UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

XILINX, INC. Petitioner, vs. INTELLECTUAL VENTURES I LLC, Patent Owner.	Case Nos.: IPR2013-00029 & 00112

VIDEOTAPED DEPOSITION OF
ROBERT SMITH-GILLESPIE
Volume I (Pages 1 through 165)
Taken in behalf of the Petitioner
Thursday, August 29, 2013

BE IT REMEMBERED that the deposition of ROBERT SMITH-GILLESPIE, Volume I, was taken before Victoria A. Guerrero, Notary Public and CSR, RPR, CRR, on Thursday, August 29, 2013, commencing at the hour of 9:25 a.m., in the conference room of the law firm of Schwabe Williamson & Wyatt, PC, in the City of Portland, County of Multnomah, State of Oregon.

-:-

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Walter Sanford, Videographer

Don Coulman, Intellectual Ventures IP Attorney

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Thursday, August 29, 2013; 9:25 a.m.

Portland, Oregon

THE VIDEOGRAPHER: Good morning. My name is Walter Sanford, the videographer for I Witness Video Group of Irvine, California.

This marks the beginning of Media No. 1 for the deposition of Robert Smith-Gillespie in the matter of Xilinx Incorporated, petitioner, versus Intellectual Ventures I, LLC, patent owner, pending before the Patent Trial and Appeal Board of the United States, Patent and Trademark Office, Case No. IPR2013-00029, regarding Patent No. 5,632,545, under the title of Enhanced Video Projection System; and Xilinx Incorporated, petitioner, v Intellectual Ventures I, LLC, patent owner, pending before the Patent Trial and Appeal Board of the United States Patent and Trademark Office, Case No. IPR2013-0012 (sic), regarding Patent No. 5,779,334 under the title of Enhanced Video Projection system.

This deposition is being taken on behalf of Xilinx Incorporated and is being held at the Pac West Center, Suite 1900, 1121 SW Fifth Avenue, Portland, Oregon 97204 on Thursday, August 29th, 2013. 9:25AM

We are now going on the record. The time is approximately 9:25 Pacific Daylight Time. Counsel and 9:25AM all others present will now identify themselves for the record beginning with the deponent. 9:25AM

THE WITNESS: Oh, Robert Smith-Gillespie.

MR. QUILLIN: I'm George Quillin on behalf of the patent owner, Intellectual Ventures. With me is my colleague, Chris Kalafut. Both of us are from the law firm of Foley & Lardner LLP. And also with us is a representative from patent owner, Mr. Don Coulman. 9:25AM

MR. KING: Tom King from Haynes & Boone here on behalf of Xilinx. 9:25AM

THE VIDEOGRAPHER: The court reporter will now administer the oath.

ooOoo

ROBERT SMITH-GILLESPIE,

having first been sworn by the Notary Public, testified under oath as follows: 9:26AM

EXAMINATION

BY MR. KING: 9:26AM

Q Good morning.

A Morning.

Q Would you please state your name and address, or your address for the record?

A Home address? 9:26AM

Q Yes. 9:26AM
A 2790 Timberline Drive, Eugene, Oregon.
Q Now, I understand you've been deposed before?
A I have.
Q Approximately how many times? 9:26AM
A Probably around ten times.
Q Always in patent matters?
A Yes.
Q Now, I understand that since you've been deposed before you're probably familiar with the ground 9:26AM rules for depositions?
A Yes, I am.
Q And so I don't want to spend a lot of time on this, but you understand that we're here to have a conversation about the opinions that you've expressed on 9:26AM two different patents, right?
A That's my understanding, yes.
Q Okay. And you understand that Mr. Quillin here is here to represent interests of his client, Intellectual Ventures, right? 9:27AM
A Yes.
Q And from time to time he'll make objections; but notwithstanding his objections, you understand that you need to respond to my questions, right?
A I do. 9:27AM

Q I'm going to hand you two exhibits. 9:27AM
(Exhibit 1, Exhibit No. 1001 from '545 IPR, was marked.)
(Exhibit 2, Exhibit No. 1001 from '334 IPR; Exhibit No. 1001, was marked.) 9:27AM
BY MR. KING:
Q The first I'm going to mark as Exhibit 1. This is Exhibit 1001 from the '545 IPR.
Have you seen this document before?
A Yes, I have. 9:27AM
Q And you understand that this is the patent at issue in the '545 IPR?
A Yes, I do.
Q Okay. I'm also going to hand you what I've marked as Exhibit 2. And this is Exhibit 1001 in the 9:28AM '334 matter. And it's the '334 patent, correct?
A That's correct.
Q Now, I understand that you have some experience with liquid crystal displays, right?
A I do. 9:28AM
Q Can you describe your experience with LCDs for me?
A Sure. I worked beginning in around 1989 doing display design and research and development for control panel and user interface displays on commercial aircraft 9:29AM

while I was at Honeywell. 9:29AM

Worked really will LCD manufacturers in the US to develop some control panel LCDs. The lighting associated with those LCDs as well. Then moved on to larger displays for instruments such as what's called an 9:29AM attitude position indicators, TCOS. They're roughly 3 1/2 inch square displays.

Then was involved in the development of the triple seven large format LCDs, active matrix, eight-inch displays. For that program I was responsible 9:30AM primarily for the backlight in the beginning and then LCD supplier optimization for the actual TFC cell.

After my work in Honeywell I moved on to Three-Five Systems where Three-Five Systems was a manufacturer of liquid crystal displays for cell phone, 9:30AM medical devices, office instrumentation; that sort of thing.

They had an automated processing line in Arizona. So we not only designed and -- designed the displays, we built the LCDs as well. Though, for 9:30AM back-end processes we sent those elsewhere.

So I was involved in, most of the time, optimizing the display assembly, not doing the LCD -- the LCD design itself, but basically characterizing the LCD performance, designing backlight systems, ancillary 9:31AM

requirements for it. 9:31AM
Then beyond that, I just stayed involved doing product design, recordization for liquid crystal panels. Because after -- after those displays, pretty much everything is built in Asia and now purchased as what we 9:31AM call commercial off-the-shelf and then modified as necessary.
But I've been basically working in the LCD field for over 25 years.
Q Okay. I noticed that you mentioned lighting 9:31AM and backlighting a couple times in your response.
Can you explain to me what that means?
A Most LCDs, not all, but most are passive devices that require some sort of illumination. Well, all LCDs are passive devices. Some require rear 9:32AM illumination, some utilize front illumination, such as, say, a calculator or watch display.
So most of the product I've been involved with have either been transmissivity requiring backlighting or transflective requiring backlighting and optimization 9:32AM of front surface properties as well.
Q Transflective; what does that mean?
A Means that the display acts in both transmissivity and reflective modes depending upon the ambient environment. 9:32AM

Q Can you explain that in lay terms? 9:32AM
A Okay. So on your watch you have a little back light. And when it gets dark you press the button, at least I do, and the little Indiglo thing comes on and I see the characters illuminated from behind. 9:33AM
But in daylight mode it operates in reflective. You have dark characters on kind of a silver background and we're just using the ambient illumination.
Q I thought I heard you say that you, at least right now, you don't build LCD panels; is that right? 9:33AM
A One of the companies that I'm involved with, I guess -- let me clarify what I did say. I said primarily LCD panels nowadays are built in Asia. And -- for active matrix cells, at least. And they're brought in as modules. And typically, the involvement now is 9:33AM more around using commercial off-the-shelf product and modifying it.
So disassembling the product and enhancing it in various ways through a lot of what I've done is backlight design for conversion to very high bright 9:34AM backlights for outdoor applications.
Night vision, filtering, and then also installing heaters to extend operating temperature range, you know, characterizing the displays to provide -- figure out how to provide the best 9:34AM

performance and meet customers' needs in rugged -- in a rugged environment. 9:34AM

Q Okay. I want to get a sense for where in the LCD space you have expertise. So why don't I ask it this way: Can you, at a high level, just describe the key components of a typical LCD panel in, say, 1993? 9:35AM

A Okay. Starting with the liquid crystal cell, you essentially have two glass plates separated by some small space, roughly three -- well, in 1993 it would be probably around five microns. The cell is sealed with an epoxy perimeter seal between the two pieces of glass. Well, really on the inside if you're drawing. And then it's filled with fluid. 9:35AM

Q Would it help to draw a picture?

A I'll explain it. The cell is filled with a liquid crystal fluid and then a little plug seal is administered. And inside the liquid crystal display would be, for the type of displays that I've worked on, would be the, basically, the electrodes for the pixels, or if you want to look at character displays also, the characters themselves, segment electrodes, those are usually formed on the glass as a transparent metal oxide called Indium tin oxide, which is installed via photolithographic process or a pattern via photolithographic process. 9:35AM 9:36AM 9:36AM

In active matrix displays there's additionally thin film transistors that are formed on one glass that connect to each of the pixels in the cell. And then also to row and column drivers. And further on the other glass that does not have the active matrix array form on it, there would be color filters formed. 9:36AM 9:37AM

Typically stripes of red, green, and blue, one per pixel, corresponding each to a TFT, thin film transistor on the opposite plate. So that's the cell. Attached to the cell are electronic components -- 9:37AM

Q Can we stop with the cell?

A Okay.

Q I'll come back to this, but I just have a couple questions about the cell.

A Okay. 9:37AM

Q So I just want to make sure I have this straight. In an LCD cell there are two glass plates that are separated by a very small distance, right?

A Yes.

Q And in between those plates there is -- there are liquid crystal molecules that are trapped between those plates, right? 9:37AM

A Yeah. Fluid contained between, yeah. Okay.

Q And then one of the plates has an electrode on it made out of Indium tin oxide? Or is that on both of 9:38AM

the plates? 9:38AM
A That would be on both of the plates.
Q Is that on the side of the glass plate that is touching the liquid crystal or on the side of the glass plate that's not touching the liquid crystal? 9:38AM
A It's on the side of the glass plate that's touching the liquid crystal.
Q And then you mentioned some thin film transistors that make up a pixel, right? Or that make up the pixels? 9:38AM
A In a particular -- so there are different varieties, flavors of liquid crystal display. Passive matrix displays just simply have rows and columns of ITO. That's the Indium tin oxide. And the active matrix displays have thin film transistors formed on one 9:39AM of the pieces of glass and the other has an array of ITO only.
Q So let's talk about the active -- let's just talk about the active matrix LCD type.
A Okay. 9:39AM
Q So in the active matrix LCD type, are the thin film transistors formed on the side of -- they're formed on one side of the glass, right?
A That's correct.
Q And is it the side of the glass that's touching 9:39AM

the liquid crystal? Or is it the side of the glass that's not touching the liquid crystal? 9:40AM

A It's on the side of the glass that's touching the liquid crystal. So basically, internal to the cell.

Q Those transistors don't stretch so that they cover -- so that they touch the other electrode, right? Let me ask a different way. 9:40AM

Those -- those thin film transistors that are touching the liquid crystal, do they also touch the other plate of glass? 9:40AM

A No. There has to be liquid crystal between the thin film transistors and the other plate. So they're very small in height. I mean, probably microns. And then there's usually a layer that I didn't tell you about. 9:41AM

What they would call a planarization layer. And then a layer, an alignment layer made out of polyimide that's spin cast onto the plates after the DFT structure's gone down. And that acts as -- that's mechanically or optically adjusted to provide alignment to the liquid crystal at the interface of the plate. 9:41AM

Q Okay. So looking at the plate of glass that has the transistors on it, so if you were just looking at that glass plate, you'd have a glass plate and then on top of that you would have transistors, right? 9:42AM

A In a very simplistic model, yes. 9:42AM

Q And then on top of the transistors, what would you have?

A Well, the transistors connect to transparent conductor material, the ITO. So they basically are 9:42AM electrically attached to ITO. Then over top of the transistors is probably a black mask to prevent photo activation of the transistors.

Black mask is, in this period of time, or let's say 199- -- 1996 time frame, it would have been chromium 9:43AM chromium oxide.

Q The glass, then above the glass the transistors?

A Yes.

Q Then above the transistors an ITO layer? 9:43AM

A Adjacent to the transistors.

Q I'm sorry. Adjacent to the transistors.

MADAM COURT REPORTER: Can you repeat that part?

Q And then adjacent to those transistors on the 9:43AM glass is an ITO layer, right?

A That's correct.

Q And then --

A And then there's --

Q Then going up a layer? 9:43AM

A Polymer layer above that. 9:43AM
Q Okay.
A The polymer layer is polyimide, with an I. The polyimide itself is, at this time, was mechanically rubbed, 1996, to provide surface alignment of the liquid 9:44AM crystal material on the cell surface, inner cell surface.
Q Okay. And then what's above -- what's the next layer up from the polymer layer?
A Liquid crystal. 9:44AM
Q So the liquid crystal doesn't actually touch the transistors physically, right?
A No. There's a separation layer to protect them, obviously. That's the polyimide.
Q And that's because liquid crystal is a 9:44AM sensitive material and transistors are sensitive and you don't want them touching each other because they might chemically react?
A I think they're pretty much protected by the chromium layer, chromium chromium oxide black layer; but 9:45AM there's no reason to not just pattern the polyimide over the whole glass substrate.

The pixel area where the TFT is located is not a light emitting area. It's usually kept dark. So the key is to make that as small as possible relative to the 9:45AM rest of the pixel. 9:45AM

Q Okay. And then the liquid crystal layer itself is just a continuous layer across the entire display, right?

A That's correct. 9:45AM

Q All right. So above the liquid crystal layer there's going to be another plate of glass, right?

A Yes.

Q Starting from the part of that plate of glass that touches the liquid crystal, can we keep on going up 9:46AM the stack and can you describe that for me, please?

A Sure. There would be a polyimide layer, a color filter layer that would be basically three different colors apply down, you know, three per pixel, basically, forming red, green, and blue sub pixels. 9:46AM

And then there may be some black mask between them. I'm not certain at the time of this patent. Then above that would be the ITO, planer ITO layer. Then on the outside --

Q Sorry. Above the planer ITO is the glass, 9:46AM right?

A Yes.

Q Sorry. You were saying on the outsides?

A Would be polarizers placed on each glass.

Q Would that be physically connected to the glass 9:47AM

or would that be a separate element? 9:47AM
A Laminated, too.
Q So the polarizer would be fabricated as a separate element from the glass and then it would be connected by a process? 9:47AM
A Yes. It's a sheet of film.
Q And there's a polarizer on each side?
A I'm sorry. I didn't hear you.
Q There's a polarizer outside of each plate of glass, right? 9:48AM
A That's correct.
Q Are there any other elements that make up an LCD cell?
A Well, there's the perimeter seal which is usually an epoxy layer that's formed -- if you have a 9:48AM rectangular display, an epoxy layer is screen printed down with leaving a little opening at the end. And there's also typically spacers inside the cell which I didn't tell you about either.
That's how you keep the glass apart. They're 9:48AM micro beads that set the cell gap. And the micro beads are present also in the perimeter seal. And before the liquid crystal is inserted, the planes of glass are brought together and, on the seal, that's, you know, preformed. 9:48AM

And then that assembly is secured, then it's evacuated in a vacuum chamber. And then liquid crystal is allowed to basically move by capillary action into the cell to fill the liquid crystal cell, the vacuum's released, and then the little port that the liquid crystal entered in is sealed off finally with a UV-cured epoxy. That's your whole cell. 9:48AM 9:49AM

Q Okay. And what you just described was an active matrix LCD cell, right?

A That's correct. 9:49AM

Q Okay. And if we just look at Exhibit 1, which is the '545 patent.

A Okay.

Q Would the system of the '545 patent use the active matrix LCD cell that you just described? 9:50AM

A No, it would not use the active matrix that I described.

Q How would the -- how would the LCD cell of the '545 system differ from what you just described?

A It would not have the color filters formed inside the cell. 9:50AM

Q Okay. Any other differences?

A No.

Q All right. Now, let's look at Exhibit 2. That's the '334 patent. 9:51AM

A Okay. 9:51AM
Q Are there any differences between the LCD cell that you just described and the LCD cell that would be used with the system of the '334 patent?
A Again, the color filters would not be formed inside the cell. So the LCDs of this patent and the previous one are what are called monochrome LCDs. Oh, and I need to amend my previous answer, if you don't mind. 9:52AM
The pixel structure would not be a three-pixel structure. Because if you remove the color filters, then you don't need to have a red, green, and blue thin film transistor, one each for those sub pixels. 9:52AM
So you reduce the number of -- I didn't say what the number of transistors were, but just to clarify, in a monochrome LCD you would have fewer thin film transistors. In a monochrome active matrix LCD. 9:52AM
Q But those transistors would still be located in the same place, right?
A Yes. 9:53AM
Q Any other differences between the LCD cell that you described and the LCD cell that's described in either the '334 or the '545 patents?
A I don't believe so.
Q All right. 9:53AM

A I did happen to say that there's a black mask in both the patents. They say an aluminum process can be used for the mask. 9:53AM
Q Okay.
A So that could be a minor difference. But I did say that it could have been something other than chromium chromium oxide. Go ahead. 9:54AM
Q So looking at the plate of glass that has the transistors, where does the black mask fit on the stack of that glass plate? 9:54AM
A It would be over top of, that's towards the liquid crystal-facing surface of the active matrix, of the thin film transistor. And typically, the address lines. Because they would be very reflective also.
Q Okay. Would that be underneath the polymer layer? 9:55AM
A Yes.
Q Would it be underneath the ITO layer?
A ITO is probably -- hmm. Can't say for certain.
Q Whatever it is, it doesn't touch the liquid crystal itself, right? 9:55AM
A Black layer does not touch the liquid crystal.
Q All right. We started this conversation on LCD cells when I asked you what were the major components of a flat panel display and I cut you off. So can you -- 9:55AM

A Actually, I believe you asked of a liquid crystal display. 9:55AM

Q Of a liquid crystal display. All right. Thanks for that clarification. So I want to -- can you keep on running through the other major elements of a liquid crystal display? 9:56AM

A Can you tell me which type of liquid crystal -- give me an example of a liquid crystal display that you would like me to describe.

Q Okay. So I think you're asking, am I asking about projection or I'm asking about flat panels? 9:56AM

A I want to be sure.

