SEL EXHIBIT NO. 2026

INNOLUX CORP. v. PATENT OF SEMICONDUCTOR ENERGY LABORATORY CO., LTD.

IPR2013-00066

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

INNOLUX CORPORATION,	)	
	)	
Petitioner,	)	
	)	
vs.	)	IPR2013-00068
	)	U.S. Pat. No.
SEMICONDUCTOR ENERGY	)	8,066,204
LABORATORY CO., LTD.,	)	
	)	
Patent Owner.	)	

The videotaped deposition of MICHAEL J. ESCUTI, Ph.D., called by the Petitioner for examination, pursuant to Notice, and pursuant to the applicable rules, taken before Sandra L. Rocca, CSR, CRR, at 115 South LaSalle Street, Chicago, Illinois, on the 6th day of September, 2013, at the hour of 9:49 a.m.

APPEARANCES:

JEFFER MANGELS BUTLER & MITCHELL, LLP
By: MR. STANLEY M. GIBSON
3 Park Plaza, Suite 1100
Irvine, CA 92614
(949) 623-7200/Fax: (949) 623-7202
sgibson@jmbm.com
appeared on behalf of the
Petitioner;

STEPTOE & JOHNSON, LLP
By: MR. STANLEY A. SCHLITTER
115 South LaSalle Street
Chicago, IL 60603
(312) 577-1250/Fax: (312) 577-1370
sschlitter@steptoe.com
-and-
HUSCH BLACKWELL LLP
By: MR. EDWARD D. MANZO
120 South Riverside Plaza
Suite 2200
Chicago, IL 60606
(312) 526-1535/Fax: (312) 655-1501
edward.manzo@huschblackwell.com
appeared on behalf of the
Patent Owner.

Also Present:
Ms. Mary Ann Naas, Videographer

INDEX

WITNESS	PAGE
MICHAEL J. ESCUTI, Ph.D.	
EXAMINED BY	
Mr. Gibson	5
Mr. Schlitter	177
Mr. Gibson (Further)	187

EXHIBITS

NUMBER	PRESENTED
Deposition Exhibit	
No. 1004 U.S. Pat. No. 5,504,601	144
No. 1005 U.S. Pat. No. 5,636,329	106
No. 1008 Late-News Paper: Polarization Independent Liquid Crystal Microdisplays	53
No. 1009 Schematic of Fig. A, pg. 40 of Escuti '204 declaration	82
No. 1010 schematic of Fig. B, pg. 50 of Escuti '204 declaration	82
No. 1011 schematic of new modified Fig. 4 of Shiba	83
No. 1012 U.S. Pat. No. 8,068,204	9
No. 1013 U.S. Pat. No. 5,684,555	28
No. 2011 Escuti declaration re U.S. Pat. No. 8,068,204	6

VIDEOGRAPHER: Okay. We're on record. My name is Mary Ann Naas of Veritext. Today's date is September 6th, 2013. The time is approximately 9:49.

This deposition is being held in the office of Steptoe & Johnson located at 115 South LaSalle Street, Chicago, Illinois.

The caption of the case is Innolux Corp. versus Patent of Semiconductor Energy Lab, case number IPR 2013-00068, Patent No. 8,066,204, in the United States Patent and Trademark Office before the Patent Trial and Appeal Board. The name of the witness is Dr. Michael Escuti.

At this time will the attorneys please identify themselves and the parties they represent, after which our court reporter, Sandra Rocca of Veritext, will swear in the witness and we can proceed.

MR. GIBSON: Stan Gibson on behalf of the Petitioner.

MR. SCHLITTER: Stan Schlitter of Steptoe & Johnson and Edward Manzo from Husch Blackwell on behalf of the patent owner.

MICHAEL J. ESCUTI, Ph.D.,
having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. GIBSON:

Q. Good morning. If you could once again spell your last name and state your name for the record.

A. Good morning. My last name is spelled E-s-c-u-t-i and my full name is Michael James Escuti.

Q. And I went over the background rules for the deposition yesterday. I'm not going to repeat those unless you would like me to do so.

Would you like me to repeat those for you?

A. There's no need to do so.

Q. And there's no reason your deposition can't proceed today?

A. There's no reason.

Q. All right. Let's -- we're now here dealing with the '204 patent and you also submitted a declaration in that matter as well?

A. I did.

(Document marked previously as Exhibit Number 2011 was presented.)
BY MR. GIBSON:
Q. And I'm going to hand you a copy of that and ask you to take a look at it and confirm that it's your declaration.
A. It does appear to be my declaration and exhibit -- I'm sorry, declaration and appendices but not the exhibits.
Q. And if you look at Appendix B to your declaration --
A. I see it.
Q. -- are those the materials that you reviewed to prepare your declaration?
A. Yes.
Q. And did you review anything else in preparing your declaration?
A. In forming the opinions that are expressed here and in preparing the declaration itself, I didn't review anything else in addition to this list.
Q. So you didn't look at any other patents, for example?
A. Not for the purpose of forming the opinions and preparing the declaration, no. As I

did mention yesterday, there were other things I looked at but decided not to spend any more time on, other than recognizing that I had seen them.
Q. And do you recall any patents you looked at and decided not to consider?
A. No. I certainly don't recall any -- any of those.
Q. How much time did you spend looking at the things you decided not to consider?
A. A small -- small number of hours, one hour, not very much time at all.
Q. Were -- those things that you didn't consider, were those provided to you by counsel or were those just things you looked at on your own?
A. Those were things that I looked at on my own.
Q. Were there any things that were provided by counsel that you did not consider?
A. Not that I can recall. This list seems to be complete in that regard.
Q. And the CV that's attached to your declaration, is it the same CV as yesterday?
A. It appears to be, but there does appear to be two copies of it. I'm not sure if that's our error or an error that happened in your

printing, but it does seem to be that there's two copies of the same thing.
Q. Okay. And I'm not sure if that's attached to the original that way or if that was something that was done in the copying either, but putting that aside, is it the same CV, albeit with two copies of the one we went through yesterday?
A. It does appear to be the same and that certainly was my intention.
Q. If you'd look at paragraph 52 of your declaration --
A. I see it.
Q. -- and if you have a moment, just to read that to yourself. Just let me know when you're done.
A. I've read it.
Q. And what are you trying to articulate there?
A. The statement says what it says and I stand by it, that an ordinarily skilled artisan understands that this terminal in the '204 patent is fabricated generally from the bottom up, beginning with the foundation and substrate and then the other layers. And that's required because of the processing that's needed during the

fabrication.
Q. And this figure's coming from the '204 patent, is that correct?
A. Yes, I believe it's Fig. 4A.
(Document marked previously as Exhibit Number 1012 was presented.)
BY MR. GIBSON:
Q. I'm going to hand you the '204 patent. And --
A. To be clear, it's been colorized in my declaration. So it's a modification of Fig. 4A, but that's where it's from.
Q. Right. Now, when you look at say Claim 1 of the '204 patent -- have you had a chance to look at that?
A. While I have reviewed Claim 1 of the '204 patent, I certainly haven't spent a lot of time reading it. That certainly was not my focus.
Q. Okay, fair enough.
What would you consider to be a representative claim that would embody what's in 4A in the '204 patent?
A. Can you tell me what you mean by "representative claim"?
Q. What's a claim that would claim the

features that you see in Fig. 4A of the '204 patent?
A. Well, Fig. 4A is an embodiment of Claim 31 and maybe others. So is that what you're asking, what my opinion is?
Q. Yeah, and what specific claim do you think would cover that embodiment?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, I'm quite certain that Fig. 4A covers multiple claims in this patent. The one that comes to mind first is Claim 31, but by no means is it limited to that.
BY MR. GIBSON:
Q. Okay. And I'm not asking for a limit. I'm asking for something that would be representative.
And Claim 31 uses the language of "first" and "second," for example? There's those words in that claim?
A. The words "first" and "second" are indeed in Claim 31, but of course applied to lines -- oh, I'm sorry. Well, there's the insulating films in Claim 31.
In Claim 54, which also I think applies, it's used in a different way, those words. But

the words "first" and "second" do appear in Claim 31.
Q. All right. And when you -- or when an ordinary -- when a person of -- an ordinary person of skill in the art reads a claim that states "first" and "second," would you understand that that's referring to the order that the layers are deposited --
MR. SCHLITTER: Objection, form.
BY MR. GIBSON:
Q. -- on the substrate?
MR. SCHLITTER: And foundation.
THE WITNESS: It would depend on the claim that the person of ordinary skill is reading.
BY MR. GIBSON:
Q. Well, the Claim 31, for example, how would you interpret the order of the deposition steps as being set forth in that claim?
A. Are you asking generally or do you want me to give you a comprehensive --
Q. Specifically in Claim 31, how would a person of ordinary skill in the art understand the words "first" and "second" in terms of a direction into -- or the depositing of the layers?

A. Well, in Claim 31, first of all, the terms "first insulating film" and "second insulating film" are part of the claim and they are part of the claim in a sequence of limitations, which I'd like to go through to lay the ground work for my answer, right.
So it's clearly a liquid crystal display device. There must be a substrate with thin film transistors, pixel electrodes each electrically connected to one of the thin film transistors, a counter substrate facing the substrate, a liquid crystal material and a sealant provided between the substrate and the counter substrate.
And then we get into the claim limitations that are really particularly at issue. There's an auxiliary line, an external connection line overlapping the auxiliary line with a first insulating film interposed there between. So that's the first instance of the word "first" applied to the insulating film.
The word "first" in this use doesn't require a sequence, but its relationship of this element to the other elements identified here does imply a sequence. It's not so much the word "first," but rather that whole limitation that

describes the relationship between those three elements.
Q. All right. And so it's obviously not -- what you're saying is it's not the word "first" by itself, but you understand in the context of that claim when you see the words "first" and "second," there is an order that's being directed in how you're going to deposit these layers?
MR. SCHLITTER: Objection, form.
THE WITNESS: In Claim 31, the order that is and sequence of the layers that are present is not principally linked to the use of the word "first" or the use of the word "second." It's the other descriptions that are provided that describe that.
The function in this claim of the word "first" and "second" principally goes to identify that there's two separate insulating films.
BY MR. GIBSON:
Q. Would that -- would you understand if you didn't have the words "first" and "second," that you could order these in a -- well, strike that.
Let's look at Claim 54. In Claim 54, you also have the words "first" and "second"?

A. Yes, they're used and applied on first conductive line, second conductive line as well as first insulating film and second insulating film.
Q. And the statement where you say, "a first conductive line over the substrate," you would understand that element to be telling you a sequence of how you're going to deposit that layer, correct?
A. Well, not strictly speaking. If there's a substrate, there should be a -- in this claim limitation, there should be a first conductive line over that substrate. I think a person of ordinary skill would normally expect that the substrate is first somehow manufactured and then prepared for the deposition of that conductive line, but the claim certainly doesn't require that. It could be the inverse.
Q. What do you mean it could be the inverse?
A. It's entirely possible to have a metal layer formed and a material deposited onto that that will later serve the function of the substrate. You know, for example, in flexible displays, that's a possibility. I'm not saying it's common or -- or preferred, but it's certainly

an aspect that's explored in that context.
Q. Okay. But looking at Claim 54, you would not understand Claim 54 to be directing that kind of step, right?
A. It doesn't direct either way. It simply says there must be a first conductive line over the substrate and that word "over" then places a direction above a substrate that's going to be built upon in the rest of the claim limitations.
Q. All right. So you're saying the substrate could come after the first conductive line?
A. Claim 54 could certainly apply to terminals where a first conductive line is first somehow prepared and then a substrate material is applied onto that.
It sounded to me like you were asking me if this limitation required a sequence between a substrate first and then a first conductive line and I'm simply commenting that that's not the what claim limitation requires. It could be the inverse as well.
Q. When you look at a first insulating film over the first conductive line, could that be the inverse as well?

A. Well, in that case, I don't think a person of ordinary skill would -- would be able to see that as the inverse. So in that case, it's building on top of that first conductive line because of the word "over."
Q. No, the word "over" is also used in the previous element.
A. It is.
Q. First conductive line over the substrate.
A. It is.
Q. So how is the word "over" being used differently in the element of first insulating film over the first conductive line?
A. Well, I'd like to be clear. I think a person of ordinary skill would normally read this, a first conductive line over the substrate limitation and understand that the substrate would be prepared first and then the first wiring line would be deposited and patterned on top of it, but the claim limitation does not require that. That's simply what I'm -- I'm pointing out.
And the use of the word "over," the first time it's used refers to the arrangement of just two things. Whereas its second use refers to

its use with respect to more than two things.
Q. So would you then read a limitation into a first conductive line over the substrate as saying the substrate's going to have to come before the first conductive line because the next element of first insulating film over the first conductive line requires the insulating film to be over the conductive line?
MR. SCHLITTER: Objection, form.
THE WITNESS: I -- I don't think that a person of ordinary skill would read the phrase "a first conductive line over the substrate" as requiring that the substrate come first. That is a preferable way to do it certainly, but it's not required.
However, when it's used in the next limitation, the first insulating film over the first conductive line, there is an order that's required there because it's -- it's describing the relationship of the first insulating film which now must be over the first conductive line, which of course is already over the substrate.
BY MR. GIBSON:
Q. Now, when you look at the next element, a second conductive line -- actually let me just

follow-up on what you just said.
When you look at the two elements together, a first conductive line over the substrate, a first insulating film over the first conductive line, are you saying that that does tell you that the substrate is going to come first and then you're going to have a conductive line and then you're going to have an insulating film over the conductive line?
A. Perhaps I misunderstand what you mean by "first." What sequence are you referring to more specifically, the sequence that is used during the actual fabrication or in --
Q. No, I'm looking at the claim language and I want to make sure it's not what I understand, it's what you understand about the words "first" that matter.
And I'm just trying to understand, if you look at those two claim elements, a first conductive line over the substrate, a first insulating film over the first conductive line, does that tell you that there's going to be a substrate and then a conductive line over the substrate and then a first insulating film over the first conductive line?

A. At the end of whatever process is used to implement these claim limitations, there should be a substrate, which I'd prefer to talk about as being on the lower side of the element. The next element should be a first conductive line, and then the next element should be a first insulating film. I think that structure is required by those claim limitations. I think the difference that I'm trying to express is that that structure can be reached even if the substrate isn't the first thing that's actually fabricated.
Q. Okay. When we get to the next element, a second conductive line over the first insulation film, would you understand that to require that the second conductive line is coming after the first conductive line has been deposited?
A. I think a person of ordinary skill would -- would read a second conductive line over the first insulating film as requiring that the deposition and patterning of the second conductive line should happen after the first insulating film is already deposited.
Q. All right. So, I mean, you wouldn't expect someone to build this backwards. In other words, we wouldn't start with the second

conductive line and then put down -- put an insulating film and put a first conductive line next and then put a substrate on top of that?
A. Well, the claim refers to the final relative relationships between these elements. The claim doesn't have forming language. It's not a process claim. So no, I don't think I can agree that it requires what I think I heard you describe. This whole thing could have been fabricated in an inverted way.
Q. As one of ordinary skill in the art, would you be able to fabricate this? If you look at all the claims, would you be able to fabricate this in an inverted way, opening up the particular layers and --
A. Well, what I'm -- what I'm I guess most clearly trying to say is that the path of fabrication, the process of creating these layers can take many different paths and I don't think the claim limits how the structure is gotten to. It does limit the relative relationships of those -- of those layers.
So there's a normal way that I think one of ordinary skill would anticipate building this and that's certainly corresponding with what

you're asking me to agree to, but I don't think the claim limits it to that.
Q. So you wouldn't agree that in Claim 54, the sequence of the disclosed layers necessarily follows that you're going to have the first conductive line deposited, then the insulating film deposited and patterned to enable the required electrical connection?
A. Well, it depends on what you mean by "sequence."
Q. What do you mean?
A. Well, again, if we're talking about the sequence used during fabrication, that's one thing. If we talk about the sequence looking at the structure itself at the end, it's a different matter. So the claim does require the relative sequence in the final structure.
Q. As one of ordinary skill in the art, isn't that how you're going to have to deposit them in order to achieve that structure?
A. Again, I gave you the example in the first claim limitation that we were talking about, a first conductive line over the substrate. There are at least two ways to achieve that claim limitation. One is where the substrate is somehow

formed and then the first conductive line is patterned -- deposited and patterned on top of it.

I think that would be a very usual example, but the opposite could have also been the case, where the first conductive line is somehow prepared and the substrate material applied on top of that. In either way, you still wind up with that relative relationship of the two and you can then process the rest of these on top of that.

So in the end, the relative sequence in looking at the final structure, going from the substrate and to the next layer that's over the substrate in the language of the claim, the sequence is prescribed.

Q. But you think that the deposition steps could be reversed from what the sequence is when you're looking at the finished product?

A. What --

MR. SCHLITTER: Objection, form.

THE WITNESS: What are you asking me to reverse?

BY MR. GIBSON:

Q. Well, what I'm trying to understand is the order of the deposition steps that you would understand would happen from Claim 54. And I

would assume that -- well, I don't want to assume anything. Let me just ask you a question.

