amplifier and y velocity, which wa a function of the differentiated signal into the Y. So given those two velocities, all I had to do was to take the square root of the sum of the squares and I would have the absolute velocity.

It's fully described in the patent.

It's been about six or eight years since I've done a thing on it because it was such a dead end. I found it was quite interesting and beautiful but, first of all it had no commercial application because I found that people in special effects, in film or advertising, all have very tried and true techniques that they stick to. They don't want anybody coming in and disturbing their nice game. That's very difficult. I tried to break into advertising and I found that I was not very skilled at the politics of it, for starters. I had a terrible time.

Except for my background and I had learned television at least technically, I had never been interested in television until somewhere around the time when I met you, some people in Berkeley asked me to make a colorizer for them. People at Video Free America . . . Arthur Ginsberg, Skip Sweeney and Alan Shulman.

They asked me to build this colorizer about that time and they showed me that they had a colorizer. When they opened it up all the parts fell out. It was a little thing in a gray box about this big and it cost, you know, $800 and it had two knobs on it. Kind of made a smeary color. And I said, "Gee, we could do better than that." So at that point I had evolved the concept of the zone colorizer. I said what you want to do is cut the gray scale in segments.

It's a multi-level colorizer, which is like a multi-level keyer I guess. A colorizer which cuts the luminance scale into sections. I used the word zone because since then I've learned the Ansel Adams system a little better.

He's a photographer and he has a technique where he measures the luminance of what he's photographing and divides it into what he calls zones, which I believe the luminance doubles when you go to zones and he says that you divide the total range of discernable gray scale into ten zones. And it's a logarithmic progression. In other words it doubles as you go . . . the brightness doubles. So, the luminance of a video signal can be split in the same way. It doesn't have to be every time the luminance doubles. In fact, in the colorizers I make you get to slice the gray scale at arbitrary points.

The concept is that you slice the gray scale, essentially. I sat down and I said, "What's the best way to make a colorizer?" at that point, and it occurred to me that what you wanted to do was to be able to assign an arbitrary color and brightness to any segment of the gray scale. You pick it out and you assign it. It would be the only way to do it. So I worked on that and I made one colorizer which was terrible but it sort of worked. And I made three or four more and started confronting the basic problems of this which, in terms of the user, things like gen-lock . . .

I paid for all of it myself up to the point where I got some exposure and a very wonderful man named Al Leavitt here in San Francisco, who later turned out to be a kind of pain in the ass. A very well known entrepreneur saw it.

We used to have the best classical music station in San Francisco, KSFR, and he was an immaculate man. He saw it and he loved it, and he said we should exploit this. I said fine and he made a contract with me through negotiations with my attorney who had already filed. . .

We formed the "Color Communications Corporation" and Al put in $30,000 and I put in my patent and he died.

I got the $30,000. I never would have been able to do what I did if Al had lived. That's the funny part of it. Al died of a heart attack at the beginning of the project and the money was in the bank and I went ahead and built this thing you saw. But I never had the ability to exploit it commercially like Al would have. Al was a businessman, and he was very successful.

You never know dealing with these sharp people. After I dealt with him I had a kind of prejudice against business people. You have to be very careful. I'm a technical person. I'm not a businessman.

I meant it to be something for an artist or a creative person. I try to make all my tools for creative people. That's my primary impetus.

Now . . . that was one of the reasons that I split from the Exploratorium, because it was more oriented toward technology than art. I wanted a synthesis of art and technology. That's what I was willing to work for.

Through EAT I met a number of budding electronic music composers. Two, which are good friends of mine, Alden Jancks (sp) and Martin Bartlett. I helped them build music synthesizers and when I developed the Vidium, they found it was a really sympathetic way of producing images through their electronic music, just directly from their signals and getting a visual synthesis of what they were doing.

Don Buchla came by for a few meetings. I think David Tudor was very interested in it. David Tudor could tell you a few things about EAT.