Q Okay. We will ultimately get to both of them. So let's start with -- but I want to start with where your experience is. I understand your experience is more with flat panels than with projectors, right? 9:56AM

A That's correct.

Q Let's start with the flat panel side.

Can you tell me the major -- at a very high level, can you tell me the major components of a -- 9:56AM

A Okay. So we'll try and sift through this. So you have to drive the pixels. That means basically apply a voltage field across the cell. To do that you have to connect to the outside world. Okay? So each of the TFT pixels is connected through column and row 9:57AM address lines which go to ledges on the outside of the cell. 9:57AM

And those ledges, so the glass is -- the two pieces of glass are not the same size. I guess I should point that out to you. The, what we call the bottom 9:57AM glass, that would be the TFT glass, has a ledge on, you know, at least one edge, on which electronic interconnect circuitry is attached.

Those circuits, typically called flexes or tabs, contain driver chips on them that set up the 9:57AM voltage signal for each pixel. Okay.

Then behind the -- so just moving to the outside now, behind the liquid crystal display there needs to be a light source, whether it's projection or a notebook computer or TV. So the light source is 9:58AM typically formed either as an array of lamps, behind some diffusers, such as in a TV, you know, flat panel TV, LCD TV.

Or it can be lit through a -- what's called a light guide assembly, which would be a transparent 9:58AM acrylic plate that has illumination from the edge. And basically it illuminates a structure that uniformly distributes the light on the rear surface of the liquid crystal panel.

Those, at the time of these inventions, were 9:59AM typically fluorescent lamps in an edge lit. Actually, fluorescent lamps in a direct view as well. 9:59AM

I actually did some designs even earlier where we were using incandescent lamps that were heavily filtered for backlighting LCDs. Nowadays, it's moving towards LEDs. 9:59AM

Q Okay. Are there any other major components that would go into a flat panel display?

A Structures. Optical films to help boost efficiency, reflector films to drive the light forward, housing that would support the entire structure. And then there's a controller board that would attach to the TFT chips. 9:59AM

Q Okay. Tell me about that controller board. Can you describe it in more detail? 10:00AM

A Typically, it sets up the timings and signal levels in response to some incoming signal and sends it out to -- it has a bunch of shift registers on it, you know, basic -- the main blocks are timing controller, shift registers, and D to A and A to D converters. 10:00AM

Q All right. Now, from reading your CV, it looks like you have a lot of experience with the backlight component; is that right?

A Lighting in general, but relative to LCDs, illumination of the display, yes. 10:01AM

Q Okay. What about the LCD cell itself? Do you have experience making or designing LCD cells? 10:01AM

A Yes, I do.

Q Can you describe that for me?

A Probably the first experience was having to redesign an aircraft display that's used in a control panel on the 737. From a sort of a low performing design that used a technology called dichroic liquid crystal, which means that there are dye molecules attached to a highly wound up cholesteric liquid crystal, very slow responding, especially at cold temperatures, poor viewing angle performance. 10:01AM 10:01AM

So I worked very closely with a US display supplier to develop -- to develop -- to commercialize an older technology that really hadn't been -- hadn't been commercialized for that application. 10:02AM

Actually ran experiments with them at their facility. The type of cell that we developed was called a Heilmeier liquid crystal cell and it's known to have much faster response times, better viewing angle performance. There's a published paper that is in my CV around that. 10:02AM

And then at Three-Five Systems I was heavily involved in basically tweaking designs of super twisted nematic displays. I was really sort of the optics and 10:02AM lighting guy. 10:02AM

You know, to achieve certain performance targets we'd make minor changes to rub directions, cell gap; things like that. So even though I'm not the guy down there, you know, turning the dials on the machine, 10:03AM I was part of the team.

Q And would you say that designing LCD cells was one of the focuses of your career or was your career really more focused on backlighting?

A Not designing LCD cells, no. That's a very, 10:03AM you know, specialized field. People -- people earn Ph.D.s at places like Kent State to do LCD cell design and optimization. Mine is more productization of products that utilize liquid crystal.

Q Okay. So were you -- were you helping people 10:03AM to tweak the designs of their LCD cells? Is that what you were describing earlier?

A That's what I did, yes. And then, like, on the -- the Boeing 777 program, I was given responsibility after the cell was designed, of course, 10:04AM by a Japanese company, working very closely with them on control parameters to optimize and stabilize variation in the cell.

So, you know, I was integrally involved in many aspects of the design. But, again, I was not the guy 10:04AM doing the -- running the analysis program. 10:04AM

Q Okay. Now, what about the controller board component? Was that a focus of your career, working on the controller aspects of the liquid crystal display?

A No. 10:05AM

Q Okay. And then so we've been talking about flat panels so far. Can you tell me what the major components of a projection system or liquid crystal projection system are?

A Which type would you like me to talk about? 10:05AM

Q Well, what types are there?

A Place to start. There are transmissive and reflective, would be the first main category. Reflective displays typically utilize some sort of crystalline silicone back plane. And transmissive tend 10:06AM to use the displays we just described in small sizes.

The elements include, of course, a light source, optics to pass the light source in efficient fashion through the liquid crystal cell. Optics to combine the lighting for projection, and then obviously 10:06AM a projection lens.

Additionally, there could be things like polarizing beam splitters, dichroic filters for extracting colors from a single light source.

Q And all of those components existed in 1996 10:07AM

when the '545 patent was filed? 10:07AM
A All of which components?
Q The components you just described.
A I'm not sure about, in the reflective one. I pretty much focused on transmissive. I would say the -- 10:07AM the reflective ones were being developed.
Q So did -- when you say being developed, what do you mean?
A They're not commercialized yet.
Q Are you aware of any reflective type 10:08AM commercial -- start over.
When you say they're not commercialized yet, do you mean there aren't -- there weren't any reflective-type LCD projectors in 1996 or just that there weren't very many? 10:09AM
A I'm not sure I can answer that authoritatively. In 19- -- excuse me. In 1997 to, or probably late '96 to '99 I worked at Three-Five Systems and they were working in R & D to develop what's called liquid crystal on silicon which is a reflective mode display. I spent 10:09AM probably three years working on that and hadn't made a successful product upon my departure in late '99, 1999.
So there are others that were working on them, you know, competitors. I don't believe anybody was successful at that time because Three-Five was aiming to 10:10AM

be the main supplier of projection-based on reflective liquid crystal. 10:10AM

Q All right. Let's talk about transmissive projectors for a second. Looking at transmissive projectors, are there different types of liquid crystal cells that people could use for transmissive projectors in 1996? 10:10AM

A Yes.

Q And can you list those out for me?

A Well, you could see from looking at some of the prior art that they were trying to use things like polymer disbursed liquid crystal. Primarily, twisted nematic -- by the way, n-e-m-a-t-i-c -- twisted nematic is the design of choice. I think it was Copen was working at that time extensively in transmissive color active matrix projection. 10:11AM 10:11AM

Q Is that a different -- so there's PDLC and what's the next type?

A I just said twisted nematic.

Q Oh, that's a different type? 10:11AM

A Yes.

Q What else?

A Probably some work around ferroelectric liquid crystal. Electrophoretic were looked at; but, again, I don't think they had much of a chance. So they were not 10:12AM successful. 10:12AM

Q Why didn't they have a chance?

A Wait a second. I take that back. That's reflective-only technology.

Q Okay. And were there different types of liquid 10:13AM crystal technologies that people were looking at for reflective projectors in 1996?

A Yes. Again, it's -- with the exception of that one that moved down there, there's also twisted nematic, we can call that TN from now on. So TN. And then 10:13AM polymer disbursed liquid crystal. Probably some -- those are the main -- main categories.

Other types of liquid crystal -- or ferroelectric, too. I did mention that. And then there's another type that -- called a Pi cell which is a 10:14AM liquid crystal technology that's rather fast switching, but very high voltage.

Q Okay. And were people using -- talking about the transmissive projectors, were people using TN LCD cells to make commercial projectors in the 1996 time 10:14AM frame?

A Yes, they were.

Q Okay. And were they also using TN to make commercial flat panel displays in the 1997 time frame?

A Yes, they were. 10:14AM

Q What about PDLC? Were people using PDLC to make displays in the 1996 time frame? 10:14AM

A Not high information content displays. So if you could think of rudimentary signage displays and things like that. PDLC are -- there are some benefits to them in that they could operate in reflective mode well. But they just didn't have response time capability needed to operate, you know, in even slow refresh rates, you know, typing and things like that. 10:15AM

Q Okay. And so in 1996 no one was making a PDLC-type display that was commercially available? 10:15AM

A Not to my knowledge. Well, wait a second. You just generalized two display from -- so we're talking originally about projectors and the answer's no.

Commercially, there is probably some large segment signs. The best example of PDLC for, that I know of, are electronic windows. And that's, you know, primarily where I've seen PDLC go. There are probably niche applications that I'm not aware of. 10:16AM

Because there is a group called -- company called Kent Displays that was a spinout from Kent State University that was working to commercialize these for as long as I can remember. 10:16AM

Q But nobody was making a television out of --

A No way. 10:16AM

Q No way. That's your testimony: No way? 10:16AM
A No, they were not.
MR. KING: Thanks. Now is probably a good time for a break. That's okay with you?
MR. QUILLIN: I'm sorry? 10:17AM
MR. KING: Is now a good time for a break?
MR. QUILLIN: Yes.
THE VIDEOGRAPHER: We are going off the record. The time is approximately 10:15.
(Off record from 10:17 a.m. to 10:32 a.m.) 10:17AM
THE VIDEOGRAPHER: We are back on the record. The time is approximately 10:32.
BY MR. KING:
Q All right. I'm handing you what's been marked as Exhibit 3. 10:32AM
(Exhibit 3, Declaration of Robert Smith-Gillepsie in '334 action; Exhibit No. 2008, was marked.)
BY MR. KING:
Q This is Exhibit 2008 in the '334 action. And this is your expert report, correct? 10:32AM
A Declaration.
Q Declaration. So just a couple more questions about your qualifications. If you could turn to page four, that's paragraph five. Now, do you see about 10:33AM

three-quarters of the way down where it says, 10:34AM
Technologies that I evaluated included -- actually,
strike that.
Do you see the sentence before that where it
says, In the early phases of this program we performed 10:34AM
trade studies?
A That's correct.
Q Okay.
A I'm sorry. I do. Yes, I see that.
Q And the goal of those studies was to replace 10:34AM
cathode ray tubes instruments on the flight deck, right?
A Yes.
Q You were studying alternatives to cathode ray
tubes?
A Yes. 10:34AM
Q Then I see one of the technologies that you
evaluated were, or was, rear projection micro display
LCD panels?
A Yes.
Q Can you tell me about that? 10:34AM
A So mostly what we did was look at performance
of existing projection devices. Again, I think they
were not commercialized. They were, you know, offerings
from companies like Copen. My work, again, was more
aimed around the lighting aspect, illumination. 10:35AM

And what we found was that in order to meet -- 10:35AM there's a term called MTBF that means meantime between failure, that with the current projection displays, that the meantime, the MTBF numbers, because of light sources themselves, were too low for commercial aircraft 10:35AM applications.

So this work didn't go that far. There's another group that I got involved with that then started doing development of actual flat panel LCD.

Q How much time did you spend evaluating 10:35AM projection systems during this time period?

A I was a contributor. So I would say it was, you know, over a period of months, maybe. I don't know. I was part of the team for a few weeks looking at the light sources. 10:36AM

Q So a few weeks?

A Yeah.

Q And was that your primary responsibility during those few weeks or was it just something else you were doing? 10:36AM

A Part of my lighting job. So it included other -- I was still doing other things, supporting products.

Q Was evaluating projection systems your main responsibility during these few weeks? 10:36AM

A No. 10:36AM
Q And then moving on in paragraph five, you see where it says, Following my work at Honeywell, I moved to Three-Five Systems where I again worked as a technical specialist for displays in lighting? 10:37AM
A Yes.
Q And then it says, While there, I interfaced with the liquid crystal on silicon (LCOS) projection team (later to become Brillian Corp.) on light engine design. 10:37AM
Do you see that?
A Yes.
Q And then the sentence goes on.
A Right. Then it goes on.
Q Can you tell me what that was about? 10:37AM
A Sure. Three-Five Systems, at the time I was working there, had a team that was later spun into a parallel company, I guess, that was working on the LCOS reflective displays, active matrix thin film -- or not thin film, liquid crystal on silicon reflective back planes. 10:38AM
Because of my thermal and lighting and display test and measurement experience, I worked with their design team. Some of the tasks included characterizing the liquid crystal cell over temperature over viewing 10:38AM

angle and radiometrically. 10:38AM

And then also working with the design -- the optical engineer who was doing all the integration optics on thermal design of the light source elements.

Q And about how long would you say you worked with the projection team at Three-Five Systems? 10:39AM

A It was over a period of a year.

Q Now, it says you interfaced with the LCOS production team. I assumed you weren't part of the LCOS production team? 10:39AM

A No, I wasn't. I was a team by myself. I was called technical specialist for displays and lighting, so I supported several teams.

Q How much -- how big was the LCOS projection team at Three-Five Systems at that time? 10:39AM

A Guys actually working on hardware, I'd say four folks there. And then the liquid crystal guys, a few more. So maybe six or eight. And a technician or two.

Q Was that the largest team at Three-Five Systems? 10:40AM

A Oh, no.

Q What was the largest team you supported?

A Our handheld products team, I guess you could call them, LCDs for cellular phones and handheld devices. 10:40AM

Q And were there other teams you supported? 10:40AM
A That's the two primary teams.
Q What percentage of your time would you say was dedicated to supporting the LCOS projection team?
A Over that period, I would say not even 10:40AM ten percent. Probably -- it was on a periodic basis and then there would be a half day of work here, day of work there. And then participating in meetings.
Q So is it fair to say you've been exposed to projection technology during your career, but you don't 10:41AM have experience designing projection systems?
A That's a fair characterization.
Q Have you ever done any applied research into projection systems?
A No. Oh, wait a second. Let me take that back. 10:41AM What I was doing was supporting at Three-Five when -- doing test of the LCOS LCD. I was participating in applied research. So running radiometers and doing lab tests, at the level I previously described.
Q Now, you mentioned Kent State University a 10:42AM couple minutes ago.
A Yes.
Q And I learned recently that Kent State is one of the leading research institutions into liquid crystal displays; is that right? 10:43AM

A That's correct. 10:43AM
Q And you've taken classes from them?
A I did, yes.
Q When did you take that class?
A I need to look at my CV to remember that, but it was probably -- I would say '94 timeframe, maybe '92. Somewhere in that timeframe. It was a week-long professional short course. 10:43AM
Q What was your purpose in taking that class?
A To become -- become better skilled at working at the LCD products we were developing at Honeywell. And to understand at a deeper level the physics of liquid crystal materials and devices. 10:43AM
Q All right. Let's go to paragraph 14 of your report, page seven of the '334 report; are you there? 10:44AM
A I am.
Q Okay. I understand that you -- I see where it says, I respectfully disagree with several of the assertions made by the board with respect to the interpretation of claims 1 to 6 and 11 to 14 of the '334 patent; do you see that? 10:44AM
A I do.
Q I was a little confused about that sentence. Are you saying you disagree with the -- some of the things the board said? Or are you saying you disagree 10:45AM

with their constructions? 10:45AM
A Their interpretation of what the -- what the claims meant.
Q Okay. So you disagree with their claim constructions? 10:45AM
A I guess that would have been a cleaner way to say that.
Q That's all right. I was thinking there was a cleaner way to ask the question.
But for the '334 patent, it's your opinion that 10:45AM the claims are valid regardless of which construction is applied; is that right?
A Yes. And I'd like to amend my previous answer, if I may.
Q Okay. 10:46AM
A I'm speaking to the board's decision as well in some of their -- not just the claims construction, but some of their interpretation of materials presented and reviewed by them.
Q That's fair. So let's turn to paragraph 15. 10:46AM And I see that paragraph 15 is discussing the board's interpretation of the term light shutter matrix system; do you see that?
A Yes.
Q And then at the bottom of the first paragraph, 10:47AM

it's all one paragraph, at the bottom of the first section do you see where it says, The board's definition references cells of a monochrome LCD array? 10:47AM

A I do.

Q And you reference Dr. Buckman's response to the question, what is an LCD cell; do you see that? 10:47AM

A I do.

Q And then it looks like you disagree with that definition.

A I disagree. 10:47AM

Q Can you explain to me in lay terms why you disagree with his?

A Dr. Buckman describes an LCD cell, and I quote, an LCD cell is -- I interpret that as being another way to describe pixels. It's a -- it's a part of a spatial light modulator that corresponds to a particular position on a two dimensional surface that corresponds to, in the case of a color projector, the transmissivity at a particular color. 10:47AM

So it's my opinion that Dr. Buckman is making up what an LCD cell actually is. I've described to you what an LCD cell is at the very outset of our discussion today. And what I described to you is the industry-accepted, you know, definition of what a cell is. 10:48AM 10:48AM

A cell is the part of the liquid crystal display that contains the liquid crystal between two glass plates and, you know, the structure therein, as well as the seal and, you know, any of the thin film transistors and color filters. 10:48AM

That complete unit is what's called the cell. Now it can be simpler or it can be more complex. But it is not pixels.

Q Okay. So no one in the industry would ever -- just to summarize what you're telling me. You're saying no one in the industry would ever call an LCD cell -- let's try that again. 10:48AM

You're saying that no one in the industry would refer to a pixel as an LCD cell, right?

A That's correct. A pixel is a picture element that basically has a job of holding a signal across the cell and transmitting light at that one location. The cell is the whole structure with the liquid crystal inside it. Like in a human cell, is a structure. 10:49AM

Q Okay. And looking at -- nevermind. 10:49AM

Let's go to paragraph 16. And paragraph 16 contains some of your opinions on the interpretation of the matrix in the context of the '334 patent, right? Matrix or matrices?

A Yes. 10:50AM

Q Okay. Now, I see at the bottom of page nine that you say, In the context of the claims and specification of the '334 patent, a person of ordinary skill in the art would interpret matrix, in quotes, that, "comprises a rectangular arrangement of elements capable of limiting the passage of light," to mean something quite specific. 10:50AM 10:51AM

Do you see that?