Don't you think that based on what Claim 54 says, that a person of ordinary skill in the art is going to understand the sequence of the disclosed layers to be that the first conductive line is deposited, then the insulating film is deposited and patterned, then the -- then the second conductive line is deposited, followed by the second insulating film and then followed by the transparent conductive film? Isn't that what Claim 54 is directing the sequence of deposition steps to be?

A. Claim 54 doesn't direct the sequence of the deposition steps. It directs the sequence of the layers in the final structure, the final terminal. The sequence that you just described is certainly one example that I think a person of ordinary skill would -- would follow, but it's not limited to that. The claim is not limited to that. It's limited in its relative sequence at the end.

Q. But wouldn't you agree that the deposition steps necessarily follow from the language of Claim 54?

A. Do you mean the sequence of the deposition steps?

Q. Yes.

A. I -- I can't agree exactly with that. Again, the claim doesn't describe a -- it's not a process claim. It's a claim that limits the structure of the final terminal.

Q. If you look at your declaration, paragraph 54, and in paragraph 54, you state "In Claim 54, and Claim 61, 68 and 76 reciting similar limitations, the sequence of the disclosed layers necessarily follows:

"First, the first conductive line metal, 401 in Fig. 4A is deposited. Second, the first insulating film 112 in Fig. 4A is deposited and patterned to enable the required electrical connection between the first and second conductive lines. Third, the second conductive line metal 403 in Fig. 4A is deposited. Fourth, the second insulating film 113 in Fig. 4A is deposited and patterned to have an opening. Fifth, the transparent conductive film 114 in Fig. 4A is deposited and patterned."

Those were your words, correct?

A. Yes, and I stand by paragraph 54 fully.

Q. And you stand by the sentence that says "in Claims 54, the sequence of the disclosed layers necessarily follows"?

A. I certainly do. That's what I'm expressing right now. The sequence of the disclosed layers in the final terminal assembly necessarily follows from the claim. How to get there is not specified in the claim. What I list is the most likely way, but it's not the only way.

Q. It doesn't say the most likely way in your declaration. It says "necessarily follows," correct?

A. It says that "the sequence of the disclosed layers necessarily follows from Claim 54." I still stand by that.

Q. Now, if you look at Fig. 4A -- and I just want to check to see if I've got a blowup of that. If not, we'll just use the one that's in '204. I'll just use the one that's in the '204 patent.

So you've got that in front of you?

A. Yes, I do.

Q. And could you -- Claim 54 refers to a first conductive line?

A. Yes, it does.

Q. And if you could write down for me next to Fig. 4A what you would assume to be the first conductive line.
MR. SCHLITTER: Objection, form.
THE WITNESS: You want me to label on my copy of Fig. 4A --
BY MR. GIBSON:
Q. Yes, please.
A. -- where is the first conductive line?
Q. Yes.
A. Would you like me to just add the words to the label or actually color through the element?
Q. Oh, just add the words, please. That will be sufficient.
A. Okay. (Indicating.)
Okay, I've done so.
Q. And then if you could -- Claim 54 also refers to a first insulating film?
A. It does.
Q. If you could write where that first insulating film is.
A. (Indicating.)
I've done that.
Q. Thank you.

And Claim 54 also refers to a second conductive line?
A. Yes.
Q. And if you could write that on Fig. 4A as well.
A. (Indicating.)
I've done it.
Q. And Claim 54 refers to a second insulating film?
A. Yes.
Q. And if you could write that down as well on Fig. 4A.
A. (Indicating.) Yes.
Q. All right. If I could just take a look at that. Thank you.
So as you've indicated there, the first conductive line is equivalent to 401 auxiliary lines?
A. I can't agree that it's equivalent, but I'm pointing to that label in Fig. 4A. The auxiliary lines correspond to the first conductive line of Claim 54.
Q. You understand that to satisfy that claim limitation?
A. I understand that the 401 auxiliary

lines satisfy the first conductive line claim limitation in Claim 54, yes.
Q. And the first insulating film, you understand that is the -- corresponds to the 112?
A. The first insulating film of Claim 54 does correspond or is -- that claim limitation is met by element 112 in Fig. 4A.
Q. And then the second conductive line is the 403 external connection lines?
A. 403 meets that claim limitation, the second conductive line.
Q. And the second insulating film is met by 113, the resin inter-layer film?
A. Element 113 corresponds to the second insulating film in Claim 54.
Q. Okay. Let's look at Shiba again. I think I've got the patent from the '204 matter.
MR. SCHLITTER: Thank you.
(Document marked previously as Exhibit Number 1013 was presented.)
BY MR. GIBSON:
Q. And this is one of the patents that you reviewed in preparing your declaration for this matter?
A. Yes, it is.

Q. And if you'd look at Fig. 1 of Shiba, what's your understanding of what's being disclosed there?
A. Well, Shiba describes Fig. 1 in Column 3, line 32 as a plan view of an active matrix LCD panel according to an embodiment of the present invention.
Q. And there's a wiring 127, is that correct?
A. I see it. It has at least two labels in Fig. 1. It's a wiring that begins on the left side, extends up the left side across the top of the display and down the right side.
Q. That's the overall length of the wiring 127?
MR. SCHLITTER: Objection, form.
THE WITNESS: I'm not sure I can identify a length of wiring 127, but that's where it is located and illustrated.
BY MR. GIBSON:
Q. And I'm going to ask for a specific dimension. I mean, if you knew the hypotenuse, I suppose you could give us precise dimensions for wire 127 based on that, correct, so it's a right angle triangle?

MR. SCHLITTER: Objection, form.
THE WITNESS: I'm -- can you rephrase your question? I'm not sure what you mean by a "precise dimension."
BY MR. GIBSON:
Q. If you knew the length of the hypotenuse that runs -- there's a line that runs through the middle diagonally?
A. It's a structure that has three sides of a rectangle. So we don't normally think of hypotenuse applying to such a structure, right. It's normally triangles that have hypotenuse. I'm not sure what you're asking.
Q. Well, if you knew the dimension of one side of the rectangle, you could figure out the length of the overall wire 127, correct?
MR. SCHLITTER: Objection, form.
THE WITNESS: You or someone else would need to define what they mean by the length of that wiring. That's a very complicated pattern that's disclosed in other figures of Shiba. And I don't think without more information I can define a length of such a pattern.
BY MR. GIBSON:
Q. All right. But you do agree the wiring

runs from the bottom left corner up to the top and then across and then down to the bottom right corner?
A. That's correct. It's also -- I illustrate that in page 47 of my declaration.
Q. You put it in green, I believe. We have a black and white copy right now, but you put that in green?
A. That's correct. I'm trying to highlight what Shiba indicates as Fig. 127 (sic) in Fig. 1 there as well as in Fig. 3.
Q. And what is the purpose of wiring 127?
A. Well, Shiba discloses that the purpose of wiring 127 in Column 5 and Column 6 is to connect the power supply pads and the common pads that are around the seal region. They have numbers, for example, 731 to 734 and even 731 to 738, and these are all being connected together so that a steady reference voltage is -- would be supplied to those pads so that the counter electrode can have a steady reference voltage. I don't think he uses the word "steady," but that's the idea.
Q. And would you also understand that wiring 127 is supplying voltage to power supply

pad 735 and 738?
A. Yes, 735 and 738 are included in the list of pads in Column 5 and 6 that wiring 127 connects to.
Q. Now, the wiring 127, would you agree that the distance it's traveling along the three sides of the rectangle is longer than the diagonal of the display?
MR. SCHLITTER: Objection, form.
THE WITNESS: Can you define what you mean by the distance of the wiring 127?
BY MR. GIBSON:
Q. Well, if we just take a -- the distance from the three sides of the triangle, if we traverse those three sides, it would be longer to take that traverse than it would be to traverse the diagonal of the display?
A. I still have trouble applying your question to element 127 because it's a complicated pattern. But if you're asking me would the three sides of this rectangle be longer than the diagonal dimension, then yes, it would. I think that would always be true.
Q. What's the impact of the resistance of the 127 wiring on the ability to support frame

inversion?
MR. SCHLITTER: Objection, form.
THE WITNESS: What do you mean by --
MR. SCHLITTER: Foundation.
THE WITNESS: What do you mean by "frame inversion"?
BY MR. GIBSON:
Q. Is that a term that you've heard?
A. It certainly is.
Q. Okay. How would one of ordinary skill in the art interpret frame inversion?
A. Well, frame inversion is what generally is designed into displays because the DC bias, the average voltage that appears in liquid crystal layer, needs to be zero. In other words, it needs to be unbiased on average.
And what that means is that then the voltages on either side of the pixel need to flip or invert periodically and quite often, that's every frame or every other frame kind of a thing. So that's typically what is -- what is done in frame inversion.
Q. And does the wiring 127 have any impact on frame inversion in Shiba?
A. It's provided to support not only frame

inversion itself, but the connection to the counter electrode.

Q. And how does it -- how does it -- how does it perform that function?

A. Well, Shiba discloses that this wiring spread out along the sides of the display and connected to those eight pads, as well as the multiple terminal connections to that conductive pattern, all go to support an even voltage that can be supplied to that. So that in general, the -- the time it takes to reach the desired voltage on that counter electrode would be small. I mean, I don't think he uses that language, but that's certainly my -- my recognition of what he's talking about.

Q. Now, if 127 has high resistance, can it support frame inversion?

A. Well, it doesn't appear to me that line 127 has high resistance. It seems to me that that's the express purpose of why he split it up into multiple lines and he didn't use just one small line, for example, among other reasons as far as why he split it up. So I don't think Shiba recognizes that that's a problem for him.

Q. Right. But the wiring of -- having low

resistance in wiring 127 is important so that you can support frame inversion, correct?

A. Having a resistance that's low enough to support the design is important.

Q. And wiring 127 is critical to that?

A. It's important to that, but that doesn't necessarily mean that it needs to be as low as one can imagine. It needs to be good enough.

Q. Right. It needs to be low enough so that you don't have a signal distortion because if you have a signal distortion, your image quality will be low?

MR. SCHLITTER: Objection, form, foundation.

THE WITNESS: I think that's a fair description of the disclosure in Shiba, yeah.

BY MR. GIBSON:

Q. Now, in Shiba, would you agree that the first wiring line 27 can be formed in the same step of forming the data lines Xi?

A. I notice that Shiba in Column 6 and in the figures of Shiba does disclose exactly that, that the wiring lines 127 are formed in the same step of deposition and patterning as the data lines X, Xi.

Q. And would you also understand they can be formed in the same step of forming the scanning lines Yj?

A. While Shiba doesn't illustrate that, it is in Column 6, around lines 33 where it says depending on the kind of TFTs, the aforementioned wiring lines can be formed in the same step of forming the scanning lines Yj. So that's an alternate embodiment that he identifies.

Q. And then it goes on to explain that the wiring lines 127 may also be formed in the step of forming the scanning lines Yj and the data lines Xi respectively, thereby constituting a two-layer structure.

Do you see that?

A. Yes, I certainly do. After all, this comes after his paragraph where he says they can be used -- it could be formed from the data line, alternatively it can be formed in the scan lines, and here he says it can be formed from both to make a two-layered structure.

Q. So would you agree that Shiba discloses a single layer wiring, that is, a wiring that's formed from the same material as data lines Xi as one possible option?

MR. SCHLITTER: Objection, form.

THE WITNESS: Can you tell me what you mean by a "single layer wiring."

BY MR. GIBSON:

Q. I think we talked a little bit about -- yesterday that these wiring lines can be put down as a layer. That's what I was referring to.

A. I think then that Shiba does illustrate and talk about how wiring 127 is formed from a single deposition step and a single layer of a conductor that is the same as the data lines.

Q. And it also can be the same as the scanning lines Yj, that's also disclosed by Shiba?

A. It could also be a single layer wire using your definition formed instead by the data lines -- I'm sorry, the scanning lines Y.

Q. The scanning lines?

A. Yes.

Q. And then it also goes on to disclose a double layer wiring where one layer is made from the material the data lines, Xi and one layer is made from the material the scanning lines, Yj?

A. Is that a question?

Q. Yes.

A. I missed the question, I'm sorry. I'm

not trying to be difficult.
Q. I appreciate that.
Would you agree that Shiba also discloses that you can have a double layer wiring where one layer is made from the material of the data line, Xi and one layer is made from the material the scanning lines, Yj?
A. Well, the only disclosure in Shiba is in Column 6 where he mentions in one sentence that wiring line 127 may be formed from the scanning lines and the data lines and he refers to it as a two-layer structure. Clearly that's the sentence that's disclosed in Shiba.
And to me, it's very unclear what a person of ordinary skill -- well, I -- I think it would be very unclear to a person of ordinary skill what Shiba is disclosing there. Whatever it is, it should be a two-layer structure. That's maybe the only thing that's clear.
Q. Well, it's saying more than it's a two-layer structure. It's also saying it may be formed in the step of forming the scanning lines and the data lines?
A. He's saying that a two-layer wiring line may be formed from those two metals, to accomplish

the purpose of wiring line 127 in two layers.
Q. And then it goes on to say that the layers may then be partially connected to each other, correct?
A. That's what the next sentence mentions, yes.
Q. And so we have a -- we have two options here. We have a single layer option or a double layer option that's being discussed in Shiba in this column?
A. Well, in this column there's at least three options. There's a single layer formed from the data lines, a single layer formed from the scanning lines and then he mentions that some combination of the two is a third option, but he certainly doesn't describe what that third option involves. And there's I think likely many implementations that would meet the two sentences that he's described here.
Q. The two-layered structure, there would be a number of ways to implement that?
A. Yes, there certainly would be. I can think of at least three.
Q. And of a -- between a -- well, why don't you tell me, what are those three that you can

think of?
A. Well, I think one of ordinary skill would not know what Shiba is talking about in these two sentences and it would be -- it would be hard to implement anything in this direction. But I'll speculate on some things that would meet what he's describing if you'd like.
Q. Go ahead. Let me know what your best thoughts are on this.
A. So I think one of ordinary skill would read two-layered structure to implement a wiring line as, first of all, meaning that it would be two conductors on top of each other forming a two-layered structure accomplishing a wiring line.
And that's -- that's -- there are examples in our prior art in this case where that's exactly the kind of wiring that's either talked about in the specifications or illustrated in the figures in the other patents here. So I think that's, first of all, what a person of ordinary skill would turn to.
But nevertheless, there's still many different ways to implement that wiring line 127 where you still have only partial connection. One example is if we turn to Fig. 1, one could imagine

keeping the wiring 127 as disclosed, but then in addition, extending from the right side the scan lines, for example, element 724, a single terminal or perhaps more that would extend from the terminal region under the sealant and over into the portion that is 127, so that it could then thereby connect to it and provide additional support for that reference voltage. So that's one example.
Q. And what were the other two that you had thought of?
A. Well, another way to imagine it would be -- well, another -- another implementation would be for some part of the wiring line inside the existing 127 without an additional terminal connection to the scanning lines, as I mentioned in my first example, but for some parts of that to have the additional metal deposited right on top.
So for example, one could have -- all along the upper line, have both the material from the data lines and the scanning lines deposited on top of one another to form that connection.
A third example, of course, is that wiring line 127 has six sublines in it and certainly one can imagine that you could divide

those up between those patterning steps and connect them at the start, at the end or perhaps even somewhere in the middle and then form a structure that meets what he seems to be suggesting may be possible in those two sentences.

Q. Now, in terms of a single layer structure that's mentioned earlier and then the double-layer structures, some examples of which you provided, which would have a lower resistance?

A. Compared to what?

Q. The single layer that's mentioned compared to the double-layer structure.

A. You'd have to define from where to where you want me to comment on where the resistance would be.

Q. In line 127 where line 127 traverses the rectangle or the three sides of the rectangle?

A. Well, in all my cases I've -- I've identified only local regions where the two wires are on top of one another. If you'd like me to limit my answer to that I, of course, can.

Q. Why don't we start with that?

A. Maybe the easiest thing to do is take my second example and just use that. And in that second example, I'm commenting that wiring

line 7 could have --

Q. 127?

A. I'm sorry, yes, 127 could have the data line layer as disclosed and then have the scanning line metal applied, for example, across the top border of the wiring line 127 only. And so if you want me to comment would the resistance be lowered from the top left of wiring 127 to the right, yes, it would be.

Q. And why would it be lowered?

A. Well, it would be lowered because there is more conductor. It would be a thicker wiring than it would be if it was a single wiring. But in no case that I've offered here is it a three-layered structure with insulating material in between. I think that's the one thing that's excluded from his description.

Q. Where does he exclude that?

A. Well, he calls it a two-layered structure. A person of ordinary skill would never look at a conductor and then an insulator and then another conductor and understand that to be a two-layered structure.

Q. Doesn't he talk about it being partially connected?

A. He does. But he calls it a two-layered structure.

Q. Wouldn't one of ordinary skill in the art understand that if it's going to be partially connected, that it's not going to be lying on top of each other?

A. What do you mean by "lying on top of each other"?

Q. In direct contact.

A. Certainly not. A person of ordinary skill would -- would -- cannot come to that conclusion based on both sentences that he's provided here. It's a two-layered structure. It's not a three-layered structure.

Q. If it's -- if it's only a two-layered structure, how would it be -- how would that structure not be in contact all the time?

A. Well, first, let me note that Shiba doesn't require that it's only partially connected. It says if the layers are partially connected, right. That's just one possible implementation of his sentence about the two-layered structure.