It has nothing to do with video because it's a doctored television set. Somewhere along the line I saw that Nam June was doing the same stuff in New York and I had a couple of laughs. In '68 I guess it was in a TV Guide, his version of it, which was kind of anarchistic. Had the good fortune . . . Suzanne is well acquainted with Nam June and she introduced me to him. It's the only time I ever met him. I was on a trip to fix an old colorizer in '73 probably. In New York City. I just ran into her on a corner, you know you do that in New York City. And she was giving a concert and Nam June came along and introduced me. I only mentioned that because he was doing the same. He was also doing this lissajous thing with a TV set.

The thing that really made it happen was the Video Free America people came and asked me to make a colorizer. And then I searched and analyzed what was really needed, which is what I do. Even at that time I had been working with artists enough to talk to them for a while and second guess what they really needed. What controls would give them the most freedom. So, the concept of the multi-level colorizer may have been done by other people, but as far as I was concerned, it was original with me.

I decided that even though it was much harder to do than R-G-B or the other approaches, that that was the most effective in terms of human engineering, what people could do. So I decided to do it that way. And that lead to more complex circuits and more difficult circuits, but that was manageable in the end it became not too hard.

Adjustable zoning. It's a question of being able to set the breakpoint on the gray scale that you see on the sliders here. You set the point where it breaks into a different segment of the gray scale. That way you can separate out. So some of the main ideas were zoning the gray scale, cutting it into zones.

Generating a totally synthetic image by means of arbitrary hue saturation and gray. And being able to mix that in varying amounts.

The Videolab, which is still the best colorizer I've made, has a variable edge on each edge. When you take something and you slice it three times you get four parts. So each of these gray points is controllable in its hardness.

I think it was '72 I guess when I first made that one.

I don't know if they paid me at all. You see at EAT I had gotten into just designing things for artists and letting them build it. I didn't mind, because it's easy. I can sit down and design something in 10 minutes, usually. And it's fun. And I was getting a lot back from people because human values was really a nice trip to deal with artists, being an engineer. So I think I probably did the first one for free, and that was the prototype breadboard that you saw.

I think we made our first colorizer for Skip Sweeney and one or two other local people and some New York people.

There must be at least ten of them around. The Model 100 Colorizer.

It used a hard edged key with a four level . . . hue, saturation and gray and a knob to mix the effects and a normal knob. So you mixed in the original.

The price was $1,300. Except when we started putting in gen-locks and external subcarrier we would add another hundred or two hundred dollars for it. We did that for a couple of years and developed things and in the meantime we started making some more complex colorizers which I immediately stopped making because we went through a couple of generations.

Bill Etra and Steve Rutt called me on the telephone, kind of a conference call, and they had gotten my name and heard about me, and they told me that they wanted this and that and we talked for a while. Bill had started out saying he wanted a voltage controlled colorizer and a . . . and I told him I could build him a matrix switcher with linearly controlled crosspoints. In other words, you put in a variable voltage and it will bring in that input line on that output line. So he said . . . and eventually it happened through several conversations between me and him and Steve on the phone that they wanted . . . I suggested they put it all in one . . . the voltage controlled colorizer, the voltage controlled switcher and then somebody came up with the idea, I think it was Bill, they also could use some oscillators. I guess you know that the Rutt Etra uses a lot of oscillators. And something snapped in my head and I said, "What you guys really want is a synthesizer that has all these things and is capable of doing all the standard special effects." So I sat down and . . . it was really a terrific thing to think of, to reduce everything in video to a few little standard effects. I had to ask myself, "what do you do when you make a wipe?", "what do you do when you make a key?", "What do you do when you do all these things?" And I had already had a lot of experience because of the colorizer and I already had a lot of experience because I had made a lot of voltage controlled stuff for the music artists that I had been working with. You see, I was really steeped in voltage control.