A I do.

Q And then it says -- then you say, One of ordinary skill in the art would appreciate that the claim system of the '334 patent is an electrically-addressed system. 10:51AM

Do you see that?

A I do. 10:51AM

Q Okay. I wanted to ask you, what's the basis for that opinion?

A Well, the patent specification itself, first of all.

Q Okay. Where does the patent specification refer to electrically addressed systems? 10:51AM

A Okay. So if you look in column two, beginning in the description of preferred embodiments, at line 45 and going down through the bottom of that paragraph or that column. 10:53AM

Basically they point out -- the inventor points out that the described device in the '334 patent is -- uses an LCD, monochrome LCD array. And he points out how it's different than a color active matrix LCD array. 10:53AM

I described to you earlier what a color active matrix LCD array is. And then I also described to you how a monochrome version of that would be configured. There's no -- no way to interpret this as other than being an electrically addressed, an active matrix LCD means that it's a thin film transistor LCD, transistors are electrically addressed. 10:53AM 10:54AM

So this is a monochrome thin film transistor LCD array.

Q And where specifically on column two does it say that? 10:54AM

A Monochrome LCD array. So let's put the pieces together. So we understand that an active matrix LCD array is electrically addressed. I described that to you. You agreed that there were drivers and you asked me questions about the drivers. Okay? 10:55AM

The patent specification says the color filter is essentially a band pass filter for light and typically the scheme used is red, green, blue. By its very definition, it must absorb most of the energy reaching it. 10:55AM

Embodiments -- and I'm skipping down. 10:55AM
Embodiments of the present invention, the apparatus is arranged in a distributive manner. Light from light sources, typically lamps, is first colored and otherwise prepared into three single beams which then pass through 10:55AM a monochrome LCD array. Meaning that, essentially, you have the same LCD array that they're describing above without color -- color filters in it.
And it's well known to one of ordinary skill in the art that an AM LCD is an electrically addressed 10:56AM device.
Q Okay. So you've been reading from column two, line 45 to 60, right?
A And then additionally in column three, beginning around line 20, on the first glass of LCD unit 10:56AM 120, which comprises three monochrome LCD arrays, it gives their numbers, 117, 118, and 119, there's an optional metal mask, 116, blacking out the nonactive areas of the LCD.
An aluminum process can be used for the mask 10:57AM similar to the process known in the art for making connections on the active matrix of the LCD. And they're talking about this LCD active matrix.
Q And then they say that metal mask is optional, right? 10:57AM

A Yes. 10:57AM
Q And you've agree with me that the '334 patent does not use the words electrically addressed?
A Well, I can't do a word search on this, but if you can represent to me that you didn't find the words 10:58AM electrically addressed in there, then I would probably agree. It's inherent, however, in the description of the device for reasons I've previously pointed out.
Q That's fine. I haven't found it and I was wondering if you've found it. 10:58AM
A Not just now.
Q Okay. All right. Looking at column two, lines 64 to 65, it talks about a monochrome LCD array. Is that referring -- when it's talking about a monochrome LCD array, is that talking about one monochrome LCD cell 10:59AM or is that talking about an array of three monochrome LCD cells?
A In this case, light from light sources, typically lamps, is first colored and otherwise prepared into three single color beams which then each pass 10:59AM through a monochrome LCD array.
So that would be one of the three devices, one cell.
Q Okay. So the array is one cell of the three devices, right? 10:59AM

A Yes. In this case. 10:59AM

Q Now, going back to your report and your reference to an electrically addressed system, I understand that Dr. Buckman talked about an optically addressed system, right? 11:00AM

A I do understand that.

Q Okay. Can you give me your understanding of what an optically addressed LCD system is?

A No, I can't.

Q Do you have an understanding? 11:00AM

A Of an LCD?

Q Sorry. Do you have an understanding of what an optically addressed LCD system is?

A You have to be more specific. Because if you'd like to ask me a question relative to Dr. Buckman's 11:01AM testimony, it was not relative to an optically-addressed LCD.

Q Okay. So let's take it out -- let's take it out of Dr. Buckman's testimony.

Do you have, just aside from Dr. Buckman's 11:01AM testimony -- let's do it this way: Are you aware of any optically-addressed LCD projection systems that were around in the 1997 time frame?

A No.

Q Now, in a couple minutes we're going to talk 11:01AM

about the Takanashi reference; do you understand that? 11:01AM
A I do understand.
Q You know what, let's save Takanashi for later.
I guess, have you heard the term optically-addressed system in the context of -- of a display technology before? 11:02AM
A No.
Q It's not something you were familiar with -- have you ever heard the term optically-addressed outside of the context of this lawsuit or this IPR? 11:02AM
A No, I hadn't.
Q That's new to you?
A That's new to me.
Q Okay. All right. Looking at page ten, I see that you have a figure from a book called flat panel displays and CRTs; do you see that? 11:03AM
A Yes, I do.
Q Can you explain for me in lay terms how this figure impacts your analysis?
A It really supports, not impacts. It's my feeling that the board didn't have a proper understanding of what the matrix in a matrix address display is. Whether it's active matrix or passive matrix. 11:03AM
So I basically wanted to point out that a 11:04AM

matrix display has addressable pixels and they're arranged in a, you know, a fixed structure. I should say, an organized fixed structure. 11:04AM

And I just wanted to put that in to show what the terminology and -- it's probably not the very best picture, but every other picture puts in so much detail that it muddies the water. Essentially, we have addressable fixed positions on a substrate that could be -- and those are called pixels. 11:04AM

Q And when you say they're addressable, I see some Xs and Ys on this figure. Am I looking at the right thing for addressing? 11:04AM

A So what essentially you do in the electronics is select the location that you want to apply a signal to. In the LCD case you basically apply a voltage across the cell. And that position is essentially connected to a row and column -- row and column electronics, drive electronics. 11:05AM

So you can select and adjust the signal at each of the individual pixels. 11:05AM

Q And you select the individual pixel using XY coordinates?

A Whatever you want to call them. They're -- they might be called R and C for row and column. And that's -- that's typical. You'll see R1 through R 11:06AM

whatever and C1. 11:06AM
Q So this figure on page ten of your '334 report, it references -- it has X1, X2, X3, and Y1, Y2?
A Yeah. Basically showing there's 12 pixels that are addressed. 11:06AM
Q Okay.
A Addressable.
Q All right. So turning the page over to page 11 of your report in the '334 matter. I see it says, If the example display from Figure 1-10 of Tannas were used 11:07AM in the claim system of the '334 patent, one of ordinary skill in the art would understand that each matrix of the claimed matrix system would include a rectangular arrangement of 12 elements corresponding to the 12 depicted pixels; do you see that? 11:07AM
A Yes.
Q Is it your opinion that you could use the four by three matrix described in the work that we've been talking about --
A Yes. 11:07AM
Q -- with the '334 patent?
A Well, the answer is yes, if you wanted to have an image with only 12 pixels. The point now, of course, I pointed out that this is very diagramatic, the figure, because more detailed pictures became overly complex 11:08AM

with address lines and TFTs and -- for the purpose of this, we're just trying to point out here that there's a set of fixed rows and columns and pixels corresponding to the intersections of those rows and columns. 11:08AM

And hypothetically, one could build a '334 device by using 3 of a 12 pixel device. That's what -- that's what that paragraph that you just read means. 11:08AM

Q Okay. Let's go to paragraph 17. Can you explain for me in lay terms what paragraph 17 means?

A I thought that was lay terms. 11:09AM

Q Can you explain to me how -- I guess I didn't understand why this paragraph was in your report. So I was hoping you could explain to me why -- how this supports your analysis.

A Okay. So essentially, the very very simple case of a pixel array or matrix of three rows, four columns was shown. And a hypothetical example set up that each matrix of the '334 patent would have a pixel structure similar to these 12 depicted pixels. 11:09AM

Seventeen days, that's not really realistic. To have a useful display, you'd basically want to have high resolution. Okay? Something at the time of the '334 patent, VGA resolution was achievable on the small cells. 11:09AM

VGA resolution being 640 pixels by 480 pixels, 11:10AM not three by four of the Tannas figure. That would result in a total of 307,200 pixels. 11:10AM

Q Okay. Were you finished?

A Yes.

Q All right. Let's look at paragraph 18. Now, paragraph 18 is talking about your opinions on the proper construction of the term a video controller adapted for controlling the light shutter matrix system, correct? 11:11AM

A That's correct. 11:12AM

Q Okay. And if I understand your opinion correctly, you -- you think the board's construction that a video controller is a component that controls the light shutter matrix system to facilitate the display of video; do you think that construction is too broad, right? 11:13AM

A I do.

Q And you think that the board's construction is right, but it should also include the phrase 'in accordance with a video signal' at the end of that construction, right? 11:13AM

A Yes.

Q Can you explain to me why you think the words 'driven in accordance with a video signal' should be added to the board's construction in, kind of, lay 11:13AM terms? 11:14AM

A Yes. I saw, in reading the board's decision, that they believed that one of the pieces of prior art that was referred to, that a -- basically a motor drive that drove a spinning disk was sufficient to meet this 11:14AM requirement that -- of a video controller adapted for controlling the light shutter matrix system.

And that basically signaled to me that we really need to clarify, which I guess in patent terms maybe means narrow their interpretation so that a 11:14AM spinning wheel, a color wheel cannot be a video controller adapted to control an LCD array, my words.

So that's basically -- the color wheel in the reference that I'm talking to here, Lee, is not operated in response to a video signal. Basically, just a fixed 11:15AM frequency drive.

Q Okay. Now, you understand that Dr. Buckman has -- that Dr. Buckman agrees with you, that Lee -- that the color wheel controller of Lee is not a video controller, right? 11:15AM

A Yeah, I did see that.

Q Okay. So given that there's now an agreement about that element of Lee, do we still need your extra language on the construction of driven in accordance with a video signal? 11:16AM

A Basically, what does facilitate mean, is the question. And, you know, I guess I just find that to be a rather loose term. And I think in terms of the complexity of electronics that are required to facilitate, that something more is needed. 11:16AM 11:16AM

So -- and that would be what I interpret as the decoding portion of the video controller. And that's receiving and decoding the video signal and prepping it for controlling the LCD arrays.

Q I guess I'm trying to understand if you're posing a new term for the board to adopt or if you're trying to provide your best interpretation of what the board's construction means. 11:17AM

Which one of those are you trying to do?

A I'm not sure which one -- I'm not sure how to answer your question. Maybe if you ask again and include the references that we're referring to. 11:17AM

Q Okay. I guess you said you've been deposed in about ten patent matters before, right?

A That's correct. 11:18AM

Q I know you're not a lawyer. Are you somewhat familiar with the principles of patent construction?

A I am somewhat familiar, but not in this aspect. Mostly it's been markman-type proceedings.

Q I understand. Are you familiar with the 11:18AM

principle that it is improper to read in a limitation 11:18AM
from the specification into the claims?
A Improper to read in something that's not in the
specification into the claims?
Q Are you familiar with -- 11:18AM
A What did you --
Q Yeah. You're familiar with the patent law
principle that the claims govern the scope -- the claim
language governs the scope of the claims, right?
A That I understand. 11:19AM
Q Right. And something that's disclosed in the
specification, but not -- but it's not in the claims is
just not claimed, right?
A Okay.
Q Did I say that wrong? 11:19AM
A I -- there could be extra stuff in the spec
that was not set forth in the claims, is what you just
said.
Q Yes. Okay.
A I understand that. 11:19AM
Q Now, I'm looking at your report and I see that
the claims don't have any reference to video signal,
right?
A I disagree.
Q I could get that wrong. I'm not -- 11:20AM

A It doesn't use the word video signal, but it says a video controller adapted for controlling the light shutter matrix system. And then early on I think we talked about what the types of video signals could be. 11:20AM 11:20AM

Q Okay. So let's talk about the -- I guess I'm just trying to figure out if we really have a dispute here. Because I'm not sure that we do.

Can you tell me what types of video signals you're talking about here? When you say video signal in the context of your proposed construction, what do you mean? 11:20AM

A I mean an electrical signal, first of all, that would be configured at the time of this patent, probably would be an analog signal, either with separate red, green, blue channels and some synch values, horizontal and vertical synch; or it could be something called composite video, which is essentially a single line encoding of all the video information, which would include, in that case, something they call luminance and chrominance, or lumen and chrominance, and the synch information. 11:21AM 11:21AM

So that's what I'm interpreting video signal.

Q Basically, any video display device is going to display information in accordance with a video signal, 11:22AM right? 11:22AM

A When you say "video device," let's just clarify any video device, what you mean by that; like a television?

Q Television, projector, LCD flat panel. 11:22AM

A See, in projectors, they may be driven by a video input, you know, pure video input, such as that which I described; or they could -- or they could receive, say, some computer signal and put up static images. 11:22AM

Q But a video projection system would receive a video signal, right?

A Yes.

Q Any video projection signal is going to receive a video signal? 11:22AM

A I agree.

Q Any real video projection system is going to have a video controller, right?

A Somewhere in the system there would have to be a means of -- and when I say somewhere in the system, it 11:23AM could be a box sitting outside or it could be, you know, a board inside.

But you would have to deconstruct the video signal, you know, basically parse it, as I told you what they are, and condition it for driving the display 11:23AM elements. 11:23AM

Q So what you're saying is in any video projection system, it's going to have a video controller. Now, the controller might be in the same box as the lamp and the LCD, the liquid crystal arrays, 11:24AM or it might be in a different box. But any video projection system in 1996 is going to have a video controller, right?

A Yes, most likely.

Q All right. Could we go to paragraph 23 on your 11:25AM '334 report, pages 18 and 19.

A Okay.

Q The court reporter wisely suggested we should take a break to change the tape. So let's do that.

THE VIDEOGRAPHER: We're going to go off the 11:25AM record now. The time is approximately 11:25.

(Off record from 11:26 a.m. to 11:37 a.m.)

THE VIDEOGRAPHER: And we are at the beginning of Media No. 2 in the deposition of Robert Smith-Gillespie in the matter of Xilinx Incorporated v 11:37AM Intellectual Ventures. The time is approximately 11:38.

BY MR. KING:

Q All right. Let's switch gears a little bit and talk about the Takanashi reference. Okay?

A Okay. 11:38AM

Q And in particular, let's talk about the -- well, I'm going to be looking at your '334 report. But I just want to talk about Takanashi generally at first. 11:38AM

A Okay.

Q Now, I understand that it's your opinion that Takanashi does not render any of the challenge claims of the '334 patent invalid; is that right? 11:38AM

A That's correct.

Q And one of the reasons is because, in your view, Takanashi does not have a -- that the LCD in Takanashi is not a matrix; that's your opinion, right? 11:39AM

A That's part of my opinion.

Q Is there more that you'd like to express?

A Not yet. We're getting into Takanashi, it'll come out, I'm sure. 11:39AM

Q I'm looking at -- I guess just looking at -- looking at paragraph 23 of your report on page 18 of the '334 report, and I see that you say that Takanashi does not disclose an addressable pixel array; do you see that? 11:40AM

A Oh, you're in paragraph 28?

Q Twenty-three. Sorry.

A Oh. Oh. You said page 23. Sorry. Okay. I see it.

Q And the section about how Takanashi does not 11:40AM

disclose an addressable pixel array in your view was 11:40AM
written in support of your opinion that Takanashi does
not disclose a light shutter matrix system, right?

A That's correct.

Q Okay. Can you explain to me what you mean here 11:41AM
by addressable pixel array in paragraph 23?

A Sure. A physical structure that comprises
fixed elements that information can be loaded into and
electrically addressed. In other words, you can
basically change the characteristics by addressing 11:41AM
individual elements of a matrix.

Q Okay. And one example of that you gave earlier
when we were discussing the LCD cell, right, as an
example of an active matrix LCD cell?

A An active matrix LCD cell is one example of an 11:42AM
addressable pixel array.

Q Okay. Could you explain for me how at an
electrical level a pixel, the pixel circuitry of a pixel
causes the corresponding area of liquid crystal to act
in operation? 11:42AM

A In which type of device? In an active
matrix-type device or a passive matrix or just
generally -- generally?

Q Generally.

A Generally, across a -- across the liquid 11:42AM

crystal cell, regardless of how many pixels there are, 11:43AM
if you add a single liquid crystal cell, you apply a
differential voltage, basically, a potential across the
cell that's proportional to the -- proportional to the
amount of light that you want to pass or block, 11:43AM
depending on the characteristic of the display.
In a matrix device you would basically read the
data in electrically to the cells, either by -- excuse
me -- into the pixel array by either scanning it or by
addressing rows and activating columns in the TFT-type 11:44AM
structure.
So basically, what you're trying to do is apply
a voltage across a pixel that's proportional to its
optical property that you want.
Q Okay. So at a pixel, you apply a voltage to 11:44AM
the pixel transistor, right?
A Yes.
Q And then that voltage causes the pixel
transistor to have an electrical field around it, is
that -- 11:44AM
A Well, no.
Q No?
A That basically drives current to the capacitor,
which the pixel cell acts as a capacitor, and it
basically charges the capacitor, which then holds, in an 11:44AM

active matrix, that voltage until it's readdressed. 11:44AM

Q Okay. And the -- just so the record's clear, can you describe this capacitor that you're talking about for me?

A Yes. Before I -- when I was describing the structure of a TFT array, I mentioned that the thin film transistor was attached to a patch of ITO that forms the pixel. 11:45AM

Q Right.

A That patch of ITO is one plate of the capacitor, the other plate is the opposite side of the cell, the ITO on the other glass. 11:45AM

Q Okay. And then the liquid crystal between the two plates is the insulator?

A It's a dielectric. 11:45AM

Q Sorry. The dielectric. It's been a long time for me.

A It's okay.

Q And so in a pixel, by energizing one plate of the capacitor, that causes the liquid crystal next to that plate to behave in a certain way, right? 11:46AM

A Yes.

Q Can you describe how that works for me?