But nevertheless, in the case that I've offered in my first example where there's a

connection that comes from the terminal on the right side of the display in Fig. 1, for example, coming from the connections in element 724, then there would be a wiring that starts at the terminal that is not overlapping 127. It goes into the sealant. It's still not overlapping until it reaches 127. So it would being partially overlapping.

My third example also would apply to that where it's only connected at the ends, the beginning and the end of the conductors where those six lines are divided up, let's say three to the data lines and three to the scanning lines.

Q. All right. But you're reading two-layered structure to exclude an insulating film, correct?

A. I'm commenting that Shiba calls it a two-layered structure and it's my opinion that a person of ordinary skill would listen to him and understand it must have two layers and only two layers and thereby, would not have an insulating film in between the two conductive films.

Q. You would agree at the time that Shiba is doing this, it was well-known in the art to have two wiring layers that were separated by an

insulating film?
A. I think it was well-known in the art by 1997 to have a multi-layer wiring that was very standard. Almost all the patents here talk about that. And certainly it's well-known that connecting through an opening in an insulator was well-known in 1997 to connect two insulators.
But nowhere except in the '204 or '413 patent is the structure of two conductors with an insulating film in between where their electrical contact is because of -- or through the openings in that insulating layer is that being used to provide some benefit in the -- in the direction of the wiring. It is in Sukegawa, but that's -- that's just for the terminal region.
Q. Now, you would agree that when -- a person of ordinary skill in the art, they bring the knowledge that they have to these patents, correct?
A. Certainly they do.
Q. And they're presumed to know not just about the one patent, but about the other patents as well in the field, correct?
A. Yes.
Q. So you can't look at the patent just by

itself. You are, as one of ordinary skill in the art, permitted to look at the patents together in the field?
A. Certainly a person of ordinary skill is permitted to do that.
Q. Let's look at Fig. 6 of Shiba.
A. I've got it. Oh, I notice that the sealant is in direct contact with a transparent conductive layer in Fig. 6. I couldn't -- I couldn't find the example yesterday in our discussion, but here it is.
Q. I'll move to strike as nonresponsive. I hadn't asked a question.
Now, if we look at -- if we look at this figure, you see wiring 127?
A. I do see wiring 127 on the bottom right of the figure.
Q. And is it a single layer or a double layer in that figure?
A. In that figure, it is -- it's a cross-section, of course, of something that Shiba calls a first wiring 127 and it's formed from a single layer of deposition and patterning. So I think it's appropriate to call it a single layer wiring. But let's keep in mind it has multiple

parallel lines to it.
Q. And is this the data line Xi or the scanning line Yj?
A. What's illustrated in Fig. 6 is that the metal in 127 was deposited with -- from the data line Xj or in that step. That's all he discloses in any of his figures.
Q. Is the Yj?
A. It's the Xj.
Q. I'm sorry, it's the Xi.
A. Xi.
Q. That's what confused me.
A. I'm sorry.
Q. So it's the Xi. Okay. And that is the data line layer, correct?
A. Xi would be the data line metal, yes, or the metal that's deposited along with the data lines is probably the most precise way to say it.
Q. All right. And what is the layer below 127?
A. The layer below 127 is element 211 and that is called the gate dielectric.
Q. And is that an insulating layer?
A. That is an insulating material.
Q. Is there any other layer shown below

211?
A. The next layer that's illustrated is element 200 which is the substrate. It's called the array substrate.
Q. You wouldn't consider that to be a layer in the sense that we've been using the word "layer" to talk about wiring layers and insulating layers?
A. It depends.
Q. In terms of Shiba, is the substrate something you would understand to be a layer?
A. It depends.
Q. Well, in Fig. 6, would you consider the substrate to be a layer?
A. I know I'm repeating myself, but it depends.
Q. So it might be; it might not?
A. I can't say either way at the moment. It depends on the context.
Q. Looking at Fig. 6, would you consider that to be the glass substrate 200?
A. Shiba calls it the array substrate and I think it's -- it would be commonly some kind of glass. I'm not sure Shiba requires it to be so. I could study to find out.

Page 50

Q. That's fine. Would you consider the gate dielectric layer 211 to be a first insulating film?
A. What do you mean by "first insulating film"?
Q. Is it the first insulating film that's on the substrate?
A. Well, it is the first layer that's illustrated in Fig. 6 in Shiba, but it is certainly not the first insulating film of the claims in the '204 patent, specifically Claim 54. It cannot be because it doesn't have a first conductor underneath it.
Q. Putting that aside, is it -- in Fig. 6, is there any insulating film that comes before the gate dielectric?
A. When you say "before," what do you mean?
Q. There's nothing in between 211 and 200, right?
A. Elements 211 and 200 are illustrated in Fig. 6, as least in the region of 127, as being in direct contact, yes.
Q. What's the layer that's above 127?
A. There are many layers above 127. The first --

Page 51

Q. I meant the first layer. Let's talk about that.
A. Well, for -- of course 127 has six sublines and the -- all of them have element 241 on top of it and then beyond that, it varies. But let me see what 241 is called.
Q. And what is 241?
A. It's the protective overcoat which is identified as being, in one example, formed as silicon nitride. So that's an insulating material.
Q. So you would agree that 241 is an insulating layer?
A. I can agree that it's an insulating layer, yeah.
Q. And it's coming after the gate dielectric insulating layer?
A. By "after," do you mean it's been deposited in time after it?
Q. Yes.
A. I think that's -- that's the disclosure in Shiba that it would be formed in sequence after the other insulating layer. Of course there would be other steps in between.
Q. What is the element 113?

Page 52

A. Element 113 is called the sealing agent.
Q. And layer 241 runs under element 113?
A. Are you asking me if that's the case in Fig. 6?
Q. Yes.
A. In Fig. 6, it is illustrated that layer 241 is -- is at least partially below the element 113. Of course, element 241 extends far beyond that.
Q. Now, if the wiring 127 is formed in the same step of forming the scan lines Yj, how will they appear in Fig. 6?
A. I don't think there's one answer to that.
Q. Can you give me the different answers to that then?
A. Well, I guess the most -- because of course Shiba doesn't say, right. Shiba has one sentence that says it can be done and doesn't describe how. So it's not really fully disclosed to one of ordinary skill.
One example I can think of is that it would be the same structure, those six lines, at least in Fig. 6, and those would be -- those would appear between element 200 and element 211 instead

Page 53

of being as illustrated being between 211 and 241.
Q. Any other examples that you can think of?
A. Well, in this cross-section, I mean, of course this is not all of the wiring line 127. There's also the rest of the display. And so there certainly are many variations on -- on how to do that. I can't -- I don't think I could enumerate all the other possibilities. It's just not -- not clear what else could be done for a person of ordinary skill to implement this idea.
MR. GIBSON: If we could marked this as 1008.
(Document marked as Exhibit Number 1008 for identification.)
BY MR. GIBSON:
Q. And Exhibit 1008 is titled "Late-News Paper: Polarization Independent Liquid Crystal Microdisplays" and it lists you among others as one of the authors.
Do you see that?
A. Yes, I do.
Q. And I think yesterday when we were talking, you mentioned a particular paper and I was curious if this is that paper?

A. We talked about many papers. I agree that I did identify this paper in answer to one of your questions. I don't remember specifically which one.
Q. Okay. I think it had to do with work on TFTs. Do you recall that?
A. There was an extensive discussion on my work with TFTs and again, I don't remember the specific question for which I identified this, but this is -- this is one of the papers I identified yesterday, yes.
Q. I think you identified this as the single paper where you dealt with active matrix displays and peripheral driving circuits on the same substrate.
Do you recall that?
A. Well, I don't recall exactly what I said. What I do -- what is true is that this is the -- maybe the only publication that came out of my work involving TFTs and active matrix substrates, but my work, as I said, was largely unpublished. This is the only thing that did come out that I can point to and share with you.
Q. And would you agree that this paper deals with a 256-by-256 pixel silicon backplane?

A. Yes, exactly. This was one of the many implementations that we were working on.
Q. And what is the substrate for the silicon backplane?
A. What do you mean? What is the material?
Q. Yes.
A. Well, you said it, it's crystalline silicon.
Q. And the -- what's the substrate itself?
A. There are two substrates. The upper one is glass and ITO. The lower one is predominantly silicon but, of course, it has other layers on it, aluminum and other wirings and various dopings to achieve the transistors that are in the microdisplay.
Q. Would you -- would you call that a silicon wafer?
A. Well, it's a piece that came from a silicon wafer, yes.
Q. Does the silicon backplane use a single crystal silicon wafer?
MR. SCHLITTER: Objection, form.
THE WITNESS: I think I'm not sure what you mean by a "silicon" -- I'm sorry, what you mean by a "single crystal silicon wafer"? It is

crystalline silicon.
BY MR. GIBSON:
Q. Would you agree that the backplane is not made on a glass substrate?
A. In this example, it is -- it is not a glass substrate, that's right.
Q. And would you agree that the transistors used in this silicon backplane are conventional single crystal silicon transistors?
A. In this example, that's correct. In my other work that's unpublished, that's -- that's not correct.
Q. Okay. But I'm talking about this particular piece.
So you would agree that the transistors that are used here are conventional single crystal silicon transistors?
A. Well, they're actually unconventional because they have high voltage aspects to them, but they are more standard. They're -- they're not thin film transistors on glass.
Q. Would a person of ordinary skill in the art characterize a single crystal silicon transistor as a TFT?
A. Not in general.

Q. Who fabricated this silicon backplane that's discussed in the article?
A. Well, this is -- this particular backplane came in a partnership with a third company that's identified here. It's Boulder Nonlinear Systems and it's a modification of one of their standard silicon backplanes that we used and we were able to then publish on.
But by no means was this project limited to just this prototype or what we described here. We had others where we -- we designed and at least initially fabricated our own on -- on silicon as well as other TFTs that were on glass to form the active matrix.
Q. Now, did -- but this particular -- you know, and I'll move to strike the last part as nonresponsive.
The particular part here on -- dealing with what's in this particular article, I think you agree that this was made and provided by Boulder Nonlinear Systems?
A. It was a modification of one of their standard products for our project and then so we modified it along with them. It's -- it's not a standard thing from them.

Q. Do you know if Boulder Nonlinear Systems provides commercial products such as reflective liquid crystal spacial light modulators?
A. That is one kind of product that they -- they provide and those can be used in various applications, including near-to-eye displays.
Q. I think you mentioned that you, in some of your recent projects, were looking at gallium nitride TFTs?
A. Yes.
Q. Are those really for LEDs as opposed to TFTs?
A. No, they're not.
Q. Is gallium nitride a material that's used for fabricating LEDs?
A. Yes, it's a -- it's a very common and very important one for green and blue.
Q. I think there's some acknowledgments and there's a reference in your article to another company called Goldeneye, Inc.?
A. In addition to the reference to Boulder Nonlinear Systems, there's an additional company Goldeneye, Incorporated, yes.
Q. And what were the contributions of that company?

A. Well, you can see in the Fig. 4 right above the acknowledgments that the LEDs, the light source for this projector, came -- or at least part of it came from the company Goldeneye. They had a -- at the time -- this is not recent, right. This is 2007, 2008. They had a technology that would produce light with LEDs and then collimate it in an advantageous way and we were taking advantage of that.
Q. And how were you taking advantage of that?
A. Well, our display approach would -- needs light -- in this case, in this project needed light that would be produced by LEDs but also fairly well collimated efficiently. That was important to us. So their technique would provide that collimation for us, right. It's the light source for our projector.
Q. And do you know if Goldeneye is involved in making gallium nitride LEDs?
A. I don't recall to what extent they're actual fabricating their own LEDs or to what extent they're getting the dye from those that do fabricate it.
Q. And do you have processing capabilities

in your company to fabricate TFT-based backplanes?
A. No, our company is in many ways a virtual company. We don't have independent office or lab space in the company. We have multiple employees, but we leverage the university and all its resources for the physical aspects of our research and product development that we do here domestically and then we produce commercial products with our Japanese manufacturing partner.
Q. And who is that?
A. I'm not sure I can say. I'm sorry. Yeah, I mean, I'd like to tell you, but I'm just not sure if it's public information.
Q. I understand.
All right. Why don't we take a break?
VIDEOGRAPHER: We're going off record. This is the end of Media Unit Number 1. The time is 11:10.
(Short recess.)
VIDEOGRAPHER: We're back on record. This is the beginning of Media Unit Number 2 in the deposition of Dr. Michael Escuti. The time is 11:26. Please continue.
BY MR. GIBSON:
Q. All right. If you could look at page 52

of your declaration in the '204 matter.
A. I've got it.
Q. And these are the two figures we discussed some yesterday.
What was your purpose of putting this into the declaration in the '204 matter?
A. Well, the paragraphs explaining it certainly contain my purpose. I can certainly summarize that if you'd like.
Q. So you're saying paragraph 107 sets forth your purpose?
A. It's certainly not limited to 107. It's this -- I think there are -- there are subsequent paragraphs that have to go carefully to notice which paragraphs it ends on, but it certainly includes 108, 109, 110 and 111. It's the whole section discussing those figures.
Q. Okay. When you look at these two figures, would you agree that there's a protective overcoat and then an opening formed over it, or formed into it might be a better way to say that?
A. That would be a better way to say it. Both figures have a protective overcoat 241 and there is an opening that is illustrated as being somehow created within that overcoat.

Q. Now, can a person of ordinary skill in the art form the opening in the overcoat before forming the overcoat itself?
A. Using standard semiconductor processing, no, but there are exotic ways to do such a thing.
Q. Okay. But they would not be standard?
A. In my experience, they would not be standard.
Q. Okay. So if we call the formation --
A. Well, let me make one more comment. There is -- I'm sorry. Can I clarify my answer?
Q. You weren't finished, so go ahead.
A. Okay. In the sense that it is -- it is most common to create openings in an insulating layer in the way that we've been talking about, that first the layer is deposited and then it's etched away -- some opening is etched away, but there's also a common technique which I don't think is uncommon and this involves using a mask to cover up a portion of the substrate that you're depositing your elements on.
And in that case what's happening is, of course, only part of the substrate is getting the deposition of the insulating layer and then another part is not and so that's another way to

create openings in an insulating layer.
Q. All right. When you're looking at the '204 patent as a person of ordinary skill in the art, would you understand that the insulating layer is being deposited and then it's being etched to create the openings?
A. I'm -- I'm not sure that the '204 patent requires that. It's certainly a preferred example, but I don't recall if the '204 patent requires that.
Q. Okay. When you look at the '204 patent, you understand that's certainly one way it would be done, correct?
A. Yes.
Q. And you would consider for an insulating layer, that to be the more standard way it would be done rather than using a mask?
A. I consider both of those techniques as standard. Which one is used depends on where the opening is being made and how big the opening is. So I'm not sure I can point to one or the other as being more standard.
Q. When you're talking about using a mask, you're not forming an opening at that point, you are depositing around a mask and then you're not

actually opening up the insulation layer?
MR. SCHLITTER: Objection, form.
THE WITNESS: In that example, and to be more specific applied here, if the mask was literally some -- some kind of metal perhaps or other substrate that's placed on the edge of a display, it's another object that's being brought down to the glass substrate during the deposition process, then it would cover up that region during that process.
And then when the deposition is done, it can be, of course, removed and there would be an opening in that insulating layer that would appear because the material was never deposited there to begin with.
BY MR. GIBSON:
Q. Okay. But let's assume that you have deposited an insulation layer, no mask and then you've created openings.
A. I can assume that, yeah.
Q. And let's call that formation of the protective overcoat as step A.
A. I can assume that.
Q. And then forming the opening in the protective overcoat is step B.