September 7, 1975. Here's the video switcher that I designed for

Etra. He wanted a 100 point matrix video switcher. That was July of '75. And I had already made the front panel sketch. The switcher never materialized. The earliest thing I find in here from that. This is what was supposed to be a hip switcher. This is what Adwar now sells as a hip switcher. I could have developed this but . . . people were asking me to do it. I think the first really important thing here is this design for the hundred point matrix, 10 in-10 out. Eventually he didn't want it. He wanted something more and I said, "Look, I'll tell you what. I'll put it all together in one box or two boxes and then I'll sell it." He said, "Terrific." I said, "OK, you'll have oscillators, you'll have a matrix switcher, you'll have a colorizer and you'll be able to generate all the standard special effects."

Here's where I started building the Videolab which, I would guess was September of '75. Here's my write up of what the system should be . . . August 23 of '75. There are three types of signals in the Videolab system, logic, control and video. Logic signals are zero and plus five, later they were 0 and +2.5; control inputs are either unipolar or bipolar, that's not true, they're now unipolar only.

Here we are in August 31, 1975. What happened was, after some negotiation on the phone he said, "Why don't I come out and talk to you?" I said, "OK, I'll have a panel drawing ready for you." That panel drawing was this. Was identical to this. It hasn't changed hardly at all. When he came out I had made the basic drawing/design from what we had talked about. He only changed one thing. He insisted that the colorizer have all voltage controlled inputs. I had wanted to put a minimum voltage control on because it would have been more unitsat . . . but he's very uncompromising so he insisted that we add all these. That cost me two or three months in the design, so I went back and changed it. But otherwise it was just like this. When he stepped off the plane, we handed him the blueprint of the front panel. And I had never met him, of course.

. . . and me and Bill, we never really totally agree on who did what, but I know that I designed that panel and I conceived of the different blocks. Aside from the matrix switcher and the colorizer, which he originally suggested. And I did all the details on them also. And I conceived of the signal system and things like that. And who knows how much of his intelligence was unspoken in back of it all. I would give him credit for a lot of the energy that came behind it.

Bill Etra is a video artist and a real idea guy.

I think if you wanted to define his role in the Lab I think you'd say he asked for the original one, he put a lot of energy into it. I take credit for the detailed design and also for a lot of the way the thing is sliced up. I would say that panel is mine and the circuits inside are mine. So it's conceivable that you'd have to give him credit for a lot of this. He had all that energy you know.

Don Buchla. Buchla was the strongest influence I ever had in terms of the way he did things. If you look at this you'll see that it's totally similar to his synthesizers in the philosophy of what it does. Control voltages, logic voltages, signal voltages. It's split up into three disparate things. The only thing I didn't do was I used strictly banana jacks, and that's a very important point. Unshielded banana jacks, so that you can stack them, which makes the flow much simpler and easier. But I think technically you can say that this machine could have been designed by Don Buchla.

Woody: You see, Don Sandin professes to the influence of Moog. And your device is basically of a different generation of intelligence. It's generally kind of more specialized but more complex and closer to the digital bridge. His is, in a way, quite traditional.

Bill: I must admit to the grossest kind of prejudice in my field as a professional engineer, dealing with digital engineers who are very narrowminded about ways to do things. I know that video can use all of these things but I'm always coming up against my past experiences with guys who thought that all there was was digital. And in the end I think it's narrow to say all there is is anything.

Woody: In digital there is a hope to get a score. It would also be some sort of security. For analog, it requires high skill. It's not easy to work with analog systems. Some people get very good at it by practicing. You cannot just approach this tool and do a masterpiece.

Bill: I think about the person who made organs for Bach, the person who designed and built them. And what I want to do, what I really lust after is to make machines that are so clear to a creative person and give them so many possibilities that they can use them. That it gives them freedom as an artist. And I got that from working with the EAT, the Experiments in Art and Technology. Where I began to talk to these people and get a little glimpse of their creative drive. And it just gives me a terrific thrill when I see someone like Ernie Gusella in New York who's doing truly creative work with the Videolab. And it's always in the back of my mind whenever I make a new one . . . It's like putting the keys on an organ or how many pedals, or how many stops, how close they are to the keyboard. What's the most elegant way of giving tool control to the person who's using it.