A The -- basically, liquid crystal is a unique material that responds to an electric field. It aligns 11:46AM itself with an applied electric field. And as you increase the strength of the electric field, the alignment becomes more, how should we say this, more complete. 11:46AM

So when you apply a voltage across a cell containing liquid crystal material, liquid crystal molecules align, or I should say dis-align with their relaxed state and align with the electric field. 11:47AM

Q And when they're aligned with the electric field, that allows light to pass through the liquid crystal, right? 11:47AM

A Pass through or blocked. In fact, majority of our displays are what they call normally white. I'm talking, like, TVs and notebook computers and monitors.

And in that case, the light is allowed to pass in the relaxed state. And when you apply the electric field, light's absorbed in the front polarizer, and proportionally to the strength of the electrical fields, the absorption is, and it goes dark. 11:47AM

Q Now, going back where we started, which is paragraph three and the concept of addressing. 11:48AM

A Paragraph 23?

Q Paragraph 23, yes. So is it fair to say that -- strike that.

What's your understanding of the term 11:48AM addressing in the context of liquid crystal display technology, whether flat panel or projector? 11:48AM

A Typically, it would be applying an analog voltage to a pixel or to the full array by clocking in the data, you know, a row at a time. 11:49AM

Q Okay. Are there different types of addressing in the context of LCD itself?

A Yes.

Q What are those types?

A There is what's called passive matrix addressing in which the rows are multiplexed together in high information -- well, let's go back one step. 11:49AM

There's direct addressing in, say, a numeric display, calculators of the old days. You could drive -- you could apply a signal to a particular segment of the display directly from the driver. Okay? So a seven segment display would have seven connections plus the back plane. 11:49AM

In a matrix-type display, so in early computer displays, for instance, there would be an array of rows and array of columns and information would be read in by holding the columns at a level and then cycling down through the rows to load the -- to basically address them. 11:50AM

So each cell would receive a voltage for a 11:50AM short period of time and then it would decay. That's -- then the active matrix, basically you apply the signal in a similar fashion and it's -- it's held in place by -- the TFT structure holds the voltage on the capacitor. So you don't have the decay that you see in a passive matrix addressed cell. 11:50AM 11:50AM

Q Okay. You said each cell would see a voltage for a short period of time?

A I corrected myself. I said each pixel.

Q You just used the word cell and pixel interchangeably? 11:51AM

A It was an accident.

Q Okay. Now, you understand that in other areas of imaging technology the word cell and pixel are used interchangeably? 11:51AM

A I don't think that's quite true.

Q How about image sensors?

A That's definitely not true in image sensors.

Q Really?

A Yes. 11:51AM

Q How is that?

A Sorry. Let me compose myself. Image sensors may have a cell. Say, for instance, a CCD array, okay? A CCD array, when you -- when someone asks you how many -- what's the resolution of the camera in your cell 11:51AM phone, okay? They're describing the number of pixels in your cell phone, not the number of cells. 11:51AM

And it's always been, when they talk about the device, it's, you know, five megapixels, eight megapixels. That's how many millions of pixels there are in that CCD array which may not actually be a cell, even, because there's nothing contained in it. It's just a matrix array. 11:51AM

Q All right. So we were talking about types of addressing. We have direct addressing, we have rows and columns. 11:52AM

A Or passive matrix.

Q Passive matrix. What other types of addressing are you aware of in the context of LCD display systems such as flat panels or projection systems? 11:52AM

A Active matrix. And then there was somewhere between, for a period of time, a -- I guess you would call it a step between the active matrix and directed -- direct drive, where they just tried to form a diode, not a thin film transistor on the cells. Diode address displays, you might call them, or arrays. 11:53AM

Q Have you ever heard of a type of addressing called scanning?

A Yes.

Q What is that? 11:53AM

A That's what you do with a passive matrix device, you scan the rows while you load information in on the columns. 11:53AM

Q Are you familiar with any systems that use a CRT to do scanning addressing? 11:53AM

A That's a different kind of scanning than what I was just talking about.

Q Right.

A So let me be clear that scanning in electrically addressed is what I just mentioned, 11:54AM basically applying the signal a row at a time and it's -- you describe that -- or I described that as scanning the rows.

In a CRT, there are no rows and columns. There is a uniform phosphor plate that an electron beam that's 11:54AM scanned back and forth across the plate generates basically whatever electron it hits, generates an emission of light.

Q Okay. So the -- with a CRT, the part of the display that actually shows you the light is continuous, 11:54AM it doesn't have rows and columns, right?

A That's correct.

Q So when we go to the store to buy TVs, even CRT TVs, if you can buy them anymore, that say are 720p, that's referring to the number of rows in a television, 11:55AM

right? 11:55AM
A Scan lines.
Q Number of scan lines. Okay. And scan lines are -- fair to call them rows, right?
A No. They're scan lines. 11:55AM
Q They're scan lines. Okay. They're lines.
A No. They don't even exist. They're not physical entities, they're positions where a scanned beam would strike the phosphor plate.
Q Okay. And in a typical video system, the video 11:56AM signal would define where the scan lines are; is that fair?
A No. That's not really -- really true either.
Q Okay. Can you explain for me?
A So we're talking about CRTs, okay? The CRT 11:56AM scan lines basically are addressed by deflecting an electron beam. So the scan lines don't actually exist as lines.
Yes, I guess there is a yes portion to your question, okay, that there is a device that basically 11:56AM has to control the -- the deflection beam to, I guess, put the rows in the same place each time.
Q When you say to put the rows in the same place each time, what do you mean?
A To scan the electron beam in a way that it 11:57AM

strikes roughly the same area of the phosphor screen. 11:57AM

Q Now, the video signal that controls the CRT, does that video signal contain pixel information?

A No.

Q It doesn't? Why not? 11:58AM

A There's no pixels.

Q I guess if it's not -- if they aren't pixels, how would you describe it in that line when I'm looking at a TV when it changes from one color to -- one intensity to another? How would you describe that piece 11:58AM of information?

A In a CRT?

Q Yes.

A That's -- my description of that is it's an analog emission of light. 11:58AM

Q But that analog emission of light has a resolution, right?

A I don't know. I don't think I could say yes to that. CRTs have a -- the emission is not governed by a physical structure. It's actually governed by a 11:59AM statistical position of where an electron might strike the screen. And typically, the emission doesn't have a -- an addressable location, first of all.

But to be more clear, it doesn't even have a fixed optical characteristic to it other than being 11:59AM

Gaussian in its intensity distribution. 11:59AM

Q Does the video signal have a resolution to it in a CRT system?

A I don't know. Depends, I guess, on what the -- it has a vertical resolution which would be, you know, 12:00PM the number of rows of information before a scan return signal. I'm not sure I could say that there's a horizontal resolution to it.

Q And in, say, an old-fashioned CRT, color television CRT, that phosphorous screen that the CRT is 12:00PM striking, is that just one uniform continuous screen or does it have a color filter pattern on it?

A It does not have a color filter pattern.

Q Is it one continuous screen, though?

A No. 12:01PM

Q How do colors show up on a CRT?

A There's three different phosphors on a color CRT that are placed on the screen.

Q Okay. And how does the CRT know which one of those phosphors to strike when it wants a particular 12:01PM color?

A I guess the information must be presented to it somehow electrically.

Q And that's part of the video signal in a CRT, right? 12:02PM

A I guess so, yeah. 12:02PM

Q Now, I see you say Takanashi's devices are all based on a uniform continuous photo conductor structure which responds to incident light beams, the nature of which are not disclosed, but would have been nonmatrix 12:02PM devices such as a CRT disclosed in US patent 4,770,500 (Kalmanash) (Exhibit 2015) or other scanned source such as a monochrome laser device; do you see that?

A I do.

Q Can you explain to me what that means? 12:03PM

A Which part?

Q The whole thing, in lay terms.

A So the device disclosed in Takanashi basically is a layer of some photo conductor material. Typical at the time would have been something like cadmium sulfide, 12:03PM which responds to incoming photons by generating electrons. That's photo conductor. So it's basically a semiconductor-type material. There's a bias voltage ply across.

Q Keep going. 12:04PM

A So what the Takanashi reference discloses is a device that basically responds to an image that's projected on it. Such as, say, a slide viewer would be placed, a slide would be placed in the path of a light source and you would see on a frosted screen the image 12:04PM of the slide. 12:04PM

That's essentially what's disclosed. The photo conductor structure is a continuous structure. There's no disclosure of it being an addressable structure from what we've discussed relative to LCD displays. There 12:05PM are no rows and columns in it. There are no -- there's only one electrode across, you know, one on each side of the plate.

So that's -- so the light source that they call the write light, which is not disclosed at that time, 12:05PM would have been something such as a CRT, which you, yourself, described as a scanned device.

Q Okay. Would the -- Takanashi talks about a spatial light modulator, right?

A That's correct. 12:05PM

Q And is the spatial light moderator what you just described?

A You know, I need to look at the patent again. Because he has a number of elements in there that form the whole spatial light moderator. So in general, I 12:06PM describe one end of -- one -- one component of the Takanashi device.

Q Okay.

A And that's the part that responds to the write light. 12:06PM

Q Got it. Does that portion of Takanashi that responds to the write light contain liquid crystal? 12:06PM
A Yes, it does.
Q And is that liquid crystal the photoconductive material or is that something else? 12:07PM
A No. It's not the photoconductive material.
Q Okay. So let's talk about the liquid crystal cell of Takanashi, then. In the same way that we talked about the active matrix liquid crystal.
A Okay. 12:07PM
Q Fair to say there's two plates of glass with liquid crystal between them and then some other components?
A You don't want to give me a reference to look at to help you here? 12:07PM
Q Certainly. Takanashi good enough?
A Yes.
(Exhibit 4, Takanashi reference, US Patent No. 5,264,951; Exhibit No. 1003, was marked.)
BY MR. KING: 12:08PM
Q All right. I'm handing you what's been marked as Exhibit 4. It's the Takanashi reference, US Patent No. 5,264,951. It's got Exhibit No. 1003.
A Thank you.
Q All right. And I think you wanted this 12:09PM

reference so that we could walk through the stack, if you will, of the Takanashi liquid crystal cell. 12:09PM

A Yeah. Well, you're starting to ask questions that were causing me to rely too heavily on my memory of the multiple figures in Takanashi. So this will just make it easier for us. 12:09PM

Q Fair enough.

A So if you want to read back the question, I can start answering now.

Q Sure. Can you read that back? 12:10PM

Let me ask it this way: Earlier today we walked through all of the elements of an active matrix, LCD cell, from basically one polarizer to the other and all of the components in between.

A Okay. 12:10PM

Q I'd like to do the same. I'd like to discuss the same, have the same discussion with you with regards to the liquid crystal cell of Takanashi.

A Okay.

Q I think where we were a couple minutes ago is Takanashi has two plates of glass and liquid crystal in between, but I was hoping we could delve into that in a little more detail. 12:10PM

A Okay.

Q So let's start with -- you can pick one plate 12:11PM

of glass and let's just move from that plate of glass to 12:11PM
the other plate of glass up the stack.
A Okay.
Q If there's something here in Exhibit 4 that
you'd like to refer to, please feel free. 12:11PM
A Okay. Well, so I'm looking -- I was looking at
Figure 6 and looking for where the photo conductor layer
is located in Figure 6 since it's not labeled. But
essentially, Figure 6 has two plates of glass, number
six and number nine, okay? 12:12PM
With transparent electrode, number seven, and
liquid crystal layer located between the two of them.
I'm still looking to see where the electrical photo
conductor layer is.
Okay. This is important. I want to get it 12:12PM
right, so if you don't mind, let me have a minute or
two -- let me generally describe what happens first.
Okay?
A light, if you just look at the figure --
Figure 1. Is that Figure 1? No, it's not. The front 12:12PM
figure, which becomes Figure 8. Okay. Figure 8.
A write light shines on a cell called -- that's
labeled SLM, in this case R, for reflective. And
essentially, the write light will -- shines on a
photoconductive layer that's -- material that's 12:13PM

sensitive to incoming photons and in responding to incoming photons, it emits electrons which in the proximity of where the light hit, the -- causes a voltage to be generated. 12:13PM

Okay. Now, across the -- 12:13PM

Q And where is the photoconductive layer on Figure 1?

A Yeah. Well, it's not on Figure 1. That's why I was starting to read the spec to find out where it is.

Q That's all right. I think I'm understanding your testimony. 12:14PM

A Okay. So he describes it really almost more thoroughly in what I believe is his description of the problem to be solved. So in other words, in describing prior art. 12:14PM

And so if we look at the Figure 1 or Figure 2, which is the prior art, you'll see that there's a photoconductive layer between a pair of electrodes.

Q Where are you reading?

A In the PCL section that's between ET1 and ET2. 12:15PM
Which are the electrodes.

Q So you're reading from column one --

A Oh, I'm sorry. Reading from column 1, line 25.

Q Okay. And then you're also referring back to Figure 1? 12:15PM

A That's right. 12:15PM

Q All right.

A So what happens is when the write light comes through, it generates a charge across the cell which is for the modulation layer, which is PML. Okay. 12:15PM

So the PML would be the liquid crystal or other responding material that he describes. So essentially, what you have is a layer that responds to incoming light and applies a voltage at the position where the photons are striking. 12:16PM

That voltage then acts across what was called the photo modulation layer, essentially distorting the liquid crystal as we described by, you know, because the liquid crystal responds to an electric field.

But it does so in a, I guess, a uniform 12:16PM distributed and analog approach. So it would have -- there are no -- in Takanashi, there are not pixels that are addressed from the outside world. There's just charge being placed in a distributed pattern in response to the distributed pattern of the light source. 12:16PM

Q Okay. And that light source could be a CRT?

A It could be a CRT. I think I mentioned laser -- what they're trying to do is take a monochrome source of low energy and create a three-color system using a higher -- what would be a higher intensity lamp 12:17PM on the read side. 12:17PM

Q Okay. So one example is a CRT, another example is a laser as a light source, right?

A Yes.

Q Are there other examples of light sources in a system like this? 12:17PM

A Actually, this maybe would be part of, say, a scanning system for transparencies or something if you want to convert your slides to -- slide film to -- but that doesn't make sense because you'd have to have three different color slides instead of a color slide. But a black and white negative could be placed in the middle or a positive black and white film, whatever. 12:18PM

Q Could you also use a lower intensity active matrix display to drive -- or to be the write light? 12:18PM

A No.

Q Really?

A Really.

Q Why not?

A Because LCD displays are nonemissive devices. So they don't actually produce light. So it can't be a write light. 12:18PM

Q What about the combination of an active matrix display, like an active matrix display and a low intensity backlight; could you project the image from 12:18PM

that system onto the system of Takanashi and have that 12:18PM
be the write light?

A Um, hypothetically, you could put a matrix
device in there and shine a write light through it. But
you still don't end up with a pixilated structure on 12:19PM
your spatial light moderator. What would happen is you
would end up with smoothly varying information on your
display.

Q Okay. So what you're saying, if I understand
you right, is the write light might be pixilated in that 12:19PM
hypothetical, but the liquid crystal would not be
pixilated; is that what you're saying?

A Well, what I said was if one were to put a
matrix device between a light source and the spatial
light moderator, you would still end up with a 12:20PM
continuous structure that does not have addressable
pixels. And, in fact, it doesn't have the resolution
that a pixilated structure could have because
essentially you have a continuous substrate and there's
no, I guess, physical limits to where the light is. 12:20PM

So everything becomes sort of Gaussian in its
distribution again.

Q And when you say a continuous substrate, you're
referring to the liquid crystal layer?

A Referring to the photoconductive layer. And 12:20PM

the liquid crystal layer. 12:20PM
Q In Takanashi?
A In Takanashi.
Q All right. Anything else in that topic?
A No. 12:21PM
Q Now I'm looking at paragraph 24 where you're talking about Dr. Buckman's testimony on this issue.
A Okay.
Q Paragraph 24 of your '334 report. Now, you cite Dr. Buckman's testimony for purposes of disagreeing 12:21PM with it, that the matrix is created by the write light; do you see that?
A I do.
Q And you see that Dr. Buckman refers to a matrix of transmissivity? 12:22PM
A I see that.
Q I understand you disagree with Dr. Buckman's testimony on that point.
A That's correct.
Q Okay. Can you explain for me why you disagree 12:22PM with his testimony?
A Yes. Takanashi does not disclose a matrix system. And as I described earlier, the matrix system is actual physical construction in the LCD device, liquid crystal cell. By simply applying a write light 12:22PM

to a rectangular cell in the case of the spatial light modulator, you do not create a matrix structure. 12:22PM

Q Now, paragraph 23 where you're talking about incident light beams such as a CRT or a monochrome laser device; do you see that? 12:23PM

A I do.

Q If you used a CRT with the system of Takanashi, would the CRT beam be scanning back and forth in lines similar to what we talked about with the television?

A Not necessarily. 12:24PM

Q But it could be?

A It could be. There are two different ways to scan a CRT.

Q Okay. What are the two different ways?

A One is -- one is what they call raster scan, which you just described; and the other is a swept beam approach. 12:24PM

Q What's a swept beam approach?

A Basically, you just describe whatever image you want to make with your -- with your electron beam. 12:24PM

Q Okay.

A By not actually scanning a row at a time and putting dots only where you want them, or electrons where you want them.

Q And if you'd read Takanashi in 1996, would you 12:25PM

have an expectation on whether the write light in 12:25PM
Takanashi was a raster scanned or a swept scanned
system?

A Not actually. In fact, the one reference that
I point to, the gentleman, Kalmanash, worked in the 12:25PM
military environment. And it's very likely that those
CRTs were -- or some number of the devices that use
those were not raster scanned. Radar CRTs, for
instance, were not raster scanned.

Q Okay. So reading Takanashi, it could be either 12:25PM
one. It could be either the swept or the raster scanned
used for the write light; would you agree with that?

A Sure.

Q I'm sorry. It's getting late in the day. We
need to stop talking over each other. I've noticed 12:25PM
that. Fortunately, Victoria's doing a very good job of
keeping this straight.

All right. I think you also testified that a
person of ordinary skill in the art would understand
that a light shutter matrix is a physical structure in 12:26PM
the LCD cell? Did I summarize that right?

A That's correct.