A. Okay.
Q. And when I'm talking about forming the opening, I'm talking about all the steps necessary to accomplish that as step B.
Are you with me?
A. I think so.
Q. What is the sequence of those two steps?
A. It sounds to me that it's in your assumption, right. You said first let's assume that layer A is deposited wholly on the substrate without any kind of mask, whether it's an external mask or resist that's down there. And then after that, the next step is to form the opening by, for example, etching.
Q. So it's step A, then step B?
A. In your assumption, it is.
Q. Now, looking at the two figures you have in your -- in your declaration, do you recognize that there's another layer, the ITO layer?
A. There's several other layers. We talked about them all yesterday, but both figures have an ITO layer that's illustrated.
Q. Okay. So in my example, let's now call the -- forming the ITO layer as step C.
A. If you'd like to assume that, that's

fine.
Q. And can you list the different ways a person of ordinary skill in the art would recognize that exists for performing these three steps --
MR. SCHLITTER: Objection, foundation.
BY MR. GIBSON:
Q. -- in sequence?
A. I'm not sure I understand your question. Fig. C shows the example of first ITO A is deposited and patterned on whatever is below it. Then the protective overcoat 241 is applied and then lastly, the opening is created and that's consistent with what's in Sukegawa.
Alternatively is what's in D, where the insulating film is applied first, then the opening and then the ITO's deposited and patterned.
Q. Okay. But if we have these as three steps, an A, a B and a C, one obvious sequence you could do is A and then B and then C.
Are there any other ways to reorder those three steps?
A. Well, the A, B, C order in your assumptions -- or assuming the way you've defined those steps would correspond to Fig. D at least

partially. And Fig. C, however, would be different. It would be C, A, B, consistent with Sukegawa, not just my Fig. C.
Q. Right. So Fig. C, the steps would be step C, then step A, then step B?
A. Yes.
Q. And then Fig. D, the steps would be A, B, C?
A. Yes, but let's also keep in mind that there could be other steps in between and sometimes there has to be.
Q. I'm just talking about what we see in these two figures.
It would be A, B, C for Fig. D?
A. Sure. I'll say it again. Fig. D would correspond to A, B, C.
Q. Are there any other ways to -- in terms of the sequence that we've been discussing, the steps A, B and C, are there any other ways to do it or are these the only two?
A. You're asking me is there any other ordering of three things?
Q. No, not any three things, these particular three things.
A. Well, in your assumptions you've said

that A is a layer that's explicitly put down everywhere, right, not masked, there's no lift off resist. And step B is the -- whatever process is used to create an opening in the layer that's put down in step A. So those two have to go in that sequence, A and then B in processing by your assumptions. And so then the only two possible variations would be for C to either be before A and B or after.
Q. Do you still have Shiba around?
A. Yes, I have Shiba.
Q. If you look at Fig. 4?
A. I see it.
Q. Do you see the ITO layer?
A. I see two ITO layers.
Q. And what numbers are those?
A. Let me make sure. Layer 251 and 741.
Q. And where are you getting 741 from, what part of the specification?
A. I'm not very good at word searching. Electronically it's much easier.
Q. I mean, there may be other references, but I was looking at Column 5, line -- it's probably around line 38. I think it refers to -- Shiba refers to 741 as a connecting projection?

A. Yes, yes, exactly. So these are -- thank you for finding it. This is the contact on the counter substrate which extends out. It's the portion of the ITO layer 7 -- I'm sorry -- the counter substrate electrode which is explicitly ITO, counter electrode 541, and the projection to the left side is the portion -- I understand that to be the portion of the electrode on the other substrate that gets the contact from those pads that are all around Shiba's display.
Q. Where does it call 741 a transparent conductive layer or an ITO?
A. I don't think it's -- it's text -- that text is in the specification, but that's what Fig. 4 shows. The layer 741 goes from the left side and all the way to the right. And on the right side, I see 541, which is the pixel electrode and pixel electrode 541 appears both in Fig. 4, Fig. 6 and 541 is -- I think it's clear from the specification that that is ITO.
Q. Well, and why would the patent call 741 something different than 541 if it was the same thing?
A. That's a good question. If you look at Fig. 3, there's a single conductive layer that has

many of its regions identified with different numbers. For example, the wiring 127, the pad 125, 731, the line 121, the terminal 751, that's all formed from the same deposition step and then these element numbers correspond to different pieces of it. So it's very consistent with Shiba to do that.

Q. Well, there you're talking about an actual different -- different structures in Fig. 3, right?

A. Well, yes, but 741 is a different structure. We can see it in Fig. 1. So Fig. 1 has 741 on the bottom left. Of course Fig. 3 is the expanded view of the box labeled A in Fig. 1 and we see 741 identified there and we can see that there's a dashed line that runs all around the display. That's labeled 541. That's the counter electrode.

And then shooting off like peninsulas, there are eight little protrusions of the same dashed line, that same region and those are labeled 741 and other numbers.

Q. Those are connectors, right? They're connecting projections is what Shiba calls them?

A. They are. That's their function, but

they are -- from Fig. 1 it's clear that it's all the same conducting layer. And while I don't think Shiba requires that it be formed of ITO, it certainly is disclosed as such.

Q. Well, there's nothing that says 741 is an ITO layer, correct?

A. The specification does not say it, but it is disclosed in Fig. 4 and Fig. 1.

Q. Well, we may just have to disagree about that. But the sealant -- I take it, your reference earlier today that the sealant is over the ITO was based on 741 being an ITO?

A. It's not. Fig. 6 also shows 541, the ITO counter electrode, as in contact on the counter electrode substrate with the sealant 113.

Q. Okay. So let's start with Fig. 4 then we'll move to Fig. 6.

So Fig. 4, at the bottom of the figure, you would agree that the sealant is not in contact with the ITO, correct?

A. On the bottom substrate, I do agree with that.

Q. And on the upper substrate, because you believe 741 is an ITO layer, you would say there's some contact with the sealant?

A. Well, it's not my belief. It's what the disclosure in Shiba shows in Fig. 1. So 741 is part of the layer 541 and there are many other pad protrusions. I mean, this is how the counter electrode gets its potential, by those eight connections.

Q. Well, the connection doesn't have to be an ITO layer for there to be a connection, right?

A. It doesn't, you're correct, but that's what's shown.

Q. As I said, we disagree about that, but I'm just trying to get to what you're basing your view on that the sealant is connecting to an ITO layer and that's based on the connection -- at the top of Fig. 4, there's -- there's some touching of sealant and 741?

A. Fig. 6 clearly shows the sealant on the counter substrate touching element 541.

Q. What --

A. In Fig. 4, it shows -- it shows what might be a combination. It depends on where you define what the boundary between 741 and 541 is. So 541 is the counter electrode that must go through most of the display, it's off to the right side of Fig. 4. And then 741 appears to be this

-- this protrusion which is in direct contact with the glass substrate 501.

Q. And are you -- is it your view that sealant is contacting the ITO layer in Fig. 4? Let me -- is it your view that sealant is contacting 741?

A. It appears that 741 is connected to both element 115, which is the conductive resin or the -- I think it's called the transfer material made of a conducting resin, as well as a small part of the sealant 113 there.

Q. All right. Then Fig. 6, at the bottom of Fig. 6, you would agree that there's no contact between the sealant and the ITO layer?

A. In Fig. 6, I agree that the bottom part of the sealant does not contact ITO.

Q. And at the top, where do you think there's a touching between the sealant and 541?

A. Element 541 is extending from the left side of the figure of Fig. 6 to most of the way across toward the right side, and it is in direct contact with the majority of the sealant that's illustrated in Fig. 6.

541 is called the counter electrode. Column 5 has some language about that counter

electrode around lines 24 through 28 or so. It says, "In this case, since the counter electrode 541" is -- I'm sorry -- "counter electrode 541 made of ITO, has a relatively high resistance" and then it goes on.

Q. And then what is 581?

A. In the moment I'm not finding the description of 581, but since 581 appears to be immediately adjacent to the liquid crystal layer, then that corresponds to the orientation film. I do suspect somewhere in Shiba he does disclose what that's called, but I'm not finding it.

Q. Would that be an insulating layer?

A. It is typically formed of a polymer that would be insulating, an insulating material. It's not typically a conductor.

Q. And 581, does that also extend from the left to the right in Fig. 6?

A. It extends partially, right. You can see that it only stays within the liquid crystal portion and ends immediately before the sealant and there's a good reason for that's because that very thin polymer film is even worse to adhere to than ITO.

Q. Now, you would agree with me that the

'204 patent is not directed to the fabrication area that you're talking about where 541 extends into the sealant area?

A. I don't think I can agree with the second part of your characterization. Fig. 1 shows that element 541 goes all around the display and has -- it's roughly a rectangle with these eight protrusions. And some of those protrusions are in the terminal region, but the two sides of element 541 do correspond to the terminal portions. And while Fig. 1 shows the top-down view all around, Fig. 6 is not corresponding to a terminal portion. But that's just Fig. 6.

Q. You would agree that Fig. 6 does not correspond to a terminal portion?

A. Yes, I do agree with that. That would be represented in Fig. 4, but also in other regions of Fig. 1.

Q. And we're looking at -- you still have the '204 patent so we can look at Claim 54.

A. I've got it.

Q. In Shiba, the 541 element that you've just described, is that -- does that correspond to anything in Claim 54?

A. Claim 54 applies to the active matrix

substrate and the sealant that contacts it. It mentions that there's a counter substrate facing the substrate and, of course, the sealant has to connect to that.

But I don't see an explicit electrode mentioned in Claim 54 for that counter electrode, but certainly it's implicit.

Q. But it's not something that's described in the claims?

A. It is implicit to Claim 54. If you didn't have it, you would -- most LCD modes would not function; not all, but most.

Q. So would you say that the claims are limited to that requirement that you're finding implicit?

A. Maybe I'm being clumsy with the terms. It's -- it's not explicit in the claim and as such, the claim applies to both of those circumstances.

Q. Is the -- you would agree that Claim 54 is not directed to the type of structure we see in Fig. 6 with respect where we have element 541 connecting with the -- we have element 541 along the top of the substrate?

MR. SCHLITTER: Object to form.

THE WITNESS: Do you mean Fig. 6 of Shiba?

BY MR. GIBSON:

Q. Yes.

A. Fig. 6 in Shiba is not a cross-section of the terminal portion, but it's clear from Fig. 1 that element 541 extends all around the display. It necessarily has to and it certainly extends over the terminal portions. So if we took a cross-section there, that's a different matter.

Q. No, I'm not talking about that. I'm talking about Fig. 6.

And because it's not part of the terminal portion, you would agree that Claim 54 is not directed to the way 541 is being used in Fig. 6?

MR. SCHLITTER: Objection, form.

THE WITNESS: Fig. 6 in Shiba is not a cross-section of the terminal portion, I agree to that. But Fig. 1 makes it clear that the element 541 extends into the terminal portions in Fig. 1. And one example of that is Fig. 4, which does have the terminal portions and which does have the sealant in contact with ITO element 541.

BY MR. GIBSON:
Q. Well, it's -- you call it 741. Now you -- Fig. 4 shows 741, not 541, correct?
A. That's not correct. Fig. 4 shows 741 on the left side. It's the flat part that's in direct contact with the upper substrate. But element 541 is labeled on the right side and it similarly extends across the substrate right above the orientation layer, just like it is in Fig. 6.
Q. Where does 541 begin and 740 -- or I'm sorry.
Where does 541 end and 741 begin?
A. I don't think that's the correct characterization. I think 541 is talked about as being the counter electrode and it includes the entire region that's in the dashed line of Fig. 1. And those protrusions that Shiba identifies as 741, 745 -- he's got eight numberings for those -- are a subset of the element 541.
Q. In Fig. 6, can you just mark in pen on Shiba where you believe there's contact between 541 and the sealant?
A. On my copy here?
Q. Yes, please.
A. Anyone have a blue pen?

MR. MANZO: What color do you want?
MR. GIBSON: Red is fine. It may stand out more.
THE WITNESS: I'm not sure it's possible for me to simply identify the interface of contact, but I can identify where in 541 that the sealant 113 does contact it, which is what I've tried to draw.
BY MR. GIBSON:
Q. What do you mean by "interface"?
A. Well, the interface is a line that on that printout is a black line. That's the surface of contact. I can't simply draw a red line through that, you wouldn't see it. So I'm highlighting the portion of the layer 541 that is -- you know, is the layer above which that contact occurs.
Q. And does 541 -- you've got a lower part of 541. Well, let me just hand it back to you.
Does 541 end on the left part where it's touching the sealant?
A. The material that corresponds to 541 ends about more than halfway through the sealant in Fig. 6. In Fig. 4, it's different. It does extend out and protrude and form what Shiba calls

the connecting protrusions -- I'm sorry, connecting projections, 741 to 748.
Q. What's the -- let me just see if I can show you. It may be harder to describe.
What is this part that's coming after the sealant?
A. That's the rest of the layer.
Q. Of 541?
A. If I understand what you're referring to, 541 corresponds to a layer that begins from the left side and goes all the way to the portion of it that I've marked.
Q. Right. And but you're also saying that what you put in red is part of 541, correct?
A. Yes.
Q. All right. And what comes right after what you've marked in red when you're going to the left?
A. That's also 541.
Q. All right. That was my question.
A. Yes.
Q. How far does that extend?
A. Do you want me to draw it or to fill it in maybe with blue?
Q. With blue, that would be great.

A. (Indicating.)
So I've marked in blue the portion of 541 that is directly over the liquid crystal region.
Q. And then along the top of the substrate 541 extends and then terminates in 521?
MR. SCHLITTER: Objection, form.
THE WITNESS: No, it doesn't at all. It has no relationship to -- well, it does not end with 521, which is a completely different element.
BY MR. GIBSON:
Q. Okay. Where does it end at the top of the substrate or does it just continue on?
A. It continues off to the left across the display. Of course what's illustrated here is just one pixel, or one TFT more specifically, and there should be more if it's a display.
Q. And then I may have asked you this already, but would you agree in Fig. 4 at the bottom of the sealant, there's not -- there's no contact with an ITO layer?
A. On the bottom substrate of Fig. 4, there is not contact of the sealant with an ITO layer.
Q. Now, this Fig. 4, this is the one that you modified for your declaration?

A. Yes.
MR. GIBSON: I'm going to mark this as an exhibit in this matter so we have it. Let's mark these two as the next in order.
(Documents marked as Deposition Exhibit Nos. 1009 and 1010 for identification.)
BY MR. GIBSON:
Q. And those are 1009 and 1010. And 1009 should be the drawing that you made on page 49 from your declaration.
Do you have that in front of you?
A. That's correct. It seems to be a magnification of that.
Q. And as you stated yesterday, this is -- what's in your declaration here, this is your attempt to draw out in color what is Fig. 4 in Shiba?
A. I'm not sure I'd characterize it that way. It is -- I'm trying to represent what is explicitly in Fig. 4 of Shiba and I've left out quite a lot of things and, you know, I'm using it as a way to discuss the possibility of the ITO layer being applied differently than what's disclosed in Shiba.

Q. All right. And then Exhibit 110 -- or 1010, excuse me, is your modified version of Shiba?
A. It's my modification of Shiba's disclosure according to Dr. Hatalis' hypothesis, or at least one variation of his hypothesis.
Q. As you understood his hypothesis?
A. Yes.
Q. And you understood that from his deposition testimony?
A. At least.
Q. And it may have also been from the declaration that he submitted in this matter?
A. Yes, that's correct. For example, he -- I think he explicitly asserts that it would be obvious to reorganize the layers of fabrication in Shiba and I'm considering how that could possibly be.
MR. GIBSON: Then if we could mark this as 1012 -- 1011.
(Document marked as Exhibit Number 1011 for identification.)
BY MR. GIBSON:
Q. And Exhibit 1011 is another modification of Shiba and we discussed this yesterday as well,

correct?
A. Yes, we did.
Q. And yesterday you explained that this modification would have two capacitors.
Do you remember that?
A. At least two capacitors, but yes, there's two capacitors -- two capacitive structures that are shown.
Q. And you said they'd be in series even though the pixel electrode is electrically connected to the source electrode?
A. In a very small portion of the source electrode, the pixel electrode is being illustrated as being connected.
Q. And that makes you say that they'd be connected -- the capacitors would be connected in series?
MR. SCHLITTER: Objection, form.
THE WITNESS: I'm observing that the structure you're showing me is a sequence of three conductors with insulating material in between those three, and I'm observing that that is -- one way to describe that is two capacitors in series.
BY MR. GIBSON:
Q. And the -- is there any reason that the

contact portion between the pixel electrode and the source electrode could not be made bigger? Could one of ordinary skill in the art do that?
A. It depends. I didn't create this figure.
Q. Well, if you just etched out more of the protective overcoat on the left, you could create a bigger connection between the blue and the black?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, I suppose you could do a lot of variations on -- on this figure, on this hypothesis. Now, whether or not they would be either obvious or successful is not clear to me.
BY MR. GIBSON:
Q. If -- in this kind of a structure, do you have to have the pixel electrode on top of the storage electrode?
MR. GIBSON: Objection, form.
THE WITNESS: I don't understand this structure at all beyond what you're showing me. It's not my hypothesis. So what I see is a cross-section of a structure and I'm commenting on that. I can't -- I don't think I can speculate

beyond that.
BY MR. GIBSON:
Q. Okay. So you can't tell me one way or the other?
A. I can't tell you one way or the other.
Q. And what's -- in your mind, what's causing the two capacitors is that -- well, strike that.
Would you agree that one of ordinary skill in the art would know how to etch the protective overcoat so that it could be removed so that it was no longer above the capacitor line Cj?
A. I do agree that one of ordinary skill knows how to -- would know how to etch openings into insulating films; for example, protective overcoat 241. That would be possible, sure.
Q. So maybe I can just mark for you on this. I've put a blue marking on the protective overcoat to indicate if you etched to the right of that blue marking, so you removed the protective overcoat all the way from that blue marking to the -- to the blue, you would then have a -- you would no longer have that protective overcoat. Someone of ordinary skill in the art would know how to etch that off?