Q What's the basis for your opinion that the
matrix requires a physical structure in the context
of -- the context of either the '334 or the '545 12:26PM

patents? 12:27PM
A The way LCDs are designed, they are all electrically addressed for displays as we've been discussing. So therefore, they don't have to be in a row and column matrix. 12:27PM
If you're thinking they all have to be those rectangles up and down, there are versions that use what's called a delta triad that -- but, again, each pixel within that delta triad is addressable by a row and column address. 12:27PM
And the reason that this is my opinion is because this is the way it is. I mean, there -- there's no way to construe a liquid crystal display device that's got a pixel structure to it that is anything other than a matrix device. 12:28PM
As I pointed out earlier, there are liquid crystal devices that have, like, segmented displays. Such as numeric or alpha characters. Again, each of those is electrically addressable.
Q All right. If I wanted to go out and -- if you wanted to go out and corroborate your opinion that a light shutter matrix requires a physical -- strike that. 12:28PM
MR. QUILLIN: We've been going about three hours. It's almost 12:30. Take a lunch break?
MR. KING: Let me just wrap up this line of 12:29PM

questioning; but yeah, it's about that time. 12:29PM

MR. QUILLIN: Okay.

BY MR. KING:

Q I guess I'm just asking, you know, your opinion that a matrix in this context requires a physical 12:29PM structure, one example of that would be the pixel structure that we talked about in the active matrix, right?

A That's correct.

Q And I guess I still have the same -- what 12:30PM evidence do you have besides your own say-so that your opinion is correct, that a matrix requires a physical structure?

A How about we get out the Tannas reference that was written in 1985 and look at that. I don't know if 12:30PM you have enough pages there to get you where you're going.

How do you have a matrix display without having a matrix? That's the question I can't -- you're wanting me to answer that yes, you can have a matrix display 12:30PM without having a matrix, but that's not possible. You can't address the information, that is control the pixel by pixel information, if you don't have physical pixels. And some way of electrically getting that information in. 12:31PM

And this is what we're talking about when we're talking about the '334 and the '545 patent, is matrix addressed displays. They point out active matrix LCD, monochrome LCD array. This is what's -- what's -- what the technology is. 12:31PM 12:31PM

MR. KING: All right. Let's take a break for lunch and then come back.

THE VIDEOGRAPHER: We are going off the record. The time is approximately 12:30.

(Off record from 12:32 p.m. to 1:33 p.m.) 12:31PM

THE VIDEOGRAPHER: We are back on the record. The time is approximately 1:33 p.m.

BY MR. KING:

Q Welcome back.

A Thank you. 1:33PM

Q Now, before the break you mentioned the Tannas reference. I believe I have that here marked as Exhibit 5.

(Exhibit 5, Tannas reference, US Patent No. '334; Exhibit No. 2012, was marked.) 1:33PM

BY MR. KING:

Q That is Exhibit 2012 in the '334 IPR. Do you have that in front of you?

A Okay.

Q And this is the Tannas reference that you were 1:34PM

referring to before the break, right? 1:34PM
A That's correct. Panel displays and CRTs.
Q I believe we were discussing addressing techniques before lunch; is that right?
A I believe so. 1:34PM
Q If you could turn to page 25 of Tannas.
Are you there?
A I am there.
Q And I see that Tannas has a table, 1-4, called classification of all known addressing techniques; do 1:34PM you see that?
A I do.
Q And did you review this table in connection with preparing your declaration in the '334 matter?
A I would have been familiar with it, yes. 1:35PM
Q I see this table identifies five different known addressing techniques; is that right?
A It does.
Q And these are the addressing techniques that could be used in flat panel televisions, sorry, flat 1:35PM panel displays and televisions, right?
A No, that's not correct.
Q Why isn't that correct?
A This book addresses flood panel displays and CRTs and several of the addressing techniques are CRT 1:35PM

addressing techniques. 1:35PM

Q Okay.

A So the matrix address is possible with all flat panel display technologies.

Q Okay. So let's just go down the list here. 1:35PM You see direct addressing?

A I do.

Q Okay. Is that -- is it possible to use that with liquid crystal display technology?

A Yes. 1:36PM

Q Is it possible to use that with video display technology?

A No.

Q And that's because there are too many -- too many wires would be required with direct addressing? 1:36PM

A That's correct.

Q Okay. All right. What about the scan addressing technique; what's that?

A That's what I described earlier where a beam is scanned across a phosphor panel and generates dots. The 1:36PM beam has got -- the beam is interrupted by the -- in the CRT control electronics so that it forms dots at locations.

Q Okay. When you say it forms dots, what do you mean? 1:37PM

A There's -- basically where an electron strikes the phosphor screen, an emission of light comes from the phosphor. And the electrons hit in a little fuzzy area. That is what I'm calling the dot. 1:37PM
Q Is the dot a pixel? 1:37PM
A No.
Q Why not?
A It's not an addressable picture element.
Q So a pixel has to be an addressable picture element? 1:37PM
A Technically, a pixel is in a picture element, it's the shorthand for picture element. So I guess from that perspective, yes, it's a pixel.
Q So the dot used in the scanning addressing technique, or the dots created by the scanning addressing techniques, those are pixels; is that what you're saying? 1:38PM
A They are -- they create a picture element, yes.
Q Okay. And I think I know the answer to this, but I have to ask it. In your opinion, is the system that uses the scanning addressing technique a matrix system? 1:38PM
A No, it is not.
Q Okay. What about the grid addressing technique, what is that? 1:38PM

A It's the same thing as scan. Oh, wait a second. I was going to say that it's the same as a scan, but using a shadow mask to help sharpen the edges of the dots. 1:38PM

But when you look in the right-hand column, he's talking about vacuum fluorescence and flat CRTs, in which case, then, they're actually physical structures that are a -- form a grid of pixels that would be electrically addressed. 1:39PM

Q Is a display that uses the grid addressing technique a light shutter matrix system? 1:39PM

A No, it would not contain a shutter.

Q Okay. Is it a matrix system?

A Uh, depends on the, I guess, the grid structure and how the information is put in the grids. 1:40PM

Q Can you explain what you mean by that?

A Well, according to this, each pixel's defined by a whole -- grid hole geometry. So how you place them, them being the grid holes, they could form a matrix. But in vacuum fluorescent displays, as he 1:40PM points to, and flat CRTs, there would be actually a physical structure that would have to be used to address each of those -- those locations.

There would be a physical structure and you would address each of those locations, unlike scanning 1:40PM

with a beam. 1:41PM
Q Okay. So under what circumstances would a system that uses grid addressing be a matrix system, in your opinion?
A If it was a formed glass assembly that had cells that each of the little pockets of phosphor were physically separated from one another and there was an electrical control to each of those cells, not to confuse the words, but that's physically what they are, is a cell, really, than it would be a pixel. 1:41PM 1:41PM
Q Okay. And then under what circumstances would a system that uses the grid addressing technique not be a matrix system?
A If it were a shadow mask and it was a CRT that was scanning a shadow mask grid. 1:41PM
Q Now, the shadow mask that you're talking about, is that a -- does that shadow mask have a two-dimensional grid of rows and columns?
A Yeah, but they're not really rows and columns. They're -- yes. But the -- the pixel structure, or I should say the whole structure in the shadow mask is not usually just in rows and columns. It might be like triad patterns or something. 1:42PM
Q So why isn't a system that has a shadow mask using the grid addressing technique a matrix system, in 1:42PM

your opinion? 1:42PM
A Because there's really no switching that's taken place in the matrices.
Q Can you elaborate on that?
A You can't individually load data into, and 1:43PM access the state of, for instance, a particular cell in -- or particular pixel.
Q Why is that a requirement of a matrix system?
A The -- if you look at the controller requirements that are associated with LCD, which is what 1:43PM the '334 and '545 speak to, basically the controller has to be able to place signal data in individual pixel locations. That's the way an LCD works.
Q Okay. Is that disclosed in the '334 or '545 patents? 1:44PM
A Yes. Inherently through stating that it's an active matrix LCD and then again a monochrome LCD array.
Q Okay. So in your view it's not explicitly disclosed in the '334 or the '545 patents, but it is implicitly disclosed? 1:44PM
A It would be no reason to state at that level when they're already explaining what the devices are and it's well known to one of ordinary skill what the structure of a liquid crystal display is and how it's addressed. 1:45PM

Q Okay. 1:45PM
A Rows and columns of physical pixels.
Q Okay. And just to close out the question on the grid addressing technique, I think what you're saying is that you can have a shadow mask in the grid 1:45PM addressing technique and that shadow mask will have an organized repeating structure such as a row and column structure or a triad structure.
And that that structure is not a matrix as you interpret that term in the context of the patents; is 1:45PM that what you're saying?
A Okay. So I was just reading Section 1.8.3 of the Tannas reference at page 25 where he more clearly defines the grid addressing. And really, the grid addressing is aimed more at a way of addressing pixel 1:46PM displays, not CRTs.
Q I don't think that's an answer to my question.
A Okay. Then if you wouldn't mind asking the question again.
Q Sure. Would you mind asking my question again? 1:47PM
MADAM COURT REPORTER: "QUESTION: And just to close out the question on the grid addressing technique, I think what you're saying is that you can have a shadow mask in the grid addressing technique and that shadow 1:47PM

mask will have an organized repeating 1:47PM
structure such as a row and column structure
or a triad structure.
"And that that structure is not a matrix
as you interpret that term in the context of 1:47PM
the patents; is that what you're saying?"
THE WITNESS: So what I'm saying is that the grid addressing method is not a CRT scan method. There -- it's not a shadow mask as I first said. It's really an addressing technique for discrete pixels in a 1:48PM flat panel display. And it's a technique of addressing lines and columns that are physical structures.
BY MR. KING:
Q Okay. So the grid addressing technique is a matrix addressing technique, correct? 1:48PM
A That is, yes. Yes, it is.
Q Okay. What about the shift addressing technique? Is that a matrix addressing technique?
A It's a form of addressing a matrix.
Q So it's a yes? 1:48PM
A Yes.
Q Okay. And the last technique is the matrix addressing technique, correct?
A Yes.
Q It's safe to say that it's your opinion that 1:49PM

that is, in fact, a matrix addressing technique in the context of the patents here? 1:49PM

A That's correct.

Q Okay. Let me ask you a couple questions about the scan addressing technique. 1:49PM

A Okay.

Q Now, when we were talking about the scan addressing technique -- do you recall talking about scan addressing technique before the lunch break?

A Yes. 1:49PM

Q Is that scan addressing technique that we were talking about before the lunch break the same addressing technique that's discussed here in the table on page 25?

A Yes.

Q And then I see on page 24 that the Tannas reference teaches that scan addressing is used, for example, in a commercial television picture; do you see that? 1:49PM

A I do.

Q Do you agree that statement? 1:50PM

A Yes.

Q And do you agree with the discussion of scan addressing that's here in Section 1.8.2?

A Not necessarily, no.

Q What do you disagree with? 1:50PM

A Well, basically, in a CRT there's a continuous layer of phosphor. And when you're scanning -- so he's combining two different things. Combining commercial TV signal and saying there's 480 columns and based on bandwidth, and this is where I'm able to clarify, there can be 320 columns. Okay? 1:50PM 1:50PM

So that means that the columns are not actually physically fixed. Sort of what I was speaking to before. Depends on your signal capability. So it doesn't make 1,000 -- or I should say 153,600 usable addressable pixels. 1:51PM

If that signal had full resolution and it were applied to a pixel device, then that's how many pixels you could get without doing interpolating. This does not say that a CRT has pixels. But the scan addressing is just a method of scanning a beam across. 1:51PM

Q Well, doesn't it say that the scan addressing has a total of 153,600 usable addressable pixels?

A In a standard NTSC composite video signal. But that's what he says. And I told you, I didn't address -- I don't believe that they're physical pixels. They're data bits, is what they are. 1:51PM

Q Okay. Do you agree that they're pixels?

A No, I don't.

Q Do you agree that they're addressable? 1:52PM

A He's not talking about a physical structure here. He's talking about information content in a signal. In which case, it would be -- it would be data bits or bytes of information. So in other words, you can get information to support a 480 x 320 column array from an NTSC signal. 1:52PM 1:52PM

Q All right. Now, I notice the Tannas reference is not a book on projectors; is that right?

A That's correct.

(Exhibit 6, Lee Patent, Exhibit 1004, was marked.) 1:54PM

BY MR. KING:

Q All right. I'm handing you what's been marked as Exhibit 6. It's the Lee patent and it's Exhibit 1004. But before we get to that, let's go back to your '334 report. I just wanted to get that in front of you. 1:54PM

A Okay.

Q I'm looking at 20 paragraph, page 26 of your report where you're talking about the Lee reference. 1:55PM

A Okay.

Q I think we discussed this earlier. All sides agree now that the light controller shutter -- the light shutter controlling circuit, 19, of Lee is not the -- is not a video controller; that's your opinion, right? 1:55PM

A That's correct. 1:55PM
Q All right. And now, you understand that -- did you read Dr. Buckman's deposition testimony in this case?
A I did. 1:55PM
Q Did you see where Dr. Buckman corrected his opinion to identify element 20 in Lee as a video controller?
A Okay. I don't recall that, but I read through it and knew that he was pointing to something else. So 1:56PM whether it was that or one of the other 21 or 22, I'm not sure.
Q Okay. I see that your declaration doesn't have a response to Dr. Buckman's testimony in that point; is that right? 1:56PM
A No, I didn't respond to that.
Q All right. So that's just not an opinion that you've expressed in your declaration, if you have one on that point?
A I don't have one on that point, I guess. 1:57PM
Q All right. Let's go to paragraph -- let's go to paragraph 27 in your '334 report.
A Okay.
Q I understand it's your opinion that none of the claims of -- let me start over. 1:57PM

I understand it's your opinion that Takanashi does not satisfy the equivalent switching matrices elements in either of the two patents at issue, right? 1:58PM
A That's correct.
Q And can you explain the basis of your opinion -- of that opinion to me, please? 1:58PM
A Yes. Takanashi talks about a continuous layer of photoconductive material coupled together with another element to form a spatial light modulator on continuous planes of glass, the photoconductive layer is a continuous layer of material. And there is no pixel structure in the Takanashi disclosed devices. So therefore, they cannot be switching matrices. 1:58PM
Q Okay. And I understand you also have an opinion that the -- on whether the liquid crystal elements in -- start over. 1:59PM
The system of Takanashi uses three LCD cells, right?
A No. It uses three spatial light modulators.
Q What's the difference between a spatial light modulator and an LCD cell? 1:59PM
A Well, I think the common meaning of the liquid crystal -- well, it's a liquid crystal cell, not an LCD cell.
Q Understood. Okay. So let me -- thank you -- 1:59PM

be more careful, more precise with the terminology. 2:00PM

So if I understand what you're saying in Section C of your report starting on page 21, it's that Takanashi has three liquid crystal cells that are not equivalent; is that basically what you're saying? 2:00PM

A That's what I'm saying. That the way they're configured. They're configured to form wavelength selection filters, um, using a birefringent layer of liquid crystal. And as a result, yield three different transmitted colors. 2:01PM

So the devices of Takanashi taken together form three, in the case where they have three devices, form three unique devices.

Q Okay. Is there a figure in Takanashi that illustrates what you're talking about? 2:01PM

A Figure 17 would work.

Q Okay. Can you illustrate, use Figure 17 to illustrate what you're talking about?

A Sure. Figure 17 has three light sources. I should say three optical paths. There's a block 11, 2:02PM which is a three-color separation system.

Q What does that block do?

A Separates the light source into, looks like, red, green, and blue color bands. Okay. And then it's passing those light -- those light sources, which I 2:02PM believe Takanashi even says that they're not narrowly -- narrow enough, passes them through an ECBtr, which is electronically controlled birefringent element. 2:02PM

Q What is that?

A That's a device with a couple polarizers on the outside of glass. It's, in the case of Takanashi, a single cell and it has liquid crystal material and it would be designed to pass a narrow band of red light in this case. 2:03PM

And then there's a spatial light modulator which would follow roughly the similar stack of components shown in some of the earlier figures that we've discussed already, having a photoconductive layer, which is, you know, sensitive to one wavelength of light and not sensitive in this case to the red light. So red's allowed to pass through. 2:03PM 2:03PM

Q Okay. Which one of the two liquid crystal-containing elements actually encodes an image on the read light?

A SLMtr. 2:04PM

Q Okay. And then what is the PL2R?

A I believe that's a second polarizer. Let me just double check. Figure PL2R is a polarizer that's in the red light beam.

Q Okay. Now, in Figure 17 it looks like there 2:05PM

are three major elements in the red light path, right? The ECBtr, the PL2R, and the SLM2R? 2:05PM
A Yes, I see that.
Q Are those elements physically connected in Takanashi? 2:05PM
A Yes.
Q So how are they physically connected?
A I would envision them to be a sandwich that's laminated together.
Q Okay. 2:05PM
A And I think that the operation of one depends on the other being there.
Q Okay. So you envision it as a sandwich laminated together. That means in your vision the three components are fabricated separately and then put together later? 2:06PM
A Not necessarily.
Q But they could be?
A Perhaps. Yes.
Q That was one way to do it in 1996? 2:06PM
A It could have been, yeah. In separate cells.
Q Okay. And I think you said that the ECBtr layer is designed to pass red light through; is that right?
A That's correct. 2:06PM

Q Okay. Is the PL2R layer designed with red light in mind? 2:06PM

A Not only red light, but red light with the exact polarization that's emitted or passed through the ECBtr. 2:07PM

Q Okay. And how is the -- in other words, is the PL2R layer any different than the PL2G layer in Figure 17?

A I believe there could be a difference. It goes to pass particular color of light through the ECB elements, there will be more or less birefringence which will result in more or less rotation of the polarization vector. 2:07PM

So in order for these elements to work together optimally, the elements PL2R, G, and B are likely oriented differently, as is the cell structure likely of the ECB parts that they're -- they're either having alignment layer at a different angle or the cell gap is slightly different to achieve more or less birefringence. 2:07PM 2:08PM

Q So you said that's likely, but it's also possible that the PL2R, PL2G, and PL2B layers are just interchangeable, right?

A No. I don't believe that would be the case. Otherwise, they would just say PL2 and it would be the 2:08PM same element throughout. Like I said, the amount of birefringence, and since these are all operating on a different color they're going to have a different amount of birefringence. And, therefore, there's likely that there's going to be differences in the output, not just color, but the polarization of the light. 2:08PM 2:09PM

So, therefore, there's going to be three different polarizer configurations. And there may be shifting, you know, 45 degrees from one another. I don't know. And they don't give that information in this spec. 2:09PM

Q Does that mean the polarizers are physically mounted in a different direction? Or does it mean the elements inside the polarizer would be configured in a different direction? 2:09PM

A I can't say from the information in here.

Q All right. What about the spatial light modulator layers. If we just look at the SLMtr, does that spatial light modulator have any special features that -- relating to red light? 2:10PM

A Uh, yeah. The way the specification describes it is in these transmissive devices, each spatial light modulator is different because it has to be sensitive to the write light, but then allow passage of the read light through the cell. 2:10PM

Whereas in reflective mode, I don't know that it has that same requirement. It doesn't have to transmit through the layer of photoconductive material. 2:10PM

Q Okay. So if we were to look at the red spatial light modulator, would that be -- if you just took that by itself, would it be different than the spatial light modulator associated with the green pathway? 2:10PM

A I believe so.

Q How?

A I am not sure how, but I just described why, as they describe in here, that the spatial light modulator has a photoconductive layer that has to be sensitive to light that is the write light. Okay? 2:11PM

Now, in order for it to work, it also has to pass the read light. So the photoconductive layer has to, in one case, pass red, in another pass blue, in another pass green. So it's very likely that the construction is going to be different to allow that to happen. 2:11PM

Because -- well, I don't see how you can cover that full spectrum of light and have a write light that is able to encode information without having your read light encode information for you. 2:11PM

You understand where I'm going?

Q I think, are you saying that in the system of 2:12PM

Figure 17 that there's one write light that strikes all 2:12PM
three spatial light modulators?
A I guess I was saying that, yes.
Q Okay. And what's the basis for you saying
that? 2:12PM
A I'm looking that it's actually going through
the three color separation filter first. So let me read
a little more about 17.
Okay. So Figure 17 really is defined, those
elements are defined in Figure 9. Which basically shows 2:16PM
one -- one color mode. And the read light is applied
through the polarizer through the -- it's made narrower,
it states, through the ECB transmissive and then passes
through a second polarizer.
And then it -- don't ask me how. There's some 2:16PM
hand waving that's going on in the spec. The read light
then encodes information and comes out as the read light
out.
Q Okay. Figure 9 doesn't show the write light,
right? 2:17PM
A It does not show a write light from the
transmissive one, but it talks about the read light. In
Figure 9 the read light RLi supplied to the spatial
light modulator is outputted as the read light, RLo,
through the optical path of the polarizer, PL1, the 2:17PM

transmission electrically-controlled birefringent liquid crystal element, ECBT, the polarizer, PL2, the modulator element, SLMT, and the polarizer, PL3. And says, said modulator element, SLMT, carries out the write and read operations as described and referenced in Figure 3. 2:17PM 2:18PM

So the main gist of what I was getting to was they have to be a very narrow wavelength. And that's the part of this I guess I should have also read. Reading down column nine at line 50'ish. The read light, RLI, for the spatial light modulator is incident on the modulator element SLMT as the read light of a narrow wavelength band due to said wavelength selection filter, which was formed through the ECB portion. 2:18PM

So that's -- the basis for my opinion that the cells are different and are not interchangeable, in that their narrow wavelength selection, even though they're being provided with close to the right light, red, green, and blue through the three-color separation, in order to not affect the photoconductive layer, they have to be narrowed even further. 2:19PM 2:19PM

And therefore, it's my opinion that the three cells in Figure 17 are unique from one another.

Q Okay. My question was a little bit different. A little bit different. My question was specifically about the spatial light modulators. 2:19PM

A Just the SLM. 2:19PM
Q Just the SLM portion. Is there anything about the SLMtr that is specific to red light?
A My -- my statement before, and I still hold to this, though, I'm going to say there's not support in 2:20PM the specification for this. Because they don't define -- they say that the spatial light modulator needs to be sensitive to the write light and not sensitive to the read lights. Okay?
If the write light is broadband, or broader 2:20PM band, then you would have to have different devices to not be affected by some subset of that band. So it's my opinion that the spatial light modulator elements are different, but if I could see something else that would convince me, I could see -- basically what I'm saying, 2:21PM there's not enough information in the spec to lead me to believe other than what my opinion is here.
Q So I guess I want to look at Figure 16 for a minute, then.
A Okay. 2:21PM
Q Figure 16 shows write light, correct?
A Yes.
Q And, in fact, it shows three different types of write light, right?
A Write light red, write light green, and write 2:21PM

light blue. 2:21PM

Q And so if we look at the write light red, the write light red is coming into contact with the spatial light modulator red, right?

A Yes. 2:21PM

Q And then the write light green is coming into contact with the spatial light modulator green, right?

A Yes.

Q And the write light blue is coming into contact with the blue one, right? 2:22PM

A Yes.

Q So just looking at Figure 16 and putting aside Figure 17 for a minute, just looking at Figure 16, are the spatial light modulators in Figure 16 interchangeable with one another? 2:22PM

A Yes, they're different.

Q How's that?

A One is forming a grid wavelength selection filter, the other is forming a green wavelength selection filter, and the third is forming a blue 2:23PM wavelength selection filter.

Q Where does it say that the spatial light modulator element is forming a wavelength selection filter?

A Uh, okay. So paragraph 15 at, say, line 50. 2:23PM

Before that, actually, so starting at 44. I'll read it. In the spatial light modulators shown in figure 16, also the polarizer, D, in the polarization beam split term optically PBS, liquid crystal element, ECBtg, the polarizer, PLG, and the modulator element, SLMrg, form the green wavelength selection filter. And then they go and do the same thing for red and blue.

Q Okay. But is there anything specific to the spatial light modulator RG element that is specific to the green wavelength?

A So further down starting at line 53, the read light, RLi, incident on the spatial light modulator is changed into the read light of a narrow wavelength range by the wavelength selection filter respectively formed and supplied to the respective modulator elements, SLMrg, SLMrr, and SLMrb.

So that's telling me that basically we're -- that the spatial light modulator are designed specifically to be responsive to the red, green, and blue narrow wave light.

Q So going back to Figure 17, the SLMtr element, is it fair to say that's a monochrome LCD -- sorry. A monochrome -- let me start over.

Going back to Figure 17, looking at the SLMtr element, is it fair to say that is a monochrome liquid crystal cell? 2:26PM

A Let me go back and read where it's defined. No. It is not.

Q Why not?

A It contains liquid crystal. But it has a photo 2:27PM modulation layer on there which, you know, a liquid crystal cell does not normally have. That's why I think we're calling it a spatial light modulator, not a liquid crystal.

Q Well, you'll agree with me, then, that the 2:29PM SLMtr element only handles one color, right?

A Yes.

Q And that color's red, right?

A SLM -- oh, R as in color, not -- because normally you're putting two subscripts there like tr or 2:30PM rr, so not reflective.

Q SLMtr?

A Did you say tr?

Q I said tr.

A Sorry. 2:30PM

Q I meant to say tr. I thought tr.

A We'll see.

Q So the -- we'll see what I said later.

So the SLMtr element only addresses one -- only passes through one color? 2:30PM

A That's correct. 2:30PM
Q And the SLMtg element only passes through one color of light, correct?
A Yes.
Q Okay. 2:30PM
A Green.
Q And the SLMtb element only passes through one color of light, correct?
A Yes, blue.
Q In looking at those SLMtr, SLMtg, and SLMtb 2:30PM elements, you would expect those elements to be, in your opinion, very similar except for some layer that addresses a particular color; is that right?
A Um, I'm not sure what to expect. It's not clear from -- Takanashi doesn't detail what's going on 2:31PM inside these.
As I pointed out before, I thought that there's a likelihood that the polarizers have different orientations. So, therefore, it's also likely that in order to match the polarization exit from PL2, that the 2:31PM SLM has to have a rub direction to align the liquid crystal to that unique polarization angle.
So what I'm saying is that there's a couple of different ways that SLMtr, G, and B can be different from each other. One can be orientation of liquid 2:32PM

crystal inside the cell, another could be the cell gap because you want to transmit a given wavelength of light. And there's an ideal total birefringence that you should see through the cell. 2:32PM

So that could be different also, though maybe it doesn't have to be. So I can't answer that those are identical. 2:32PM

Q So you just can't answer that one way or the other?

A There's not enough information in Takanashi to say. 2:32PM

Q Okay. Let's take a break.

THE VIDEOGRAPHER: This concludes Media No. 2 on the deposition of Robert Smith-Gillespie. We are going off the record. The time is approximately 2:33. 2:33PM

(Off record from 2:33 p.m. to 2:53 p.m.)

THE VIDEOGRAPHER: This is the beginning of Media No. 3 for the deposition of Robert Smith-Gillespie. We are back on the record. The time is approximately 2:53 p.m. 2:52PM

(Exhibit 7, Declaration of Bruce Buckman, Ph.D., in '334 action; Exhibit No. 1005, was marked.)

/// 2:53PM

BY MR. KING: 2:53PM
Q All right. I'm going to hand you Exhibit 7. This is Exhibit 1005 in the '334 action and it is the declaration of a Bruce Buckman, Ph.D.
Have you reviewed this document, sir? 2:53PM
A Yes, I have.
Q Now, I understand from your earlier testimony that there are things in this declaration that you disagree with; is that fair?
A Yes. 2:54PM
Q Okay. Can you summarize what it is in this declaration that you disagree with?
A I've already done that in my declaration. So if you'd like me to open my declaration and look for that, I can go ahead and do that. 2:54PM
Q Okay. So whatever -- whatever disagreements you have with Dr. Buckman's declaration, they've already been expressed in your own declaration, right?
A That's correct.
Q I'm marking as Exhibit 8 a board's decision in 2:56PM the '334 proceeding.
(Exhibit 8, Board's Decision in the '334 proceeding dated 6-17-13, Paper No. 14, was marked.)
/// 2:56PM

BY MR. KING: 2:56PM

Q It's dated June 27, 2013, and it is Paper No. 14. Have you seen this document before?

A Yes, I have.

Q I guess the same question I had -- I'll have the same question for this document that I did for the Buckman declaration. 2:57PM

I understand that you disagree with some of the statements and conclusions in this decision, correct?

A That's correct. 2:57PM

Q And your disagreements, just make things quick, your disagreements with this decision are set forth in your declaration, right?

A That is correct.

Q And you don't have any other disagreements other than those set forth in your declaration, right? 2:57PM

A No. Or yes.

Q You have no other disagreements?

A I have no other disagreements.

(Exhibit 9, Board's Decision in the '545 proceeding dated 3-12-13, Paper No. 11, was marked.) 2:59PM

BY MR. KING:

Q All right. I'm handing you Exhibit 9. That's the decision from the board in the '545 proceeding. 2:59PM

It's dated March 12th, 2013, and it's paper 11. Do you have that in front of you? 2:59PM

A I do.

Q Have you reviewed this document?

A I have. 2:59PM

Q Same set of questions. I understand you disagree with some of the statements and conclusions that the board reached in their initial decision.

A I do.

Q And your disagreements are set forth in your declaration in the '545 matter; isn't that right? 2:59PM

A That's correct.

Q And there's no other disagreements besides those set forth in your declaration, right?

A I'm actually going to look through this a little bit to refresh myself because it's been a while since I've looked at this. 3:00PM

Okay. I don't have any that I can find right now, any others. I've went through this pretty thoroughly at the time I was writing the declaration. 3:01PM

(Exhibit 10, Declaration of Robert Smith-Gillespie in the '545 matter; Exhibit No. 2005, was marked.)

BY MR. KING:

Q All right. I'm handing you what's been marked 3:02PM as Exhibit 10. This is your declaration in the '545 matter. And it's Exhibit 2005. 3:02PM

Is this your declaration, sir?

A Yes, it is.

Q And is it a complete expression of your opinions in the '545 matter? 3:02PM

A Yes.

Q You'll agree that there's quite a bit of overlap between your declaration in the '334 matter and your declaration in the '545 matter, right? 3:02PM

A I do agree.

Q And you'll agree that, in general, the testimony you've given about your '334 declaration remains true for kind of the high level issues in the '545 matter? 3:03PM

A What do we mean high level issues? Are you talking claim constructions?

Q Just our discussion of the LCD technology and projection technology in general.

A Oh, so the same technical discussion applies here as well. 3:03PM

Q That's true, right?

A Yes.

Q And our discussion of Takanashi applies in the '545 matter as well, correct? 3:03PM

A That's correct. I think in the '334 I probably did a better job stating some things than I did relative to Takanashi than I did here. It's not materially different, but I think it's clear for the board to read. 3:03PM

Q Understand. All right. I'd like to talk to you about some claim construction issues in the '545 matter. Starting with paragraph 15 of your '545 report that's Exhibit 10. 3:04PM

A Okay.

Q All right. And then you see in paragraph 15 where it says, one of ordinary skill in the art in July 1996 would have understood a video projection system to be a projector system that is capable of producing video or a where a video refers to the projection of moving images that change fast enough to be undetectable by the human eye. 3:04PM 3:04PM

Do you see that?

A Yes.

Q And I guess my question is, how fast is that?

A It's generally agreed that on the order of 16 milliseconds is fast enough to merge images and give the appearance of smooth motion. 3:05PM

Q You said 16, 1-6 milliseconds, correct?

A 1-6, yes.

Q Now, images can change slower than that and 3:05PM

still be video images, right? 3:05PM
A To support video, yeah. Well, video images may not have motion that requires 16 millisecond response.
Q Okay. And so for example, television is frequently transmitted at 30 frames per second, right? 3:05PM
A Which I think if you flip 30 over you get 16 milliseconds. That might be 60 hertz.
Q I think if you flip 30 over you get 33 milliseconds.
A Then that's 60. TV has two interlaced frames. 3:06PM
Q Okay. So would you say that 30 frames per second is video speed?
A No.
Q You would not?
A Well, it's marginal. Sixty frames per second 3:06PM is really more like video speed.
Q Okay. In 1996, how fast did -- how many frames per second did television signals have?
A Uh, there are two fields presented in 30 frames per second. So that means each, so there's 60 frames 3:06PM per second totally or 60 fields per second. They're interlaced. One then the other, adjacent lines.
Q And some people refer to that as 30 frames per second, right?
A Thirty frames per second, but it's really 60 3:07PM

fields per second. 3:07PM

Q Sixty fields per second where each field is switching every 33 milliseconds?

A That's correct.

Q And then in 1996, if you went to the movie theater you would be watching films at 24 frames per second, right? 3:07PM

A That's correct.

Q Okay. So would you agree that 24 frames per second is video speed in the context of video projection? 3:07PM

A Um, it would have to be, I guess.

Q It has to be, right?

A If you ever sat in the front of a movie theater, though, and watched the blurring of images at 24 frames per second, it's really uncomfortable; but it is what it is. 3:08PM

Q Someone in 1996 would consider 24 frames per second to be video speeds, right?

A Yes. 3:08PM

Q I just want to get out my calculator. So how would I calculate the switching speed associated with 24 frames per second?

A Just invert it.

Q So one divided by 24, looks like about 41 and 3:08PM

2/3 milliseconds; does that sound about right? 3:09PM
A It's 0.041.
Q 666 repeating; does that sound about right?
A Yeah.
Q So if something had a switching speed of 41 or 42 milliseconds, you would agree that it could run at video speeds? 3:09PM
A I don't feel that that's sufficient in an LCD product to -- or device to support video switching speeds. The answer's no, I don't agree with that. 3:09PM

In motion picture theater there's a different way of presenting the image and there's a mechanical shutter that breaks the image up so that you see discrete new images each time.

With a liquid crystal display, there's lag times associated with making the switches. And as a result you end up with motion artifacts and blurriness when you start getting below, really, the 16 millisecond number, or I should say getting above the 16 millisecond number. 3:10PM 3:10PM

Now, I'm not going to say that people wouldn't have been happy to have a display in 1996 that was, you know, 33 millisecond. Getting up into the 40s and 50s, it's not acceptable for video, video speed.

For one, it doesn't keep up with the NTSC 3:10PM

signal. So you have lags. 3:10PM
Q So to keep up with the NTSC signal, you have to be faster than 33 milliseconds, right?
A Uh-huh.
Q Okay. Did they have digital theater projectors 3:11PM in 1996?
A No.
Q Those came out later, right?
A (Witness nods head.)
Q All right. Let's look at paragraph 16. Now, 3:11PM in looking at -- paragraph 16 has your discussion, your opinions about the board's claim construction for shutter matrix system, right?
A Yes.
Q And I see in paragraph 16 that you -- 3:12PM discussing the board's definition you say, This definition, which refers to limiting the passage of light, attributes little or no meaning to the term shutter and effectively replaces the claim term light shutter matrix with the nonclaim term light limiter 3:12PM matrix.
Do you see that?
A Yes, I do.
Q Can you explain to me what you mean by that and what's wrong with the term light limiter matrix? 3:12PM

A Well, the shutter really blocks out light. So it either allows it to pass or not pass. And -- or pass to some degree, I guess. So in that regard, the shutter is able to limit light, yes; but then one could easily see other versions of limiting which could be just scattering the light so that not as much makes it to the target. 3:12PM 3:13PM

And that's really not what's intended by a light shutter matrix. You really want to block the light that's not being used, not scatter it. So I really felt that it was important to distinguish the difference between a light shutter and what everyone would think a light limiter is. 3:13PM

Q Okay. Now, I think you testified earlier that an active matrix monochrome LCD array is a light shutter matrix, right? 3:14PM

A Yes.

Q And that light shutter matrix will have pixels and associated pixel circuitry, right?