A. It's a long question. Can you rephrase it?
Q. Yeah, it wasn't -- it wasn't as clear as I could make it.
So what I'm trying to find out is one of ordinary skill in the art could etch the protective overcoat off from where I made that blue mark all the way over to where you see the blue that's contacting with the black?
MR. SCHLITTER: Objection, form.
THE WITNESS: A person of ordinary skill would know how to do that. As I've said, they would know how to create openings in insulating films. I've never seen that structure, so I don't think any of these hypotheses are obvious to a person of ordinary skill.
BY MR. GIBSON:
Q. Okay. But if you removed that extra protective overcoat, as one of ordinary skill in the art would at least know how to do that, would that eliminate the two capacitors?
A. So you're now suggesting an additional hypothesis?
Q. I'm suggesting a further removal of the protective overcoat and asking you if one of

ordinary skill in the art removed that additional protective overcoat, would that eliminate the issue you raise with two capacitors?
MR. SCHLITTER: Objection, form.
THE WITNESS: It's not clear to me what you mean. Could you mark this up to represent what you mean? Because it does sound like an additional hypothesis. It's not what's shown, right.
BY MR. GIBSON:
Q. It's probably easier to mark it on this. So where I've marked in blue would be -- the protective overcoat would be etched out there.
A. I see it.
Q. Would that then eliminate the two capacitors issue that you raised yesterday?
A. In this additional hypothesis, I think it may. It depends on probably the other dimension as well.
Q. What other dimension?
A. This is two of the dimensions, right. This is a three-dimensional structure, so the third dimension is into the page.
Q. Okay. Do you know what the frame rate frequency of displays was back in 1997?

A. I have a rough understanding, but I don't think I have a precise number for it.
Q. What's your rough understanding?
A. That the -- there are many different rates and clock signals on a display. So are you referring to the update rate on the screen itself at the level of the TFTs?
Q. Yeah, the frame rate frequency.
A. I don't think there's one answer to that even in 1997. I think it's typically in the range of 80 to 100 hertz.
Q. And do you know what was a typical display format in 1997?
A. There were many display formats that were typical. There's no one answer to what is a standard format.
Q. What were some of the standard or typical formats?
MR. SCHLITTER: Object to scope. That's beyond his declaration.
THE WITNESS: Shall I answer the question?
MR. SCHLITTER: I'm not instructing you not to answer.
THE WITNESS: Okay. Well, can you just

clarify for me what you mean by "format"?
BY MR. GIBSON:
Q. Something like VGA, would you consider that to be a display format back in 1997?
A. That resolution and video standard was certainly well-known by that point. Whether or not it's a display format, it depends on the context, but yes, VGA, WVGA, there's SVGA. By that point there were many.
Q. Any others that come to mind?
A. I don't think I could list with confidence which ones were before 1997 and which were after. So none others come to mind with any surety.
Q. And do you know how -- a display, how many lines and how many columns it had in 1997?
A. Likewise there's no one answer to that.
Q. Can you give me some examples?
A. I think an example would be displays with, for example, 600-by-400 lines. As best I remember, that would be a fairly high resolution or medium resolution display.
Q. Any others?
A. Yeah, there are many others.
Q. Can you just list any that from 1997

that come to mind?
MR. SCHLITTER: Objection, form, foundation.
THE WITNESS: I'm going to have a hard time being able to identify --
MR. SCHLITTER: Scope.
THE WITNESS: -- those things with -- with any certainty, mainly because I'm not sure when they appeared and began to be used.
BY MR. GIBSON:
Q. If you look at again back at the '204 patent.
A. Yes.
Q. And look at Fig. 4A again.
A. I see it.
Q. And I think you yesterday listed two advantages of the structures shown in Fig. 4A. I think you listed low resistance and redundancy.
Do you remember that?
A. That's correct.
Q. Does the specification for the '204 patent refer to redundancy anywhere?
A. I'm not sure. I'd have to recollect my memory.
Q. Please do.

A. Are you asking specifically if the word "redundancy" is in here?
Q. Or -- or words that would convey that concept.
A. Okay. I'll take a minute and look. Okay. I think I've reminded myself enough. I apologize for the delay.
Certainly the reduced electrical resistance is identified in multiple places, but the -- there is redundancy that's mentioned, but that's indeed mentioned with respect to the peripheral driving circuits in, I think, Fig. 1.
So I'm recognizing that it's true about his structure, that it would be -- it would have redundancy, in addition to simply reducing the resistance.
Q. That's not something that's identified in the text that you were able to find as being an improvement over the prior art?
A. The specification does not explicitly talk about that, but I'm recognizing that the specification does disclose it in its figures. I mean, it's related to the fact that there's two wires instead of one going at least partially in the same direction.

Q. Okay. Did you consider that to be an improvement over the prior art?
A. I do.
Q. Okay. Do you understand that Shiba specifically disclosed redundancy?
A. I'd have to see in Shiba where you're referring to. I know wiring 127 has multiple lines and that would also be redundant, six lines next to each other. But are you referring to something else?
Q. No, that's -- that's in the disclosure that talks about line 27 that's in Column 6 that we looked at before.
That also discloses an advantage for redundancy, correct?
A. Which lines?
Q. It's the -- I think it's the lines we looked at before in Column 6. In fact, there's going to be two -- a two-layered structure?
A. Well, similar to the '204 patent, it doesn't say it is a redundant structure, but I'll observe that -- that at least some of the ways to implement what's referred to in those two sentences in Column 6, in lines 36 through 42, that would also have an improved redundancy. But

I'll also point out that, again, 127 is already split -- split up into six lines and that by itself has redundancy.

Q. All right. And I take it when you just looked at the '204 patent --

A. Yes.

Q. -- you did consider Column 8 and Column 9. They particularly talk about low resistance, but they don't claim an advantage of redundancy in Columns 8 and 9 of the '204?

A. Well, of course these columns aren't claims. So they don't claim anything, but they do refer to reducing the electrical resistance, but not explicitly to the aspect of redundancy that I'm observing is true.

Q. I wasn't using "claim" in the sense of a patent claim. I was using it as an argument or a statement.

But you would agree in Example 3 on Column 8 and 9, there's no statement that -- about there being an advantage of redundancy?

A. I don't see an explicit description to that extent, but it is implicit to the structures that are being talked about. I'm simply recognizing that and I think one of ordinary skill

would as well.

Q. In Fig. 4 -- strike that.

Example 3 is discussing Fig. 4A, correct?

A. Example 3 refers to Fig. 4A and B at least.

Q. Do you know if the '204 patent asserts or states any advantages to using an ITO or transparent conductive layer?

A. I don't recall any explicit mention of the advantage of using ITO as opposed to anything else. I think the '204 patent says that there should be a transparent conductor. An ITO is one possible choice and it's, of course, a very standard choice.

Q. In 1997?

A. In 1997.

Q. What would a person of ordinary skill in the art know about the advantages of using ITO in 1997?

A. Well, can you tell me what you mean by an advantage compared to what?

Q. An advantage compared to another alternative.

I mean, why would you use an ITO as

opposed to some other kind of transparent conductive layer?

A. I'm still not clear on what I'm comparing to, so it's hard to say where the advantage is, but I can comment on ITO if you like.

Q. Particularly in 1997, why would a person of ordinary skill in the art, why would they want to use an ITO?

A. The LCDs that we're talking about in this case are of a format where the electrodes need to be both conductive and transparent. And ITO is a material that's been known for a long time that is a conducting oxide that is transparent largely in the visible region.

So we can see through it, but it can also hold a charge and act similar to metals and other conductors. And I think it's become standard because its deposition has become well-known. It's been well studied and it's obviously very successful even in 1997.

Q. And that was known in 1997, correct?

A. It was very well-known by then.

Q. And in your view, would one of ordinary skill in the art be motivated to use an ITO in the

terminal to connect to the flexible printed circuit?

MR. SCHLITTER: Objection, foundation.

THE WITNESS: Can you be more specific of the motivation that I'm commenting on?

BY MR. GIBSON:

Q. Let me ask it this way: To your knowledge, in 1997, were ITO layers used in the terminal pad region of commercial display products?

A. I don't have specific knowledge of its use in commercial display products. I don't have any proprietary information and I never analyzed a display for that question. But I do note that at least two of the prior art pieces have ITO in the terminal portion; Sukegawa, of course, below the second insulating layer and Nakamoto from yesterday.

Q. And are you familiar with any prior art that discloses advantages of using an ITO layer in the terminals used to make external connections to the FPC?

A. Beyond the prior art that's in this case, I don't know of any other specific discussion on that, on the advantages of that.

Q. But Sukegawa and Nakamoto would be examples of advantages of that?
A. Yeah, there are disclosures mentioned, some of those advantages, yeah. Well, to be clear, I think Sukegawa does. I'm not sure -- I don't recall what Nakamoto discloses about that. It may just be that he discloses it and doesn't comment on it.
Q. In Fig. 4A, we talked about the ITO layer a little bit yesterday in terms of this upside down L.
A. I see the upside down L. I have to admit I don't remember our discussion yesterday.
Q. That's fine.
Could you pattern the ITO so that the bottom part of the upside down L was not there?
A. Are you referring to the upper portion that's horizontal, the highest most portion of the ITO?
Q. Yes, yes.
A. That could be patterned away like the rest of the ITO that is -- that is missing on the left -- to the left side which would appear underneath the sealant but, of course, it's been etched away.

Q. You could etch away all of the upside down L if you wanted to, right?
A. I think it's at least possible to do that kind of thing and I don't know if it's practically feasible to really get precise about that, probably not worth the trouble, but that's my speculation. But nevertheless, it would still meet the claims, especially Claim 54 that we talked about explicitly.
Q. Without the upside down L, you say that the claim language of 54 is still met?
A. Oh, certainly, yeah.
Q. In that situation where the -- you don't have the upside down L part of the ITO, how would a person of ordinary skill in the art know which deposition process would come first between 113 and 114?
A. Just so we can be clear, could we draw that so I can comment on it? Or could we mark up a figure for that?
Q. If you'd like to mark up the figure, go ahead. Or is this one you've already marked on?
A. It is. It's where I labeled -- should I mark that one?
Q. I thought I had another copy of Fig. 4,

but --
A. There are probably several copies of Fig. 4 in my declaration.
Q. I'm sure there are copies of Fig. 4 in your declaration. I've seen several myself. I think the easiest thing to do, why don't you -- on the Fig. 4A that's before you that's in the '204 patent that's Exhibit 1001, why don't you just cross-hatch out --
A. Would you like to cross-hatch out the portion you want to remove?
Q. (Indicating.)
Okay. I've done that in blue.
A. Thank you. Can you remind me the question?
Q. Sure. So if we have the structure that's before you in 4A the way I crossed it -- crossed it out, you would agree that that conforms to Claim 54 still?
A. I do. The little piece that you've crossed out has no bearing to me on Claim 54.
Q. And if you have the structure that I put before you, how would a person of ordinary skill in the art determine in which order layers 113 and 114 are formed?

A. It would not be apparent from that figure or from that cross-section alone.
Q. So you could form the ITO layer first and then form the resin layer second?
MR. SCHLITTER: Objection, misstates his testimony.
THE WITNESS: The figure -- the modified figure doesn't give enough information to determine the sequence of deposition during fabrication between element 113 and 114.
BY MR. GIBSON:
Q. But it would be possible to form the ITO layer first and then form the resin layer over the ITO layer and then open up and etch the resin layer out?
A. If that was done, of course that would not meet the claim limitation, Claim 54.
Q. But you would agree that one of ordinary skill in the art could use that process?
A. I must misunderstand your question. Could you restate it?
Q. One of ordinary skill in the art could put down the ITO layer and then put down the insulating layer and then etch out the insulating layer to reveal the ITO layer, correct?

A. It does -- I do think that that is a possibility for one of ordinary skill, but of course, that is not what would meet Claim 54, if that was done.
Q. So we could have a completed structure and you wouldn't know whether it met Claim 54 unless you knew the steps that were used to deposit the materials?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, Claim 54 has limitations that relate to how contacts are being formed. For example, there's a limitation near the end of the claim that says there must be direct contact through an opening between the second conductive line and the transparent conducting layer. And so if that contact is -- is not through that opening, then it wouldn't meet the claim. And so one would need to be able to determine that that's true.
BY MR. GIBSON:
Q. And if you're looking at the modified Fig. 4A, you don't know if that's true with that figure unless you know the steps that were taken to deposit and etch, correct?
A. Well, what I'm saying is this modified

figure is inconclusive to that regard.
Q. So you wouldn't know if that type of a structure was covered by Claim 54 unless you knew the deposition and etching steps, is that correct?
A. Well, as far as this figure goes, I think that's correct. But it's most likely the case that if it was a real display, you could analyze it in such a way that you could tell the difference of whether the ITO was deposited before or after the element 113 insulating film.
Q. But in terms of this figure, my question you agree with?
A. In terms of the figure, it's inconclusive. If a display was made in reality, it could be analyzed where I think one of ordinary skill could tell the difference.
Q. But you'd have to look at the particular display to see if you actually could tell the difference or not, correct?
A. You'd have to use an electron microscope to analyze the layers and look at the shapes of the interfaces and all that.
MR. GIBSON: Okay, why don't we take a break?
VIDEOGRAPHER: We're going off record.

This is the end of Media Unit Number 2. The time is 12:47.
(Whereupon, the deposition in the above-entitled cause was recessed to 1:51 p.m. this date.)

AFTERNOON SESSION
VIDEOGRAPHER: We're now on record. This is the beginning of Media Unit Number 3 in the deposition of Dr. Michael Escuti and the time is 1:51. Please continue.
EXAMINATION (Resumed)
BY MR. GIBSON:
Q. Welcome back. You understand you're still under oath?
A. Yes.
Q. And have you discussed your testimony with anyone at any of the breaks either today or last night?
A. I have not discussed the testimony of the ongoing deposition within the breaks of the deposition.
Q. Does that mean you did discuss it last night when there wasn't a break?
A. We -- we had a few comments about yesterday's deposition this morning, but I don't -- I don't think that's what you're referring to.
Q. What did you discuss this morning?
A. I don't recall.
Q. You don't recall any of the conversations you had this morning regarding

yesterday's testimony?
A. I don't. It was very brief and I don't think had anything substantial in it.
Q. Let's talk about Sukegawa, which is another patent that you considered in your declaration for the '204 patent, is that correct?
A. Yes.
(Document marked previously as Exhibit Number 1005 was presented.)
BY MR. GIBSON:
Q. I've got another one. Apologize for that.
And would you agree that Sukegawa is addressing the exposed part of the wiring that's used for testing the contact with the FPC?
A. Could you clarify what you mean by "addressing"?
Q. That's what it's directed to.
A. Among other things, it's -- it involves the open portion of the terminal, the opening in layer 9, so that the FPC can have electrical contact with the structures below it.
Q. Right. And one of the problems with the prior art was that there could be corrosion in that open region?

A. That is what is disclosed in Sukegawa and Fig. 2 shows an example of that.
Q. Is Sukegawa directed to protecting a wire under an insulating layer?
A. I'm not sure I can agree with that. It is a consequence or part of the disclosure in Sukegawa, but I don't think his disclosure is focused on that.
Q. When we look at Fig. 2C, for example, if the wiring 7 were to continue to extend under 9, do you think there needs to be any other material above it to protect it from corrosion?
A. I think the clear disclosure in Sukegawa is that the layer 8, the transparent conductor, should be always covering layer 7, the second wiring or the upper wiring I should say here. And if layer 7 is modified at all from what's disclosed here, then layer 8 should also be correspondingly modified to always cover it based on the disclosure of Sukegawa.
Q. Isn't it talking about layer -- or isn't Sukegawa discussing the importance of layer 8 covering layer 7 in the open region that's designated 13 in 2C?
A. I think it's clear in Sukegawa that he

discusses the importance of layer 8 protecting layer 7 everywhere. His central invention, after all, is to provide a double coverage where one of those coverages comes from the transparent conductor 8 and where the other one comes from several things.
Q. But isn't that double coverage in the terminal portion only?
A. It depends on what you define as the terminal portion. Could you identify that for me?
Q. Well, what we're looking at, for example, in 2C, would you consider that to be part of the terminal portion?
A. Fig. 2C should include the terminal portion, certainly.
Q. Is there somewhere in the display portion where Sukegawa is saying there should be double coverage with both a layer 8 and an insulator 9?
A. Fig. 3C shows a TFT cross-section which would be inside the display portion and, of course, within the seal region. And Fig. 3D shows the two substrates 100, 200, between which would be the seal region -- well, the sealant, I should say.

So I think the clear teaching from Sukegawa in the specification is that double coverage is necessary of layer 7 and as long as it is exposed to the environment outside the seal.
Q. Right.
A. So --
Q. I didn't mean to interrupt you.
A. Just to get to the final point in your question then, the Fig. 3C doesn't have the layer 8 in it because indeed, it's no longer needed at that point because the additional coverage comes from the other elements in the display, including the counter substrate.
Q. And the sealant?
A. Well, the sealant is not disclosed and so we have no idea what he would disclose about that. He's silent about that.
Q. But as we discussed yesterday, one of ordinary skill in the art would understand there would be sealant?
A. Sukegawa discloses that there is sealant and one of ordinary skill would understand that it should be somewhere between substrate 200 and 100 in Fig. 3D, but not its position of course and in this matter in particular, you're probing around

where Sukegawa would end layer 8 in between Fig. 3C and any of the other terminal portions and he's silent on that.

Q. Where there is sealant, would that provide extra protection for wiring 7?

A. It should. You know, it would be speculation on my part to know if Sukegawa would agree to that, but it could.

Q. And maybe you answered this, but I'm not -- I'm not sure I got a clean answer to it.

Would you agree that the display portion of Sukegawa does not teach covering wire 7 with both a layer 8 and an insulating film 9?

A. I don't think it teaches one way or another. It does show Fig. 3C, which is inside the display portion and the metal 7A and, of course, 7B does not have layer 8 on it clearly. It's -- but it, of course, could be elsewhere. He's silent on it.

Q. It's not shown in Fig. 3C?

A. Indeed, it's -- it's not shown above layer 7. Of course Fig. 3C does have ITO. It's on the left. It's 8A, forming the pixel electrode.

Q. Right, but it's not covering wiring 7

throughout the entire Fig. 3C?

A. It's only covering -- the ITO element 8 is only covering the element 7C on part of it and it's not above it in other regions.

Q. And when you say that Sukegawa is silent, you would agree there's nothing in the text that says you're going to have wire -- layering wire 8 covering 7 and also being covered by 9 in the display region?

A. Could you rephrase the question or make it more concise?

Q. Sure. You said that Sukegawa is silent on the need for 8 to be over 7 in the display region, correct?

A. It seems that's largely correct. He has an instance where it is over -- where they do overlap and an instance where it doesn't.

Q. And you're looking at Fig. 3C that you just testified about when you say that?

A. Yes.

Q. All right. And is there anything in the text that describes 8 overlapping 7 in the display region?

A. There is no disclosure on what should happen in the display region, aside from Fig. 3C,

about the relationship of layer 8 and 7.

Q. In looking at 2C, would one of ordinary skill in the art understand that once wiring 7 goes under -- strike that.

Assume in 2C you continued wiring line 7 under insulator 9, but didn't continue the ITO layer. Are you with me?

MR. SCHLITTER: Objection, form.

THE WITNESS: I can assume that, but of course, I don't agree that that's at all disclosed.

BY MR. GIBSON:

Q. Just assume it for me.

Would you -- do you believe there's any need in terms of corrosion to have 8 continue above 7 as 7 goes further under insulator 9?

A. I think the disclosure in Sukegawa is clear on exactly this question. He wants double coverage above wiring 7 because of the corrosion potential and that corrosion comes from the air that's above and around both in fabrication and in the use of this device.

And so I think it's clear from Sukegawa that if layer 7 is extended under the sealant, then layer 8 must be, according to his teaching,

extended as well, at least as far as -- as under the sealant to provide that double coverage and most likely a bit longer.

Q. What in Sukegawa are you relying on for that answer?

A. His disclosure, his specification, illustrations.

Q. Can you be specific?

A. Every cross-section that illustrates both element 7 and element 8 has the indium tin oxide 8 surrounding and going beyond wiring 7 on all sides and that is because it's protecting it. So it has to seal it all the way around.

So if we -- if we extend 7, Sukegawa is clearly saying for corrosion protection, it needs to also extend 8 and this corrosion protection is principally necessary at least on the inside of -- I'm sorry -- on the outside of the sealant during its use, but during fabrication there's also the potential for corrosion and even in that case it would likely be extended beyond as well, beyond the sealant as well.

Q. And if 7 is extending into the display region, is Sukegawa saying that 8 has to cover 7 into the display region as well?

Page 114

A. I think my answer's the same as it just was before. He shows in Fig. 3C an example where part of it does and part of it doesn't and he doesn't say much more about the display portion than that.
Q. And as one of ordinary skill in the art or your -- in your view, would one of the ordinary -- would one of ordinary skill in the art at some point stop layer 8 over layer 7 once it enters the display region?
A. Yes, and that's certainly what's disclosed in Fig. 3C, in part of it.
Q. Where would that happen?
A. He doesn't show.
Q. So how would one of ordinary skill in the art determine that?
A. It would depend on, I suppose, many things, the design of -- of the display. I'm not sure I can say if there's a single answer to that.
Q. In terms of the prior art, the prior art shows 7 extending into 13 and beyond it, correct, in Fig. 2C, for example?
A. In Fig. 2C, wiring 7 extends beneath element 13, certainly, and beyond it.
Q. And in 3E, wiring 7 is stopped, correct?

Page 115

A. Well, Fig. 3E is the cross-section of the terminal which has a top-down view in 3A. So what you see is that wiring 7 is broken up into two pads or rectangles. And in the cross-section, yes, there's a separation between the two.
Q. If you look at 3C --
A. I see it.
Q. -- 7 is just covered by 9 there in -- let's say 7A is just covered by 9, is that correct?
A. 7A and 7B are only covered by 9.
Q. And would you agree that that's sufficient to prevent corrosion?
MR. SCHLITTER: Objection, foundation.
THE WITNESS: I can't say. The figure speaks for itself. It's -- I have no idea if Sukegawa would find that sufficient for that purpose, but it is an example of what he's shown here.
BY MR. GIBSON:
Q. All right. And there's not -- as we've said before, there's no ITO layer over there to show a double layer structure needed to protect against corrosion, right?
A. In -- in Fig. 3C, which is a TFT

Page 116

inside -- well inside the display, it only has layer 9 over layer 7A.
Q. And you would agree that 9 can be made out of something like silicon nitrate -- nitride?
A. I would agree that that's an option and Sukegawa does mention that.
Q. And that's a good protection layer that's used commonly in the microelectronics industry, is that right?
A. Yes, that's correct.
Q. And that was known to someone of ordinary skill in the art in 1997 to be a good protection layer?
A. It's certainly known to a person of ordinary skill in 1997 that it's an insulating material that can be used to protect the circuits below. Whether it's characterized as good or not probably depends on the context. Sukegawa seems to teach that it's not good enough, at least in the terminal portion.
Q. And that wasn't quite my question. So I'll move to strike as nonresponsive.
Would someone of ordinary skill in the art in 1997 recognize that silicon nitride could be used as a protection layer in the

Page 117

microelectronics industry?
A. Yes.
Q. If we look at 3D?
A. I see it.
Q. And Fig. 3C, there's a -- in 3D there's a gap between element 200 and 31A, is that correct?
A. Yes.
Q. And then why don't you look at Fig. 2C?
A. I see it.
Q. And there's also a gap shown there as well, is that correct?
MR. SCHLITTER: Objection, form.
THE WITNESS: Which gap are you referring to in Fig. 2C?
BY MR. GIBSON:
Q. Well, let me ask it like this: If you're -- in 3D, the display portion, you're going to have that where 200 and 100 in the beginning of that, where 100 and 200 meet?
A. The precise beginning of that is not clear. Some of the other prior art identifies the display area as well within that. Sukegawa doesn't, I think, precisely provide the start of that.

Q. But either in what we see in Fig. 3D or off to the left of what would be in Fig. 3D, we're going to have a display area, correct?
A. Yes.
Q. And when you're -- as I understand it, there's going to be a layer 7 that's going to be connected through that gap in 3D?
A. I'm not sure what you mean about Fig. 3D. Maybe you could point me to it or draw it. Of course layer 7 is not shown in Fig. 3D.
Q. Right. But would you assume that there is a layer 7 in Fig. 3D based on what you see in the other figures?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, the other parts of Fig. 3 show an FPC and the terminal portion and that does include Fig. 7. How that precisely matches up with Fig. 3D is not clear. It's not shown. But I do expect that there is a wiring 7 or 7-1, 7-2 in Fig. 3D, largely underneath the FPC and the anisotropic conducting film that's identified there.
BY MR. GIBSON:
Q. Would you expect that it's going to extend beyond what we have as 31A, the left of

31A, do you expect layer 7 is going to extend beyond that?
A. Figs. 3E, for example, 3B, show that there's at least some portion of wiring 7 that is to the left, however slightly, but to the left of the FPC in element 10.
Q. And can you tell from Figs. -- in Fig. 3D how far that's going to extend to the left after 31A ends?
A. It's -- it's not shown in Fig. 3D, so I can't tell. But one thing I can tell is that in Fig. 3E and 3B, the terminal -- I'm sorry -- the substrate 200 is not included or shown, nor is the sealant. So wherever it is, it has to be the left of any wiring 7 in the terminal portion in this disclosure.
Q. And that's just because you see that there's the substrate 200 isn't shown in 3E?
A. It's because the sealant is not shown and the substrate is not shown.
Q. Okay. But even if you look at say 3B, no substrate 200 is shown in 3B, correct?
A. The substrate is not shown in 3B either, but nor is the FPC 31 and its elements 10, et cetera, right. Fig. 3B is largely the same as

Fig. 3E with that difference.
Q. All right. And the sealant's not shown in Fig. 3B either, correct?
A. That's correct, it's not.
Q. But we would know or a person of ordinary skill in the art would know that there's going to be sealant and a substrate 200 even though they're not shown in 3B?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, those elements -- well, the substrate 200 and 100 are shown in 3D and a person of ordinary skill knows that the sealant has to be between those and it would be most common to place that offset from the edge as we've talked about.
BY MR. GIBSON:
Q. But what I'm asking you specifically is, in 3B, there's no sealant shown even though we know it's going to be there?
MR. SCHLITTER: Objection, form.
THE WITNESS: Fig. 3B does not show sealant. A person of ordinary skill would not put the sealant in the terminal portion. That's why it's not shown.

BY MR. GIBSON:
Q. You would agree that the terminal portion connects the display portion, correct?
A. Perhaps through other portions that we might identify, but certainly the substrate 100 in 3D corresponds to the element 1 in Fig. 3B, 3C, 3E.
Q. If you look at 2C --
A. I see it.
Q. -- and wiring 2, you would consider that to be a scan line?
A. That corresponds to the gate metal layer, so that is the same metal layer as the scan lines. There may be a difference between calling it a scan line in this portion or not, but it's certainly the same metal layer.
Q. As the scan line?
A. As the scan line. Sukegawa, of course, calls it the lower layer metal wiring 2.
Q. But one of ordinary skill in the art would understand that's going to be a scan line, right?
A. No, not necessarily. It's a -- it's a metal that's been deposited in the same layer as the scan lines, but there's no disclosure to limit

it to that. It could be used for other things.
Q. And if we're talking about a bottom gate TFT, would you assume 2 is a scan line?
A. A person of ordinary skill cannot assume that.
Q. Okay. What's your understanding of a bottom gate TFT?
A. It's a TFT that has its gate positioned underneath the semiconducting layer, so at the bottom of the TFT.
Q. And if you assume that the -- let's assume that you've got a bottom gate TFT and that wiring line 2 is a scan line.
A. I can assume that.
Q. And that's a structure that someone would see in industry?
A. It's one of the possibilities that certainly a person sees in industry, yeah, and that's disclosed in Sukegawa in Fig. 3C, for example.
Q. And in Fig. 3C we have a bottom gate TFT with 2A. That would be a scan line?
A. Well, Sukegawa calls 2A a gate electrode. At least in this portion, it's a gate electrode. It should also be part of the scan

line, but I'm not sure that's expressly in the specification.
Q. Okay. But one of ordinary skill in the art would understand that it would be part of the scan line?
A. This gate metal 2A should be part of the scan line.
Q. And what if it's a top gate TFT -- or let me first ask you, are you familiar with top gate TFTs as a term of art in the industry?
A. Yes, that's the situation where the structure is at least nominally inverted and the gate is the upper metal.
Q. And then 2A, would that still be a scan line?
A. In -- in that case, 2A would still be the gate electrode.
Q. Which would connect to a scan line?
A. Which would be part of the scan line, yes.
Q. So if you look at 3E, and 3E shows both wiring 2 and a wiring 7?
A. It shows a lower -- let's see. What does he call it? He shows a lower layer metal wiring 2 and an upper layer metal wiring 7 in

Fig. 3E. Well, to be more precise, he shows in Fig. 3E that the upper layer metal wiring is split up into two parts, 7-1 and 7-2.
Q. And it's connected through wiring 2?
A. The two portions of wiring 7, 7-1 and 7-2, have electrical contact through the lower layer metal wiring 2 as well as the transparent conductor 8.
Q. But if we go to the right -- if you look at 3E -- well, strike that.
As we go into the display portion and we go from 3E to say 3C, is there going to be a connection that's made -- it's not shown here, but there's going to be a connection that's made between wire 7 and wire 2?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, that -- that is not expressly disclosed in Sukegawa.
BY MR. GIBSON:
Q. Isn't it necessary to connect the data line to the scan line?
A. I think it's expressly incorrect to do so. You'd wind up with a nonfunctioning pixel.
Q. I may have asked it incorrectly.
But how are you going to connect to your

data lines in what's disclosed in 3C?
A. Well, 3C includes a source and a drain. Of course those are the data lines or involve the data lines, for example, 7A. And the rest of the disclosure of Sukegawa is about the terminal portion and there are many ways to connect what's shown in the terminal portion to that wiring 7.
One way would be that somewhere off to the left of these terminal portions inside the display to form an opening in insulator 3 and have contact through that opening with the upper layer metal wiring 7, or whatever you want to call it, 7A. That seems to be -- to me to be the first thing that would come to the mind of a person of ordinary skill looking at Sukegawa.
Q. And that's -- the structure you've just discussed has the advantage of -- doesn't require extra contacts and would conserve space?
MR. SCHLITTER: Objection, form.
THE WITNESS: I'm -- I'm not sure what you mean by those advantages. I don't see it has any consequence on the amount of space being used. And I'm not sure what you mean by extra contacts. One terminal is generally used to contact to one data or scan line.

BY MR. GIBSON:
Q. Well, you're not -- you're not having to use a third wiring, for example, to connect your -- to have 2 to connect to 7; you can open up a hole and have 2 connect to 7?
A. That's correct.
Q. So that's simpler than using a third wiring, for example?
A. I'm not sure I'd use the phrase "third wiring" in this context because, you know, it's a claim term. So it would be an additional -- let me -- let me clarify.
So if we did what I described, then layer 7A can have electrical contact through the opening in insulator 3 to the lower metal wiring 2 without an additional wiring somewhere. But I don't want to characterize any of these as third wirings.
Q. And I wasn't looking for that. I'm just saying there's not an additional wiring that's going to be required the way you suggested you're avoiding that additional wiring, correct?
A. Yes, that's -- that's true in the suggestion that I offered.
Q. And that saves space?

A. Saves space compared to what?
Q. Compared to having a third wiring. I'm sorry, I don't want to use the term "third wiring."
It's better to avoid having additional wiring, it takes up extra space, it is an extra manufacturing step, right?
MR. SCHLITTER: Objection, form, foundation.
THE WITNESS: I'm trying to follow you, but I don't know what you mean by a "third wiring."
BY MR. GIBSON:
Q. I'm using the word "additional wiring" now that you used --
A. Okay. Well, can you tell me what you mean by "additional wiring"?
Q. Well, how you suggested it. I'm not -- you're the -- you're the expert here. What -- if you were going to not open up a contact hole between -- in layer 3 for 7 and 2 in Fig. 3C and instead you use an additional wiring, wouldn't that be more complicated than just opening up a hole in 3 for contact between 7 and 2?
MR. SCHLITTER: Objection, form and

foundation.
THE WITNESS: Whether or not it's more complicated depends. I don't have enough information to make any kind of statement to that regard --
BY MR. GIBSON:
Q. Would you think --
A. -- in general.
Q. Would you think that it would take extra space?
A. It depends.
Q. Do you think it would -- well, strike that.
In your view in 1997, would it have been -- for the ordinary person of skill in the art been more common to use an additional wiring or just open up contact holes in 3 for 7 and 2 to be in contact?
MR. SCHLITTER: Objection, foundation.
THE WITNESS: I can't say if there was a preference in that case.
BY MR. GIBSON:
Q. You don't know one way or the other?
A. There's not enough information to know one way or the other.

Q. Would you agree in 1997 that a person of ordinary skill in the art was aware of opening up contact holes in layer 3 as depicted in Fig. 7C to enable a connection between 7A and 2A or between wiring 7 and wiring 2?
A. No, I'm not aware of anything like that. It would make the TFT not work.
Q. And maybe I misspoke when I said 7A and 2A.
When -- you're talking about opening up contact holes in 3, you were talking about having -- enabling a connection between 7 and 2, correct?
A. The one option -- not the only option, but one option would be indeed to create an opening somewhere inside the display portion, an opening in layer 3, so that some portion of 7A could have contact with the lower layer metal wiring 2 through that opening.
Q. And that was something that was known to one of ordinary skill in the art in 1997?
A. It was known as one of multiple options.
Q. So if we look at -- still looking at the figures on -- where we have Figs. 3A, 3B and 3C?
A. I see it.