A Correct. 3:14PM

Q And just looking at one of those pixels, I seem to recall you testified earlier that you could control the transmissivity of a pixel by controlling the amount of charge applied to the pixel transistor; do I recall that right? 3:15PM

A Uh, by -- actually, the pixel capacitor, transistor allows the passage of, you know, current through the transistor to charge the capacitor. 3:15PM
Q Okay. And so if we were dealing with a normally white LCD array, if there was no voltage applied to the capacitor, then no light would get through that pixel, right? 3:15PM
A No. You've got it backwards.
Q Do I have it backwards? All right. Fix it for me. 3:15PM
A Okay. So with no field applied, the liquid crystal in its relaxed state has the 90 degree twist and light that passes the first polarizer ends up passing the second polarizer which is orthogonal to the first polarizer. 3:15PM
Q So with no field applied to a pixel of the type we're talking about --
A In a normal white version, as you said.
Q That's what I mean. In a normal -- so with no voltage applied to the pixel circuitry in a normally white system? 3:16PM
A Yes.
Q Light would pass through that portion of the liquid crystal without attenuation?
A Correct. 3:16PM

Q Okay. And then if you applied a little bit of -- a very trace amount of charge, then, to that pixel, then most of the light would get through, but some of it would be blocked, right? 3:16PM
A Yes. That's what's called a grey level. 3:16PM
Q That's called a grey level.
And so as you increase the charge on that pixel, the opacity of the pixel, of the liquid crystal elements in that pixel would increase, right?
A Well, what you're saying is correct, but it's technically not correct the way you said it. 3:17PM
Q Okay. Fix it for me.
A So as you increase the voltage, which comes about from increasing charges, more light is absorbed in the front polarizer which makes the pixel darker. 3:17PM
Q Okay. So in this system we described, it's fair to say that the pixel doesn't have to block all of the light that's passing through it, right? The amount of light that's blocked depends on the voltage that's applied to the pixel, right? 3:17PM
A Yes. I agree.
Q And when you have a voltage that's associated with a grey level, the light that's passing through the pixel is -- some of it is blocked, some of it's allowed through, but the light as a whole is just limited, 3:18PM

right? 3:18PM
A Yeah. It's absorbed in the front polarizer to differing degrees.
Q Okay. Now, I think you -- I don't want to put words in your mouth, but I think you said earlier that 3:18PM you disagreed with the use of the word limiter or limiting as part of a definition of shutter; is that right?
A That's correct.
Q Okay. And you understand that the board got 3:18PM the word limiter or limiting from the Miriam Webster's dictionary, right?
A That's where they pointed.
Q And you think they were --
A No. They got -- they looked -- yeah, from the 3:19PM definition of shutter in that dictionary. Yes.
Q And the definition of shutter in that dictionary, there's several, but one of them is a mechanical device that limits the passage of light, especially a camera attachment that exposes the film or 3:19PM plate by opening and closing an aperture?
A Talked about two different things. An aperture and a shutter. Because in a camera the aperture is one thing and the shutter is another thing.
Q Okay. So safe to say that you disagree with 3:19PM

the definition of the Miriam Webster's dictionary as being accurate? 3:19PM

A In regard to how the LCD works, yeah.

Q Okay. Do you think the definition of shutter in the American Heritage Dictionary is -- 3:19PM

A I don't recall what that was. Do you have that one with you?

Q Looking at your report in the '545 matter, you're not siding to the American Heritage Dictionary as being an accurate definition of what a light shutter -- what a shutter means in the context of these patents? 3:20PM

A Well, a light shutter may indeed limit the passage of light. Not everything that limits the passage of light is a shutter. So I agree that limiting the passage of light is something that a shutter will do. 3:21PM

Q So necessary, but not sufficient in your --

A Yes.

Q And just to get back to my question, you're not relying on the American Heritage Dictionary as supporting your opinions about the proper interpretation of light shutter matrix system in this case? 3:21PM

A I don't recall what the American Heritage Dictionary said, so I can't answer that question.

Q But you don't site it here in your report, 3:21PM

right? 3:21PM

A No. But that could be an omission. Omission.

Q So I see a little farther down in paragraph 16 where you say, one of ordinary skill in the art in July 1996 would consider a light shutter to be a 3:22PM component that selectively admits and blocks light where the light is blocked through an absorption.

Do you see that?

A Yes, I do.

Q Can you explain in lay terms what you mean by 3:22PM that?

A Essentially, that in a shutter device, something is placed in a beam to essentially absorb the light that was going through the beam. In optical systems they're always mat black to prevent scattering 3:22PM and reduction of contrast.

In the LCD case, as I pointed out before, even sort of clarified the operation of the LCD in that the light is -- the light that is not passed through the system is absorbed in the polarizer. It's not 3:23PM scattered. To basically support the analogy that I just provided, you know, LCD absorbing shutter and optical system absorbing.

Q All right. Now, you'll agree that it's possible to block light through scattering? 3:23PM

A I don't believe that that's the same. And I just mentioned that scattering is not something that really wants to -- that you want to have happen in a shutter system, because it reduces the contrast of the light in the, say, for instance, the adjacent pixels in a display. Or if you're scattering light in a camera shutter, then you're getting wash-out of your image. 3:23PM 3:23PM

Q Okay. But you can block light through scattering, right?

A You could disrupt an image through scattering so you don't see an image anymore. But scattering is -- is -- if it's true scattering, it's conservative. So you're not really blocking the light, you're just simply redirecting the light in random orientations. 3:24PM

Q So if you have a -- well, would you agree that liquid crystal is capable of scattering light? 3:24PM

A Certain configurations, yes.

Q Okay. What kind of configurations of liquid crystal are capable of scattering light?

A There's a mode called polymer disbursed liquid crystal where liquid crystal is formed in droplets in a cured polymer that's basically just a carrier for the droplets and the droplets have random orientation. There's no alignment of the liquid crystal. 3:25PM

So when light hits them, it sees all kinds of 3:25PM different indexes of refraction. And as a result, it's refracted in a large array of random directions. 3:25PM

Q Okay. What other configurations of liquid crystal besides PDLC scatter light?

A Could be a guest host mode where dye molecules -- but again, dye molecules tend to be absorbing. So I'm not sure that's a good example. In the on state they certainly -- I mean, in the transmissive state they scatter somewhat. In the off state they're more absorbing. 3:26PM 3:26PM

Q Anything else? Any other configurations of liquid crystal that scatter light?

A Any nonaligned versions, maybe cholesteric, liquid crystal without alignment layers. So no more, I'm not aware of many beyond the polymer disbursed liquid crystal. 3:27PM

Q Okay. And which ones had been used in -- which of the types of liquid crystal arrangements have been used in display systems?

A Predominantly, there are a few ordered phases of liquid crystal. The first and the most common is nematic liquid crystal. Another one is called homotropic. That's basically liquid crystals align themselves vertically to plates. 3:27PM

And then another -- another one would be 3:27PM

smectic phase. And then there's Pi phase also. So these are all, like, phases of liquid crystal that are used in displays. 3:28PM
Q And the nematic phase, does that scatter light?
A No. 3:28PM
Q It only absorbs light?
A Well, so I have to be clear. In a display device with a nematic liquid crystal, it would have a preferential alignment so that all the liquid crystals basically line up like cigars in a box and have a fixed twist to the front glass, from the rear glass to the front glass. So I'm not aware of any devices that are made where no alignment is provided for the liquid crystal in nematic-type devices. 3:28PM
In the other type cell that I described, homotropic, they tend to put structures inside the liquid crystals to get the liquid crystals to align preferentially in certain directions. Again, they're not designed for scattering, they're designed for transmission or absorption. 3:29PM 3:29PM
Q Do you agree that a liquid crystal display system controls the light transmission by varying the light scattering in the liquid?
A No, I do not.
Q Why not? 3:29PM

A Because it doesn't. It basically controls the amount of retardation that a particular polarization of light ceases as passing through the cell. And that results in a phase change which causes the light to be absorbed or transmitted through the polarizer. 3:29PM 3:30PM

Q Looking still on paragraph 16, but going to page nine. Do you see the section where you talk about the board's discussion of the Flasck reference?

A Yes, I do.

Q All right. Now, I see that you quote on page 13 of the board's decision that says Flasck discloses the active matrix, 46, is covered by an LCD which is one example of a matrix capable of limiting the passage of light. 3:31PM

Do you see that quote from the board's decision? 3:31PM

A Yes, I do.

Q That's quoted in paragraph 16 of your report?

A Right. I do. I see it.

Q Do you disagree with that statement from the board? 3:31PM

A Actually, I do.

Q Okay. What's wrong with that statement?

A There's a problem with Flasck. And I noted this, unfortunately, after writing this. But Flasck 3:31PM makes a mistake and he says that the active matrix is covered by an LCD. And really, what he means to say is covered by liquid crystal, not a liquid crystal display. 3:32PM

Because what he's forming is a liquid crystal cell, not covering the active matrix, and the active matrix is inside that part of it. 3:32PM

Q You understand that some people sometimes refer to --

A It just comes out -- I'm sorry. I did it again. 3:32PM

Q Sorry. Is it fair to say that some people in the industry sometimes refer to liquid crystal using the acronym LCD?

A They shouldn't.

Q They shouldn't, but they do, right? 3:32PM

A They make that mistake sometimes. Flasck knows better.

Q Do you know Mr. Flasck?

A No. But the lawyer that wrote his specification messed up. Say it that way. 3:32PM

Q Okay. So putting aside what looks like a typo from the patent lawyer and Flasck, is there anything about this sentence that you, from the board, that you disagree with?

A No. 3:33PM

Q Okay. Do you see where it says, accordingly, the board appears to regard every LCD layer or layer of material containing liquid crystals as a light shutter matrix? 3:33PM

A Yes. 3:33PM

Q Okay. Did you make the same LCD typo in that sentence that we were just talking about with Flasck?

A No, because you skipped an important sentence relative to Takanashi.

Q Okay. Is it your opinion, then, that the board is saying that every liquid crystal display is a light shutter matrix? 3:34PM

A I believe I'm arguing the converse of that, that the board jumped from seeing liquid crystal fluid in the ECB element and right away felt that it was an LCD array. And that's not the case. 3:34PM

Q Okay. So Takanashi has an LCD array, right?

A No, it doesn't.

Q Takanashi has a two dimensional spatial light modulator containing liquid crystal that encodes a projection image, right? 3:35PM

A That is true.

Q But you wouldn't call that an array?

A It's not a liquid -- it's not an LCD array by any means, just because it has liquid crystal in it. 3:35PM

Liquid crystal has many many uses. 3:35PM

Q Yeah.

A Okay.

Q Okay. And if I understand your primary complaint, is that -- your primary complaint is that the liquid crystal element ECB in Takanashi is not a light shutter matrix, right? 3:35PM

A It's not a light shutter matrix. In fact, the ECB in Takanashi is really an element of a wavelength selection filter. And the board -- my -- what I'm trying to do is explain so that when the board reads my declaration, that they just got it wrong. And I read Takanashi, you know, numerous times to make sure that I've got a proper understanding. 3:36PM

Q Okay. Let's go to page 18 of your '545 report; or declaration, as you call it. Paragraph 18 is discussing your claim construction opinions for the equivalent switching matrices term, right? 3:37PM

A Yes.

Q Okay. And I see in the middle of that paragraph where you wrote, At the time of the filing of the '545 patent, one of ordinary skill in the art would have understood equivalent switching matrices to be switching matrices that are virtually identical in effect or function; do you see that? 3:38PM 3:38PM

A Yes. 3:38PM

Q What's the basis for that opinion?

A Equivalency in functionality. Basically, in having the same -- the '545 patent describes a system which does all the light conditioning outside of the 3:38PM matrices, the switching matrices, or the monochrome LCDs. So therefore, the equivalence means that they have the same effect in the system or they perform the same function.

Q Is that your general understanding of the word 3:39PM equivalent?

A Yes.

Q Okay. Did you consult a dictionary to arrive at that interpretation?

A No. I guess I was going off of, you know, what 3:39PM I believe the specification taught and what my knowledge of monochrome LCDs was.

Q Okay.

A I provide support in the last paragraph or last sentence of that. 3:39PM

Q You provide support or you just provide a clarification?

A Yeah. Say -- clarification, yes. Clarification.

Q Okay. What's your basis for that 3:40PM clarification? 3:40PM

A Oh, there's no unique characteristics defined, unlike, say, for instance, Takanashi, where we keep track of the red, the green, and the blue SLM and ECBs. In the '545 patent they're identical devices and the 3:40PM only differences reside in the color filters.

So it's clear that they can be interchanged and still provide the same results.

Q Okay. Are you -- going back to your testifying experience in other cases, are you familiar with the 3:41PM concept called the doctrine of equivalence?

A Yes, I've been exposed to it; but I can't say that I can recall what exactly the doctrine of equivalence states.

Q Okay. In your -- in formulating your opinions, 3:41PM you weren't suggesting that the term equivalent in equivalent switching matrices refers to the concepts in the doctrine of equivalence, right?

A I was not referring to the doctrine of equivalence. 3:41PM

Q They're just two different things, right?

A Yes.

Q Okay.

A I was using the words from the '545 patent.

Q Once again, you did not consult a dictionary in 3:42PM

formulating this construction? 3:42PM
A Speaking of what I believe one of ordinary skill in the art would have understood. So the dictionary doesn't really define what one of ordinary skill in the art defines general public, I think, 3:42PM definition.
Q Did you use a dictionary to inform your construction here?
A I don't recall.
Q Do you recall taking a dictionary definition 3:42PM and changing it to arrive at your proffered construction?
A No, I don't. I don't recall.
Q Were you aware that the board considered this construction in the context of the '334 action? 3:43PM
A Which construction?
Q The construction of equivalent switching matrices.
A I read the board's decision, so I would have been aware of it. 3:43PM
Q Do you recall that the board declined to adopt this construction because it omitted a key word from the dictionary definition that IV offered?
A I do recall seeing that.
Q Is there a reason why you omitted that key word 3:44PM

from your construction? 3:44PM
A Maybe I didn't think it was so key.
Q You liked the rest of the definition, the dictionary definition, but you didn't like that part?
A I didn't say that. 3:44PM
Q All right. Let's go to paragraph 20 of your '545 report. Now, in paragraph 20 you're expressing your opinion that the Flasck system -- the Flasck projector system was not appropriate for video displays in the 1996 time frame; is that right? 3:45PM
A That's correct.
Q So I think you expressed your opinion that in particular, PDLC, or polymer disbursed liquid crystals materials, were not appropriate for use in video projectors at that time because their switching speeds 3:45PM were too slow, right?
A Yes, that's correct.
Q Okay. Now, I see at the last sentence of that paragraph that you say that PDLCs were not used in typical video displays in the 1996 time frame, right? 3:46PM
A Yeah.
Q Okay. So the word typical jumped out at me.
A Yeah. It just jumped out at me again, too. Because I think I put it in the wrong place. Would typically not be used in video displays at the time. 3:46PM

It's really not even necessary. It just wasn't used in video displays. 3:46PM

Q Was not used in video displays; that's your opinion?

A That's my opinion. 3:46PM

Q And then in paragraph 21 -- paragraph 21 -- you're elaborating on that opinion with respect to the Lackner patent which is US Patent No. 5,170,271, right?

A I'm referring to Lackner to support my assertion that the PDLC devices have insufficient 3:47PM switching speeds to support video.

Q And then you give a specific example of where PDLC device had insufficient switching speed to support video, right?

A That's correct. 3:47PM

Q And can you describe that example for me?

A It says that the photo activated rise and decay times with a constant bias voltage. In typical LCLV operation, this is where 5 to 10 milliseconds on time and 1.5 to 3 seconds off time. Thus, the frame rate is 3:47PM very slow compared to dynamic television image frame time of less than 33 milliseconds.

Q Okay. Can you explain to me what that means in lay terms?

A Basically, the -- there are two switching 3:48PM

characterizations that one looks at when determining the 3:48PM
total response time, which would be like the cycle from
light to dark to light again.

So you have an on switching speed, which is
typically when the -- not -- it's not optically like 3:48PM
when the light comes through. It's when the signal is
applied. So the on speed. And then you have an off
speed, which was when the signal is removed. And the
material has to relax back to its neutral state, if you
will. Its relaxed state. 3:48PM

Here we're saying that they're able to drive an
on -- a switching on time of 5 to 10 milliseconds, but
the off time was over a second, 1 1/2 seconds. So when
switching video, both directions are equally important.
And the 1 1/2 second off time is just not acceptable. 3:49PM

Q I understand. So the five to ten milliseconds
on time, that's acceptable, right?

A Yeah, if you can have it in both directions in
5 to 10 milliseconds, you'd be in the ballpark.

Q Okay. And then if you had the on time at, say, 3:49PM
30 milliseconds and the off time at 30 milliseconds,
would that be fast enough for video speeds?

A It's marginal, because it's the combined time
that usually is counted. And now you're talking upwards
of 60 milliseconds. I don't think it would be, but -- 3:50PM

it would be borderline case. 3:50PM

Q It would be borderline. But you'd really want to see, say, something less than 16 milliseconds on --

A Somewhere on the order of 16 milliseconds -- I did it again. 3:50PM

Q Let me just --

A Go ahead. It's my fault.

Q I know you're going to answer my question. Let me just ask it again.

So for video speeds, you would want 3:50PM something -- you would want an on time less than 16 milliseconds and you would want an off time less than 16 milliseconds, right?

A Actually, you'd want the T on plus T off. That's the time to turn it on, plus the time to turn it 3:50PM off to be on the order of milliseconds. The round trip.

Q You would want the round trip to be 16 milliseconds?

A Yeah.

Q Why wouldn't, say, a round trip of 33 3:51PM milliseconds be good enough?

A Uh, how would I answer that? It's just -- it's not -- always, always display response times are given in combined on to off, off to on times. And the combined time of 33 milliseconds is not fast enough to 3:52PM keep up with a 16 millisecond field rate. 3:52PM

Even though the frame rate may be 33 milliseconds, the field rate, if you're doing old school interlaced video, is twice that speed. Sorry. Should say half the speed, twice the frequency. So that's why 3:52PM 16 milliseconds.