Q. Is 2A the gate of the TFT?
A. 2A is the gate electrode of that TFT.
Q. And what is to the left of the gate electrode?
MR. SCHLITTER: Objection, form.
THE WITNESS: Immediately to the left is the insulator 3, of course in that same horizontal direction. Above that are the other elements of the TFT, including one of the source drain electrodes and the pixel electrode, 8A, formed of the same transparent conductor, most commonly is 8 in the terminal portion.
BY MR. GIBSON:
Q. So you would agree that 8A is the pixel electrode?
A. I do. That's what Sukegawa calls it, the pixel electrode, 8A.
Q. And you would agree that above the pixel electrode, there is no layer 9?
A. I can't agree to that. Layer 9 partially overlaps 8A.
Q. Well, the part that -- there is part of it that -- part of 8A right there that does not have a insulating layer 9 on top of it, correct?
A. There is a portion of 8A that is not

covered by insulator 9, that's true.
Q. Do you know why that would have been removed?
A. I think I do.
Q. And why is that?
A. Well, the response of the liquid crystal layer depends on the electric field that's produced in it. And having additional insulators between the electrode that's applying the potential to the liquid crystal generally requires higher voltages to switch. So it's a kind of negative direction in most -- most contexts and while it's not catastrophic, it's generally to be avoided.
Q. So in other words, if you remove 9, you can use a smaller voltage?
A. The voltage to get the same optical effect in the liquid crystal layer would be lower if you removed 9.
Q. And if you -- could you extend 8A, the pixel electrode all the way to the terminal portion to the left?
A. I don't think so. It sounds like you're saying can we make some very large portion of the display a single pixel. That would seem like a

very strange display.
Q. Right. Because you need to have lots of pixels to have a good display?
A. Usually.
Q. And so you would agree that you're going to have a number of pixel electrodes in the display portion that are going to extend out to the terminal portion, you're not just going to have one?
MR. SCHLITTER: Objection, form.
THE WITNESS: I don't think you're going to have any pixel electrodes in the display portion that are going to extend to the terminal portion.
BY MR. GIBSON:
Q. Instead you're going to have a plurality of pixels in the display portion?
A. Certainly a plurality of pixels and each one should have its corresponding pixel electrode in a -- at least approximately rectangular shape connected to the TFT.
Q. To the right of the TFT we see 7A?
A. Yes.
Q. And I think we agreed that that is a data line?

A. Yes.
Q. Is the data line in the -- in the display region continuous across the display?
MR. SCHLITTER: Objection, form.
THE WITNESS: What do you mean by "continuous"?
BY MR. GIBSON:
Q. Does it start at one edge and then terminate at the opposing edge?
A. Most of the time that's the way a data line is configured, but certainly not always.
Q. And the scan lines, are those continuous across the display?
A. Same answer, most of the time they will extend from one side to the other side, but not always.
Q. And would you agree that the scan lines are isolated from each other?
A. Individual scan lines should be electrically isolated from each other to function.
Q. And I think as you pointed out a couple times to me, the scan lines should also be electrically isolated from the data lines?
A. Yes, that's a general principle that needs to happen for the TFT to work.

Q. And the data lines are also isolated from one another?
A. Yes.
Q. And in Fig. C3 (sic) we have the insulating layer 9 above 7A?
A. In Fig. 3C we do, yes.
Q. All right. And as this line 7A extends across the display region, is 9 going to be over the entire length of that?
A. It's not shown, so it's not clear. It's not disclosed.
Q. Is there anything to suggest that it would not?
A. There's nothing explicit that suggests it would not. I just note that in Fig. 3C, layer 9 does end over the pixel region.
Q. But as we're extending to the terminal portion, would you expect 7A to -- as 7A is extending, to have 9 over it?
A. I can't say one way or another. It's just not shown.
Q. And in Fig. 3C, the only place we don't have layer 9 is where we have the pixel electrode, 8A, correct?
A. That's true in Fig. 3C.

Q. And everywhere we see 7A, we see layer 9 on top of it, correct?
MR. SCHLITTER: Objection, form.
THE WITNESS: In Fig. 3C, that is correct.
BY MR. GIBSON:
Q. And Fig. 3C shows the line 7A is going to be extended toward the terminal portion?
A. Well, it shows it extending off the illustration and then there's an additional arrow showing us the direction of the terminal portion on that side. It doesn't say whether it actually extends out there.
Q. Would a person of ordinary skill in the art understand that it would extend that way?
A. There's not enough information given to know one way or the other. Well, on the other hand, I mean, we have lots of terminal portions disclosed here and clearly the metal 7 does not extend all the way there in a continuous fashion. It has to end at some point.
Q. But you're not sure at what point that is?
A. It's not clear where that is, but what is clear is it does have to end before it gets to

the terminal portion according to the disclosure in Sukegawa.
Q. If you look at 3E --
A. I see it.
Q. -- the scan line 2 is what's going from the terminal region to the display portion.
Do you know where that is going to -- let me ask it this way: Is that going to go all the way across through the display portion?
A. Element 2 is the conductor that is illustrated in Fig. 3E that does go into the display portion. I disagree that it is identical to the scan line, as we talked about earlier.
But it is the single conductor, the only one that does extend to the left towards the display portion. So I think one of ordinary skill would understand that at least that does go toward the display portion.
Q. And if you matched it with 3C, would you then understand that 2 would be the scan line?
A. Well, I wouldn't go quite that far. I think if Fig. 3E were assumed to be connecting to Fig. 3C, then I think it's appropriate to say that element 2 in 3E does connect to element 2A in 3C. Whether or not they should be characterized as all

the same scan line, it's not clear. That connection is not shown.
Q. Do you think that if you're connecting 3E to 3C, that 2 could be a data line?
A. Let me see if I understand your question. You're asking me can the terminal in Fig. 3E be used to connect to the data line?
Q. No. I'm asking you if you're connecting 3E to 3C if 2 is going to be the data line.
MR. SCHLITTER: Object to form.
THE WITNESS: If the terminal in 3E is used to connect to the gate electrode 2A in Fig. 3C, then it can be that that whole line could be referred to as the scan line. It's not necessary to be so, but that's certainly a common configuration.
BY MR. GIBSON:
Q. I mean, would you expect that someone of ordinary skill in the art would understand that configuration when looking at Fig. 3C and 3E?
A. Well, one of ordinary skill would understand that that's one possibility. I don't think they would see the disclosure in Sukegawa as requiring that. After all, element 2A is identified differently, not only by numbering, but

Page 138

by description from element 2 and neither of them are called scan lines.
Q. But you think that one of ordinary skill in the art would recognize that it would be a common configuration to have 2 be a scan line if you were connecting Fig. 3 to Fig. 3C?
A. One of ordinary skill I think could find that as a common, typical situation.
Q. If we look at 3A of Sukegawa.
A. I see it.
Q. And Sukegawa, I think, uses the term "tape carrier package 300"?
A. Yes, that's correct. Of course that's not shown in Fig. 3A.
Q. Would you understand that the tape carrier package also could be a flexible printed circuit?
A. As a general matter, yes. Those are terms that are often used interchangeably.
Q. Would you understand that the flexible printed circuit is going to overlap Fig. 3A?
A. Well, the tape carrier package that is disclosed overlaps part of it. It's illustrated in, for example, 3E, kind of the right portion of what's shown in Fig. 3A.

Page 139

Q. When you say "the right portion," what are you referring to?
A. Well, if we look at Fig. 3E, we see the anisotropic conducting film 10 which extends from the rightmost -- almost the rightmost portion of the terminal region, not quite, but almost, most of the way across the opening that's been formed in insulating film 9.
And so if we look at the Fig. 3A, we can see that the opening in element 9 is also shown and so that anisotropic conducting film goes from the right side of Fig. 3A only part of the way through, at least approximately halfway through.
Q. And would you agree that when we're looking at Fig. 3A, there's transparent conductive film 8 where the flexible printed circuit can overlap and then connect?
A. There is a portion in Fig. 3A, as well as in 3E where the anisotropic conducting film is in direct contact with the ITO and that is through the opening in layer 9. That's not shown in Fig. 3A, but we could identify that region. I think I did in my declaration.
Q. And then in -- and the flexible printed circuit is going to have a certain dimension,

Page 140

correct?
A. It's a physical object, so of course it has dimensions.
Q. So even if you have plenty of available contact area, you're limited by the size of the wiring on the flexible substrate 31, for example?
A. Could you rephrase the question?
Q. Sure. I mean, regardless of how big your contact area is in your terminal portion, the contact -- the actual area where there's contact is limited by the size of what you have as 31?
A. I'm not trying to be difficult, but I don't understand the question.
Q. Okay. Well, you see -- in 3D you see 31A and 31B?
A. Yes, I do.
Q. What would you call those two things?
A. Well, element 31 is the flexible wiring substrate of the tape carrier package 300 and 3 -- 31B is the copper foil wirings. I don't see yet what 31A is. I could find that, but clearly the conductive portion is 31B.
Q. And you say that's part of the flexible substrate?
A. It appears that both 31A and 31B

Page 141

together form element 31 and that is the flexible wiring substrate.
Q. And you're going to connect that to your terminal portion?
A. It's shown in Fig. 3E, for example, as connecting through the anisotropic conducting film to the conductors in the terminal portion.
Q. And the film is element 10?
A. Yes, thank you.
Q. And your contact area is going to be limited by the size of the wiring on the flexible substrate, correct?
MR. SCHLITTER: Objection, form.
THE WITNESS: That will be one of the limitations in this context, but there are many others.
BY MR. GIBSON:
Q. That would be one?
A. That would certainly be one.
Q. And if the flexible printed circuit is smaller than the available contact area, would you agree then the area -- well, let me do it this way.
Why don't you turn to page 40 of your declaration?

A. I've got it.
Q. Which I know in your original it's in color. There's a -- I think here it's shown in a darker shade of gray, which you had in red in your declaration.
Do you see that darker shade?
A. Well, the darker shade, of course, is indicating the opening in layer 9 through which the ITO is exposed for contact.
Q. That's your contact area?
A. That's a subset of the contact area most likely.
Q. Why is it only a subset?
A. Most likely the anisotropic conducting film overlays much more than just that little area.
Q. Where is it actually connecting then, to that area?
A. Well, direct contact could be outside that opening and -- but electrical contact would be just in that opening.
Q. And if the flexible printed circuit substrate is smaller than that available area, that could be a possibility, correct?
A. Well, I think it's unlikely. I think

the way design -- the design process generally goes at least would be that a particular size of the terminal is determined based on other constraints and then a tape carrier package or flexible substrate is chosen or designed to meet exactly what's needed in that terminal portion.
Q. But let's assume that you've got a flexible substrate that's smaller than the available area.
A. I can assume that, sure.
Q. Would you agree then that the shaded area is not limiting the resistance?
A. In this unlikely assumption and hypothesis, I can agree to that.
Q. Then let's assume if the flexible printed circuit is larger but the resistance of the contact formed is within the specifications of the system, would you then agree that the shaded area is not limiting the performance of the LCD display?
MR. SCHLITTER: Object to form.
THE WITNESS: I can't agree to that in general, even under your assumptions.
BY MR. GIBSON:
Q. Okay. In the event that the shaded area

is limiting the resistance, couldn't one of ordinary skill in the art increase its size?
A. That is one option available to those of ordinary skill but, of course, that then makes the entire terminal portion larger and, of course, there are other terminals next to this that aren't illustrated and there's a -- there's a limit to that.
Q. Let's take a look at Watanabe.
A. Thank you.
(Document marked previously as Exhibit Number 1004 was presented.)
BY MR. GIBSON:
Q. And this is another one of the prior art pieces that you considered?
A. Yes, it is.
Q. Do you know how wide a typical seal region of an LCD is?
A. There is no one answer to that.
Q. What would be typical?
A. In -- in 1997, I think a typical region would be in the range of millimeters.
Q. Can you give me an estimate?
A. It depends on the display.
Q. But millimeters, not centimeters?

A. I think for the larger sized displays, it could even get large enough to be close to the scale of a centimeter, not multiple centimeters, clearly not.
Q. And would that be true in 1997?
A. Yeah, I think that the upper bound for the size of a seal region would be -- could be as high as tens of millimeters but not that many tens of millimeters.
Q. Do the adhesive properties of the seal material affect the weight -- the width of the seal region?
A. They certainly do. And Shiba, for example, goes to some effort to complement those properties by structuring the bottom surface so that it has a little more surface area and thereby use the same set of materials but shrink the width of the seal region and not compromise the adhesion.
Q. And so if you have a stronger adhesive, it requires less width?
A. That may be, but subject to other constraints.
Q. Such as?
A. Well, from one material to another, a

seal may be stronger or not. And let's say we have two materials that are both equally strong in their adhesion properties, but there are other factors in displays that are very important.

First would be lifetime behavior -- or I should say reliability to temperature variations in the lifetime of the display and that may be different, quite apart from the initial adhesive properties of the two sealants, and there are other considerations like that.

Q. All right. But you would agree that in general, a stronger adhesive requires less width?

A. In general I can agree to that.

Q. And would you give -- would you agree that a given seal material has an optimum width that can be established?

MR. SCHLITTER: Objection, foundation.

THE WITNESS: It depends on how you're defining "optimum."

BY MR. GIBSON:

Q. A width that is neither too wide nor too small.

MR. SCHLITTER: Same objection.

THE WITNESS: If you define it that way, then you can -- you can -- a person of ordinary

skill could find the optimum according to those constraints, whatever you want to define those for.

BY MR. GIBSON:

Q. Well, for example, you don't want to use more sealant material than you need, right?

A. As a general principle, I can agree with that.

Q. And you don't want to use less than you need, that wouldn't have good results?

A. As a general principle, I can agree with that.

Q. If you look at -- I think it's page 55 of your declaration.

You have a couple figures there and those are coming out of Watanabe?

A. Yes, the figures on page 55 are reproductions, without modification as far as I can tell. Oh, I think in my declaration, I may have highlighted something in them, but they are Fig. 9 and Fig. 5 from Watanabe.

Q. And I think regarding Fig. 5 -- I thought you made a statement regarding Fig. 5. Let me -- it's on the previous page. If you go ahead and read that to yourself.

MR. SCHLITTER: What page are you referring to?

MR. GIBSON: Page 54.

THE WITNESS: Yeah, I've reviewed it.

BY MR. GIBSON:

Q. All right. So the sentence that begins "Fig. 5 below shows," what do you mean by that statement?

A. Well, there's two sides to what I'm meaning there. First, I'm observing that when compared to the prior art that's disclosed in Watanabe, Fig. 5 has a substantially wider seal region by a factor of 8 or so, maybe 5. All right. That's just what's illustrated in the figures.

In addition, I'm observing that -- I also mean to say that central to the -- to the disclosure in Watanabe is the presence of the adjustment layers or adjusting layers -- let me get the term right -- the adjustment layers in the sealing region around the lead portions. And by doing so, what he's of course trying to do is create a more equal gap between the substrates.

And when compared to the prior art, of course there's a less equal gap in the prior art.

And so if we look at Shiba, for example, Shiba improves his adhesion by having peaks and valleys, an uneven surface, which in Fig. 5 Watanabe is removing or at least minimizing and decreasing by the presence of those gap adjusting layers. So to compensate for that, it seems that he is forced to widen the sealant region.

Q. All right. So is it your testimony then that the width of the sealing region in Watanabe is -- it doesn't depend upon the seal material, but rather by the design of the gap adjusting layers?

A. That's not my testimony.

Q. Well, what you said here was, Watanabe is removing or at least minimizing and decreasing the presence of the gap adjustment -- adjusting layers, so to compensate for that, it seems that's forced to widen the sealant region.

And what I'm trying to understand is are you -- so you're saying he's widening the sealing region because he's using these gap adjusting layers?

A. That's what he's showing. He's -- he's not just illustrating the sealant region as being wider for the convenience of his illustrating.

He's widening it because he has removed unevenness from the seal region and, therefore, he needs a wider seal to get the same adhesive strength even with the same materials as compared to the prior art that he has.

Q. Is there any statement that you're basing this on or is it just on Fig. 5?

A. I'm recognizing what's true about his disclosure in Fig. 5 as compared to Fig. 9. I don't think he states this, but I'll note that it's also exactly the same principle that Shiba uses to narrow the seal region.

Q. All right. But is there anything where -- is there anything that -- other than Fig. 5 and your comparison to Fig. 9 of the prior art, is there anything else that you have to support your statement?

A. Well, in addition to that would be the other examples and embodiments that he has of adjustment layers and all of them have a wider seal region. It seems to be every embodiment has a wider seal region than the prior art that he's showing.

Q. What are you referring to in particular?

A. Well, I'm referring to -- we were just

talking about Fig. 5 and -- in compared with Fig. 9. Fig. 9 is the prior art and it does not have gap adjusting layers and clearly, Watanabe is saying that that has a more uneven lead portion surface underneath the sealant.

So Fig. 5 adds those adjustment layers and the unevenness is reduced and as a consequence, we also see that the seal region is wider. And that general trend is also true as well in Fig. 1, Fig. 6, Fig. 8A which has a seal region that is not a constant width, so it's a little more nuanced, but they all have a wider seal region than the prior art.

Q. And you're observing that from just looking at the proportions of the figures where the sealing region is shown compared to the prior art?

A. I'm doing more than that. As I've just explained, there's a technical reason why that should be.

Q. All right. Is that technical reason explained by Watanabe?

A. To some extent it is explained. He's clearly reducing the unevenness of the bottom substrate that's central to his invention.

Q. Where does it say that he will then require wider space for the sealant?

A. He shows a wider space in all of his inventions.

Q. Where does he say that by decreasing the unevenness, he has to have a wider space for the sealant?

A. I don't recall that he says something to that regard. He discloses it in his illustrations.

Q. But there's nothing disclosed in the -- in the text itself that this wider sealing range -- this wider sealing area is required?

A. There is not a discussion of that in the specification, but the principle is -- is true nonetheless. If he wants to keep the same seal strength and he has removed unevenness, then he will need a larger width to a seal region as he's illustrating.

Q. What if he just uses stronger sealant?

A. That might be done.

Q. He doesn't rule out using a stronger sealant?

A. He doesn't speak about changing sealants. He's silent on that.

Q. Are there any quantitative measurements that you're using to form this conclusion?

A. What do you mean by "quantitative measurements"?

Q. Dimensions, are there any dimensions that you're using?

A. I'm observing the illustrations from the figure and recognizing the effect of his invention on the evenness of the bottom substrate.