You're putting up two images on an LCD. One right after another. Both of them within 30 millisecond total time. Okay? So that means each one gets 16 -- or 33 milliseconds, so each one gets 16 milliseconds. It's 3:52PM back to the 30 hertz --

Q Yeah. Yeah. I understand. I would have thought that because the lines were interlaced that each line would get a full 33 milliseconds.

A They're not in an LCD. They're only interlaced 3:53PM in CRTs.

Q Okay. And was that true in 1996?

A That they were not interlaced in LCDs?

Q Yes.

A Yes, that's true. Because that would basically 3:53PM cut your resolution in half.

Q Okay. So in 1996, if you had an LCD projection system that was displaying an interlaced signal, it wouldn't be really interlacing the lines?

A There's control electronics that de-interlaces 3:53PM

to set up the signal for driving the LCD. 3:53PM
MR. QUILLIN: We've been going about an hour. Good time for a break?
MR. KING: Yeah. Now's a good time for a break. 3:54PM
THE VIDEOGRAPHER: We are going off the record. The time is approximately 3:54 p.m.
(Off record from 3:54 p.m. to 4:10 p.m.)
THE VIDEOGRAPHER: We are back on the record. The time is approximately 4:10 p.m. 4:10PM
BY MR. KING:
Q Okay. Looking back at paragraph 21 of your declaration where you're talking about the Lackner reference. Now, as I understand your testimony about the -- or at least your declaration on the Lackner 4:11PM reference, is that Lackner describes a typical experimental PDLC system, right?
A Yes.
Q So someone in 1996, in your opinion, would know that a PDLC system did not have rise and fall times that 4:11PM were sufficiently fast for video, right?
A That's correct.
Q Now, I see that you say that the photo activated rise and decay times, I see you refer to the photo activated rise and decay times, right? 4:11PM

A What it really means is you're using a photo sensor to look at the light and measure the rise and decay times. 4:11PM

Q So it's not talking -- it's not talking about activating the PDLC with light, it's talking about measuring it? 4:11PM

A Yes.

Q Okay. Then why does it use the word photo activated rise and decay times?

A I don't know. I'd need to look again at the specification. 4:11PM

Q Okay. Does PDLC -- can you activate PDLC liquid crystal with a beam of light, like a CRT?

A No.

Q No, you can't? 4:12PM

A (Witness shakes head.)

Q Can you activate PDLC crystals with an electric field?

A Yes. But activating is not really the right term. It's more aligning them or allowing to misalign. 4:12PM

Q All right. I'm marking as Exhibit 11 the Lackner reference. It's US Patent No. 5,170,271 and it is Exhibit 2011 in the '545 matter.

///

/// 4:13PM

(Exhibit 11, Lackner reference in '545 matter, US Patent No. 5,170,271; Exhibit 2011, was marked.) 4:13PM

BY MR. KING:

Q Okay. This is the Lackner reference, right? 4:13PM
A Yes.
Q And I believe you were referencing the discussion of PDLCs on column two, lines 6 through 11, right?
A Yeah. Yes. 4:14PM
Q Okay. You see that, that's the -- column two, line 6 through 11, has the statement that the photo activated rise and decay times with a constant bias voltage and typical LCLV operation were 5 to 10 milliseconds on time and 1.5 to 3 seconds off time. 4:14PM
A Yes.
Q Thus, the frame rate (on time plus off time) was very slow compared to a dynamic television image frame time of less than 33 milliseconds, right?
A Yes. 4:15PM
Q So that's saying that a typical television image frame time is 33 milliseconds, right?
A Image frame rate, yes. Well, frame time they say, but yeah.
Q All right. Now, the next sentence says, The 4:15PM

response of the PDLC type film layer to a square voltage pulse was much faster with rise and decay times of less than 1 millisecond and 15 milliseconds respectively; do you see that? 4:15PM

A I do. 4:15PM

Q What does that refer to?

A Must be the voltage across the cell that they're applying. And they're applying it in a sharp high energy pulse.

Q Okay. And is that relevant to the use of PDLC technology in video projection displays? 4:16PM

A It would be relevant.

Q How would it be relevant?

A If that were achievable on a matrix-type device, then it would be possible to at least achieve acceptable response times. I don't believe these are matrix-type devices. And so that's how it's relevant. 4:17PM

Q Okay. Now, if we just go down the list here, I see in column two, lines 16 through 25, there's a discussion of a Macknick reference; do you see that? 4:17PM

A Yes.

Q And the Macknick reference had fast response PDLC-type films, correct?

A Yes.

Q With -- can you explain to me, can you 4:17PM interpret this section for me and explain to me what the on time and the off time is in this discussion of Macknick? 4:17PM

A It's hard to compare what they're talking about here because they're sort of mixing the means by which they're characterizing the response time. Right here they say about 50 percent transmission was reached during the 5.3 millisecond pulse. 4:18PM

And essentially, with liquid crystal displays, when characterizing response time you go from 10 percent transmission to 90 percent transmission, not to 50 percent transmission. 4:18PM

So don't really know whether or not that's -- that's meaningful. It slows down considerably. I didn't finish my -- I apologize. 4:19PM

Q It's my fault.

A So that's all I have to say.

Q Okay. So Macknick may or may not be relevant to video systems, you just can't tell from this discussion? 4:19PM

A Well, it even says full voltage activation of the film is not shown.

Q Do you see going on down the line they talk about the Takazawa reference, column two, line 25 through 38? 4:19PM

A Yes. 4:19PM

Q That's another discussion of research into PDLC response times, right?

A Yes.

Q Is the discussion in Takazawa relevant to video speeds? Let me ask it a different way. 4:19PM

Is the discussion of Takazawa relevant to whether PDLC technology could be used with video displays in 1996?

A Again, I'd say that it depends on what the device is, but the speeds are getting in the neighborhood of where they need to be. These devices are single cell devices, obviously. Not matrix address devices. So I'm not sure if it's really relevant to video displays. 4:20PM 4:21PM

Q Okay. Let's keep on going down the line. Actually, sorry. Let's keep on going down the line.

Do you see in column two, lines 39 through 52, there's the discussion of the Kunigada reference?

A Yes. 4:21PM

Q And the Kunigada reference is a discussion of a PDLC display technology, right?

A Yes.

Q And, in fact, it looks like they made a full color projection TV using PDLC technology, right? 4:21PM

A That's what it says. 4:21PM
Q And that's not something you were aware of when you were testifying about PDLC technology earlier today, right?
A Apparently not. 4:22PM
Q Okay. So this example shows that people before 1996 did, in fact, use PDLC to make a video display system, right?
A At least in the lab.
Q At least in the lab? 4:22PM
A Yes.
Q Let's keep on going down the line. Column two, lines 53 through 65, is discussing the Lauer reference, right?
A Yes. 4:22PM
Q And the Lauer reference discusses PDLC technology, right?
A Yes.
Q Is the discussion of the Lauer reference relevant to whether someone in 1996 could use PDLC to make a video display? 4:22PM
A Yes.
Q Okay. And, in fact, in Lauer -- in Lauer they're actually discussing an active matrix system, correct? 4:23PM

A Yes. 4:23PM

Q And that's also true of Kunigada, right? Kunigada discusses an active matrix display, right?

A That's correct.

Q Let's go to paragraph 22 of your '545 report. 4:25PM

A Okay.

Q And paragraph 22 is discussing your opinions about electrophoretic materials, right?

A That's correct.

Q And I see that you say that electrophoretic 4:26PM materials are still not typically used for video speed displays, right?

A Yes.

Q Largely because of their very slow response time, correct? 4:26PM

A That's correct.

Q The word typically jumps out at me again; do you see that?

A Yes.

Q Okay. Does that mean that there are some 4:26PM electrophoretic materials that are suitable for video displays?

A Not to my knowledge.

Q So you're not aware of any electrophoretic materials in 1996 that had switching speeds fast enough 4:26PM

to be used in video applications? 4:27PM
A No.
Q You're not saying they don't exist, you're just saying you're not aware of any?
A Even to date the switching speeds of electrophoretic displays, even now I should say, are not sufficient to provide video. 4:27PM
Q What's the fastest switching speed for an electrophoretic display that you're aware of?
A Fastest. Tenths of a second. 4:27PM
Q And do those exist, were people in the art aware of the switching speeds associated with those materials being in the tenths of a second in 1996, in your opinion?
A I would say not, no. 4:28PM
Q What switching speed would you expect to be typical for an electrophoretic material in 1996?
A Well, upper tenths of a second, yeah, for on off, on off on.
Q So, like, .2 of a second or like .9 of a second? 4:28PM
A .5 to a second.
Q Can we turn to page 14 of your '545 declaration, paragraph 25?
A Okay. 4:28PM

Q Here you're discussing your opinions about the 4:29PM
reference to TV or computer interface electronics in
Flasck Figure 9, right?
A Yes.
Q And I see one sentence there says, However, at 4:29PM
the relevant time, one of ordinary skill in the art
would have understood that the mere labeling of an
interface as TV ... interface electronics, as Flasck
does with Element 118 in Figure 9, does not imply the
interface can necessarily be used to carry a video 4:29PM
signal.
Do you see that?
A Yes.
Q Okay. The word necessarily jumps out at me
again. What did you mean by that sentence and, in 4:29PM
particular, the word necessarily?
A The existence of a cable that essentially has
the connections to, say, for instance, a computer
output, doesn't necessarily imply that it's carrying a
video signal. 4:30PM
Q So it might be carrying a video signal, it
might not?
A Right.
Q Is that what you're saying?
A Right. 4:30PM

Q When a person of ordinary skill in the art sees the words TV or computer interface electronics, wouldn't they -- they might not know for a hundred percent certainty that it's carrying a video signal, but wouldn't they think that it's probably carrying a video signal? 4:30PM 4:30PM
A I couldn't say. I don't know. One of ordinary skill in the art, TV interface electronics, I -- I'm not sure what -- I guess I would have to lean towards saying if it were me, I would have an idea of what it is. 4:31PM
Q And what would that idea be?
A It would be a connector and some electronics to accept a signal.
Q A video signal, right?
A A video signal. 4:31PM
Q Okay.
A Or to be more precise, a TV signal.
Q And a TV signal is one example of a video signal, right?
A Yes. 4:31PM
Q And -- or if it were a computer interface, it would be a computer signal, right?
A That's right.
Q And your understanding of a computer signal is that in this context, it would also be a video signal, 4:31PM

right? 4:31PM
A No. That's -- that's not true.
Q It's not true?
A No. It could just be static images being put up. 4:32PM
Q Okay. All right. Let's go to page 31 of your '545 declaration. This is the discussion of the --
A Page or paragraph?
Q Page 31, paragraph 59. Okay. So this is part of your discussion of proposed claims four and five. 4:33PM Can we have -- I don't have -- I don't think your report has proposed claims four and five in them. Do you need to have that in front of you before we have this conversation?
A If I need them, I'll ask for them. 4:33PM
Q Okay. You say proposed claims four and five also require, in part, a second controller adapted to control the individual light sources and the fan and a control link adapted to connect the video controller to the second controller to provide individualized variable 4:34PM control of each of the light sources.
Do you see that?
A Yes. Each of the individual light sources.
Q Thank you. Can you explain for me what that means or what those terms refer to? 4:34PM

A What terms? 4:34PM
Q What you were talking about in paragraph 59.
A Okay. So what we're talking about is being able to have control of light source intensity as a function of incoming video signal. So as fields become 4:35PM brighter, you know, the light source could be made brighter. As fields of picture information become lower, and the light sources could become lower. And then I think N is self-explanatory.
Q And going to paragraph 60, do you see where it 4:36PM says, Flasck and Lee, however, fail to disclose or suggest a second controller or a control link to provide individualized variable control of each of the individual light sources?
A Yes. 4:36PM
Q So I want to talk about the Lee reference for a second. Do you have that in front of you?
A Yes.
Q And remind me what the exhibit number of the Lee reference is? 4:36PM
A Exhibit 6.
Q Thank you. So does the Lee reference have a second controller adapted to control the individual light sources?
A Yes. It is item 18, a lamp controlling 4:37PM

circuit, lamp voltage controlling circuit. 4:37PM

Q Okay. And does controller 18 provide individualized variable control of each of the individual light sources?

A Yes. It shows that it does. 4:39PM

(Exhibit 12, Declaration of Dr. Buckman in the '545 action; Exhibit No. 1006, was marked.)

BY MR. KING:

Q All right. I'm handing you Exhibit 12. This is the Buckman declaration in the '545 action. It's 4:40PM Exhibit 1006.

Do you have that in front of you?

A Yes.

Q Okay. Same question as before. I understand that you've reviewed this declaration in connection with 4:40PM forming your opinions in this case?

A I have.

Q And I understand you disagree with some of the statements that Dr. Buckman made?

A That's correct. 4:40PM

Q And your disagreements with what Dr. Buckman said are set forth in your declaration, correct?

A That's correct.

Q Do you have any disagreements with what Dr. Buckman said that are not set forth in your 4:40PM declaration? 4:40PM

A Not to my knowledge without going through this in fine detail. So I'd say no.

Q Okay. You understand that Dr. Buckman has a -- has had a long career as a professor at the University 4:41PM of Texas, right?

A Yes.

Q And that includes writing a textbook on optics?

A Yes.

Q Do you have an opinion on whether or not 4:41PM Dr. Buckman is qualified to serve as an expert in this case?

A I feel his knowledge of liquid crystal displays doesn't seem to be equivalent to one of ordinary skill in the art. I don't question his other optics 4:42PM experience and knowledge.

I'll take back what I just said. And if we can strike the part where I said one of ordinary skill in the art.

You asked the question whether he's qualified 4:43PM as an expert. And my statement really should have been that I didn't feel that he was an expert relative to LCD, not that he didn't have the skill of one of ordinary skill in the art.

Q So help me to understand what your opinion is. 4:43PM

It sounds like you've got some nuance to it. 4:43PM
A No, it's not a nuance. It's just a correction of what I said. I used the term that we use often and it doesn't apply. Basically, there's some opinions presented in Dr. Buckman's declarations and then again 4:43PM in his testimony at deposition that lead me to believe that he's not an expert in liquid crystal displays.
Q Okay. And what opinions are those?
A Certain things like lack of knowledge of what an LCD cell gap is, not knowing what the standard 4:44PM definition of a pixel is, mischaracterizing nonpixilated device as a pixilated device.
Q Okay. I didn't see any discussion of LCD cell gaps in either of your declarations.
A There was a question in a deposition relative 4:45PM to cell gap.
Q Okay. But you didn't discuss that in your declaration, right?
A No.
Q And you say that Dr. Buckman got the definition 4:45PM of pixel wrong?
A Yes.
Q Do you mean he got the definition of pixel wrong in your view or do you mean he got the definition of LCD cell wrong in your view? 4:45PM

A Both. He called an LCD cell something like a pixel. And when asked what a pixel was, he didn't give a clear answer. Pixel is an addressable picture element. And then he gave examples in terms of what it would mean relevant to '545 or '334 patents. 4:45PM 4:45PM

Q All right. Going back to the construction, the board's construction of the term light shutter maintenance system.

In the '334 action, do you recall that the board interpreted light shutter maintenance system as a set of matrices such as monochrome LCD arrays or cell of a monochrome LCD array where each -- where each matrix comprises a rectangular arrangement of elements capable of limiting the passage of light? 4:46PM

A Your question was do I recall that statement? 4:47PM

Q Yes.

A I've heard it, so I don't need to recall it.

Q I believe you testified earlier that a monochrome LCD array is -- what is a monochrome LCD array? 4:47PM

A It's an array -- it's an LCD structure cell as defined earlier with no color filters and a plurality of addressable rows and columns of pixels.

Q Okay. But it's just one two-dimensional array, right? 4:47PM

A That's correct. 4:47PM

Q And the '545 and the '334 systems use three LCD arrays, right?

A That's correct.

Q Okay. And each one of those LCD arrays, in your opinion, has one LCD cell, right? 4:48PM

A That's correct.

Q Okay. So it would be a mistake to refer to cells of an LCD array, in your opinion, right?

A Well, I think I understood an interpretation of the board. Should the device be formed on a single substrate, such that you had an array with three individual liquid crystal cells formed on it and those not being individualized, then that could -- that could fit that requirement. 4:48PM 4:48PM

And that's almost what the drawing on the '545 figure, Figure 1 shows.

MR. KING: All right. Fair enough. All right. I think that's all I have. Should we go off the record?

MR. QUILLIN: Cross-examination's over? 4:50PM

MR. KING: Yes.

MR. QUILLIN: I understand our reporter has an appointment, so we will adjourn until tomorrow morning at 9:00 a.m.

MR. KING: Okay. 4:50PM

MR. QUILLIN: Off the record. 4:50PM

THE VIDEOGRAPHER: This concludes end of Media No. 3 at the end of Volume 1 of the deposition of Robert Smith-Gillespie and we will resume testimony tomorrow. We are off the record at approximately 4:51 p.m. 4:51PM

(Proceedings ended at 4:51 p.m.)

ROBERT SMITH-GILLESPIE

EXAMINATION DATE:

Thursday, August 29, 2013

PAGE NO. LINE NO. CORRECTION

I, the undersigned, declare under penalty of perjury that I have read the foregoing transcript and I have made any corrections, additions, or deletions that I was desirous of making; that the foregoing is a true and correct transcript of my testimony contained therein.

EXECUTED this ____ day of _______, 20__, at ____________, Oregon.

____

ROBERT SMITH-GILLESPIE

STATE OF OREGON)
) SS.
COUNTY OF MULTNOMAH)

I, Victoria A. Guerrero, CSR, RPR, CRR and Notary Public, hereby certify that, pursuant to the Rules of Civil Procedure, ROBERT SMITH-GILLESPIE personally appeared before me at the time and place set forth in the caption hereof;

that at said time and place I reported in stenotype all testimony adduced and other oral proceedings had in the foregoing matter;

that thereafter, my notes were reduced to typewriting under my direction;

and the foregoing transcript, pages 1 through 163, both inclusive, constitutes a full, true, and correct record of such testimony adduced and oral proceedings had and of the whole thereof.

Witness my hand and notarial seal at Portland, Oregon, this Tuesday, September 2, 2013.

____

Victoria A. Guerrero, RPR, CRR, CLR
Washington CCR No. 3293