Q. And the figures themselves don't have dimensions, correct?

A. There's no scale provided for them, no.

MR. GIBSON: If we could change the media and we'll take a break.

VIDEOGRAPHER: Going off record. This is the end of Media Unit Number 3. The time is 3:15.

(Short recess.)

VIDEOGRAPHER: We're back on record. This is the beginning of Media Unit Number 4 in the deposition of Dr. Michael Escuti. The time is 3:31. Please continue.

BY MR. GIBSON:

Q. And before we broke, we were looking at some of the figures from Watanabe.

Would you agree that these figures are frequently not drawn to scale?
A. Are you referring to the figures in the Watanabe patent?
Q. The figures in patents in general, do you agree they're frequently not drawn to scale?
A. In general, that's -- that's true. I would -- I would agree that most commonly scale is not provided in patent figures.
Q. And do you have any reason to believe that these are drawn to scale?
A. Well, based on the absolute dimensions, they're not likely drawn to scale. After all, the dimensions of the seal regions in all of this are substantially similar to the area of the nine pixels that are disclosed and, of course, there's more than nine pixels in the displays that would typically be imagined here.
But the -- but most of my comments we just discussed about refer to the relative comparison between the figures, not the absolute.
Q. And the comparison you're making between the figures, is that what you're talking about, Fig. 9 to Fig. 5, for example?
A. Well, for example, when comparing Fig. 5

to Fig. 9, the prior art, the seal region relative to the other dimensions is substantially smaller as illustrated and the seal in Fig. 5 is larger as illustrated.
Q. Would you expect that Fig. 9 is drawn to scale?
A. I don't suspect that any of these figures are drawn to an absolute scale.
Q. Would you understand that artwork such as this in patents is designed to describe certain features or to show distinctive features?
MR. SCHLITTER: Objection, foundation, form.
THE WITNESS: Well, that's my understanding, that the figures in patents are meant to convey some kind of relationship between the elements and not an engineering drawing.
BY MR. GIBSON:
Q. And they don't show all the -- usually a figure doesn't show all the elements?
A. It's quite common that a figure does not show all the elements.
Q. And particularly in art such as this where there are so many elements that if you tried to show them all, you probably wouldn't have a

figure that you could understand?
A. In many cases, that is true. Of course, that's not always true, but yes.
Q. Would you agree that in Fig. 5, the distinctive features are trying to show the absence of substrate gap adjusting regions?
MR. SCHLITTER: Objection, form.
THE WITNESS: Maybe you mean -- you should rephrase.
BY MR. GIBSON:
Q. You mean the presence?
A. Well, could you just restate the question for me? I don't understand it.
Q. All right. Fig. 5 is trying to show something regarding substrate gap adjusting regions, correct?
MR. SCHLITTER: Objection, form.
THE WITNESS: Well, Fig. 5 is referred to as a plan view showing a liquid crystal display apparatus according to the second embodiment of the present invention. There are gap adjusting layers identified, 25 and 27, in that figure.
BY MR. GIBSON:
Q. And those are discussed in the text of the specification, correct?

A. Elements 25 and 27 are indeed discussed in the text.
Q. And if you look at 3A and 3B -- actually, let's look at -- I meant to look at '204, 3A and 3B.
A. So I've got 3A and 3B of the '204 before me.
Q. All right. And those are -- 3A is showing an adjustment layer 301?
A. 3A shows multiple adjustment layers 301.
Q. And 3B calls 301 an adjustment film, but you would understand that to be an adjustment layer?
A. I understand that those are the same element and I don't think there's a difference between the adjustment layer terminology and adjustment film terminology.
Q. And would you agree that they're located next to the external connection lines?
A. One of the adjustment layers is adjacent to the external connection lines but, of course, there are many others that are not. The second one is to the left of the first adjustment layer.
Q. Okay. But there is one adjustment layer shown next to the external connection line in both

3A and 3B?
A. There is one shown that is next to the first external connection line.
Q. And if you look at 6A and 6B of the '204 patent.
A. I see it.
Q. These show adjustment layers 501 and 502, is that correct?
A. It does, both 6A and 6B include those two elements.
Q. And they're both below and next to the external connection lines?
A. Some of them are below and some are to the side and external to it.
Q. Where are the first and second conductive layers in the '204 patent?
A. In these figures?
Q. Or with reference to these figures.
A. Well, by the terms first and second conductive layers, are you referring to Claim 54 claim terms?
Q. That's fine. You can use Claim 54.
A. Well, I think that the first conductive -- what's the language? Okay. The first conductive line over the substrate also then

has other limitations on it and that is not in Fig. 6A and B. But I can, of course, identify that there are two metal layers in 6A and 6B that are patterned for different purposes.
Q. Okay. What are those?
A. Well, the lower conductive layer that's shown in 6A and 6B is used to form multiple first adjustment layers 501, and the second conductive layer that's been deposited and patterned forms both the external connection lines 108 and the 502 second adjustment layers.
Q. Do those overlap with the sealant?
A. In 6A and 6B, all of those elements are underneath the sealant.
Q. And what would you understand the purpose of the first and second conductive layers to be?
A. Do you mean in these figures 6A and 6B?
Q. We can start with that.
A. Well, I'll have to refresh my memory on the figures in the specification. In Figs. 6A and 6B, a cross-section of a -- the cross-section of B to B prime, which appears most likely somewhere else in a plan view of the display -- I'm not sure where, we can find it -- but it appears that the

two conductors that are labeled the external connection line are an external connections to something external to the sealant, whereas all the other adjustment layers that are conductors serve to adjust the height difference.
Q. Isn't their purpose to create a uniform gap?
A. The adjustment layers would have that purpose, yes.
Q. And would you understand that to be the purpose in Claim 54 as well?
A. The purpose of what in Claim 54?
Q. To conduct -- the first and second conductive layers?
A. In Fig. 6A and 6B, I don't see a structure that meets the limitations Claim 54.
Q. But Claim 54 does refer to a first and second conductive layer, correct?
A. It does, of course with many limitations on it.
Q. What's your understanding of the purpose of those layers?
A. Are you referring to the layers that are in 6A or are you referring to the first and second conductive layers in Claim 54?

Q. The latter.
A. The claim doesn't say what the purpose of those are. It speaks to the relative relationship of the first and second conductor and the connection between them and what's above them and regions of -- of them, but doesn't say what the purpose of them is.
Q. What would one of ordinary skill in the art, after reading the '204 patent, learn would be the purpose of having those two layers?
MR. SCHLITTER: Objection, form.
THE WITNESS: In Claim 54, one possibility is what's illustrated in Fig. 4A, where there's a connection that goes across the sealant toward the display portion. So they serve to connect the terminal to something inside the display.
BY MR. GIBSON:
Q. Any other purpose?
A. That's one example. There certainly could be other purposes.
Q. What would they be?
A. Can you rephrase the question for me to be maybe more specific?
Q. Yes. So what would one of ordinary

Page 162

skill in the art understand from reading the '204 patent would be the purpose of the first and second conductive layers in Claim 54?

MR. SCHLITTER: Objection, form.

THE WITNESS: Another purpose would be to reduce the unevenness in the gap, whether or not they extend it all the way through the sealant and into the display portion.

BY MR. GIBSON:

Q. Any other purpose?

A. Not that I can think of right now.

Q. If we look back at Watanabe, Watanabe Fig. 5.

A. Yes.

Q. There's gap adjusting layers 25 and 27?

A. I see them.

Q. And what is the purpose of those?

A. The purpose of those gap adjusting layers is to provide an equal gap between the two substrates, ultimately to improve display image quality and display image contrast as he says in Column 3.

Q. Where in a typical LCD display is the sealant located?

A. In the '204 patent, there are multiple

Page 163

figures that -- that show it, Fig. 5, for example, and I think that's fairly emblematic. It's typically around most of the periphery of the display, but there needs to be an opening, at least one opening -- sometimes there's many openings -- so that the liquid crystal can be filled after the seal has been applied and the two substrates have been joined.

Q. And would you understand that the substrate gap adjusting layers 25 and 27 overlap with the sealant in Watanabe?

A. In Fig. 5, they completely overlap. In other figures they partially overlap.

Q. And so you would agree that typically the sealant is along the edge of the display; it's not, for example, in the middle of the display?

MR. SCHLITTER: Object to form.

THE WITNESS: It is typically on the periphery or edge of the display.

BY MR. GIBSON:

Q. And if you could look at Fig. 3A of the '204 patent.

A. I see it.

Q. You see there's again adjustment layer 301?

Page 164

A. I see it.

Q. And that's located across the sealant?

A. As illustrated, those adjustment layers do extend from one side to the other and also extend away from the terminals.

Q. And they're in parallel to the external connection lines?

A. In this portion it is, but clearly from looking in Fig. 5, that's not the case everywhere.

Q. But in 3A, that's what we're seeing, a parallel adjustment layer and external connection lines?

A. In 3A, it shows the adjustment layers that are at least illustrated in parallel with the external connection lines.

Q. And in 6A, which we looked at a minute ago, the two adjustment layers 501 and 502 are located across the sealant?

A. They do extend from one side of the sealant to the next and underneath.

Q. And they're also in parallel to the external connection lines?

A. While 501, the first adjustment layers are in parallel, 502 is not. 502 is illustrated as orthogonal.

Page 165

Q. If we look at Shiba.

A. Which part?

Q. Oh, Fig. 3. I don't think we've talked a lot about Fig. 3 yet. We wouldn't want to leave that one out.

Are the signal lines identified as X1, X2, X3, X4?

A. No.

Q. What lines do you believe those are?

A. Those are referred to as the data lines, for example, Column 5, line 5.

Q. Would you understand that one of ordinary skill in the art might use data and signal lines?

A. Yes. I think I'm getting tired and -- and didn't hear them as essentially the same thing to a person of ordinary skill, but yeah, I agree that they -- they can be used interchangeably.

Q. But I will agree with you that the patent does call them data lines.

A. I didn't mean to be so abrupt, but it's been a long -- long few hours.

Q. I understand.

The data lines, would you agree that they're located across the sealing region,

region 11?
A. In Fig. 3, they're clearly illustrated as going from the terminals across the sealant region and into the display portion or the -- I guess it's called the display area in Shiba.
Q. And if you look at Fig. 1, do you see the data lines in Fig. 1?
A. I don't see the lines themselves, they're not illustrated X1, X2, X3, but there are the elements 7-11 through 7-18 that hold the connections to the data lines and immediately above them on the substrate would be the data lines.
Q. So they're fed into the display from the bottom of Fig. 1?
A. That's -- that's generally correct, yes.
Q. And how do the data lines get their signal in Shiba?
A. Do you mean what connects to the terminal regions around the data lines?
Q. Right. Isn't there a driver?
A. There may be. I don't recall. I'd have to look to find out. Maybe you can point me to where that is. There is a driver board mentioned in, for example, Column 5. I don't think it's

illustrated or numbered.
Q. Would you understand that driver board would be at the bottom of Fig. 1?
A. The driver board could be -- could be arranged somewhere near the bottom of Fig. 1. It's not disclosed and I think there are many ways to do it. Certainly one could put it off to the side and then connect it up that way. But I think a very common way to do it would be to have the driver board at the bottom or near the bottom of Fig. 1.
Q. And in Fig. 1, would you understand these data lines to go across the sealant region the same way it's shown in Fig. 3?
A. I'm sorry. I should correct myself just very briefly. There are identified the X driver circuit boards 800 and the Y driver circuit boards 900, and it's that wide rectangle that's at the bottom and the right side respectively of Fig. 1. So they are numbered. They are illustrated.
Q. Okay. Appreciate that.
So the data lines that are going into Fig. 1 from the bottom, would you understand those would go across the sealant region the same way as shown in Fig. 3?

A. Fig. 3 is, after all, an expansion of the box labeled A in Fig. 1 and what's true in Fig. 3 should be true in Fig. 1 as well for that portion.
Q. And in Fig. 1, do you see where the scan lines are?
A. I see where their driver is and where their wirings in those big blocks are, 7-21 to 7-24, but I don't see the lines themselves. They're not illustrated.
Q. Would you agree the scan lines are going to be fed into the display from the right-hand side of Fig. 1?
A. I do agree, in a manner that's at least similar and analogous to Fig. 3, they would extend from the wiring film and go underneath the sealant toward the display area. Although, the one important difference is they would also have to cross the wiring 127.
Q. Right, because we don't have the wiring 127 at the bottom of the rectangle?
A. That's correct because it would short all those lines.
Q. But you would expect the scan lines to go in from the right-hand side and be connected to

the drivers you pointed out, 7-21 to 7-24?
A. Yes, that's correct.
Q. Are the -- looking at the bottom side of Fig. 1 and the right side of Fig. 1 where the lines are going in, how are they positioned relative to the sealant?
A. I'll try to answer your question, but you may need to rephrase it. The data lines and the scan lines extend across the sealant in a way that might be characterized as orthogonal to it, not parallel to the sealant.
Q. Could you call it transverse?
A. I think that's an alternate way to express it, yeah.
Q. And if you look at Fig. 3 again of Shiba, you can see wiring lines 127?
A. Yes, I see that. That would be an example of something that's not transverse.
Q. They would be parallel to the sealant?
A. Most of wiring 127 is largely parallel to the sealant, yes. Of course there are portions where that's not true, but they're very small.
Q. And would you -- do you see that those wiring lines 127 cover the region 111 of the sealant in places?

A. I might reverse the order of that. The seal region 111 covers a substantial portion of wiring 127, at least four of the lines. Two of the lines are, of course, inside the seal region and not under it.
Q. And then there's several that are under it?
A. There are several that are under it and those are pictured in Fig. 6.
Q. And then would you agree that there are portions of the sealant region that have no wiring lines 127?
A. I do agree. For example, in Fig. 1, the entire bottom horizontal portion of the seal does not have wiring 127 under it.
Q. But even in Fig. 3, you can see areas where there's sealant and no wires, correct?
A. Yes.
Q. And looking back at Watanabe, would you agree that Watanabe discloses an adjustment layer?
A. To be precise, he calls it a gap adjusting layer and he discloses several kinds.
Q. Is that the gap adjusting layer electrically isolated from the auxiliary line?
MR. SCHLITTER: Objection, form --

THE WITNESS: I don't --
MR. SCHLITTER: -- and foundation.
THE WITNESS: I don't think that Watanabe references an auxiliary line at all.
BY MR. GIBSON:
Q. Is the -- you say there's multiple gap adjustment layers.
Do you agree there's at least two in Watanabe?
A. There's at least two designs of those adjusting layers.
Q. And you have a 25 and a 27 in Watanabe, correct?
A. In Fig. 5, there's adjusting layer 25 and 27, and they correspond to those that are near the scan and data lines respectively.
Q. Is 25 electrically isolated?
A. All of the adjusting layers in Fig. 5 are said to be electrically isolated from the lead portions that they're next to.
Q. They're electrically isolated from the TFTs?
A. That's correct.
Q. And they're electrically isolated from the flexible printed circuit?

A. Yes, that's correct.
Q. Would you agree that the gap adjusting layers that are described in Watanabe can also be made from the same material that's used to form the signal lines?
MR. SCHLITTER: Objection, form and foundation.
THE WITNESS: Well, Column 12 and beginning in line roughly 49 and then that following paragraph discusses that issue and I think maybe more generally says that the material of the substrate gap adjusting layers 25 and 27 is the same, in this embodiment at least, as the material used in the first embodiment. And then he goes on to clarify it could be used as the same material as the signal lines and so on.
BY MR. GIBSON:
Q. So you would agree?
A. That's -- I do agree that's what's disclosed in Watanabe.
Q. So let's look back at Shiba for a moment.
In Fig. 4 where you identified Item 741, that's on the counter substrate, correct?
A. Yes, the connecting protrusion 741 and

its brothers and sisters are on the counter substrate.
Q. And that's where you say the sealant is contacting an ITO layer is on the counter substrate, is that correct?
A. I am saying that, but it's not limited to that. As you can see, 741 is part of what it -- what the sealant 113 contacts. But as the layer -- the ITO layer comes up -- well, I should say it comes diagonally down and then across the display, it's -- it's labeled 541. So it touches both of those regions.
Q. But that's on the counter substrate side?
A. It is all on the counter substrate side.
Q. And there is no sealant touching the ITO on the substrate side?
A. Not that's disclosed in Shiba.
Q. And if you look at Fig. 6, the sealant that you're saying is touching an ITO layer is again on the counter substrate?
A. In Fig. 6 it's even more clear and yes, it's the counter substrate that has the ITO directly touching at least partially the sealant.
Q. And the sealant at the -- on the

substrate is not touching the ITO layer, correct?
A. Well, just to be clear, the other substrate we're talking about is element 200 in this answer and the question previously and that's called the array substrate. So yes, I agree the sealant is not touching the ITO on the array substrate or element 200.
Q. Now, if you look at the '204 patent, if we look at Claim 54.
A. I've got it.
Q. And in Claim 54, we're talking about the array substrate when we look at the first use of the word "substrate"?
A. If the substrate has thin film transistors and pixel electrodes and it is an LCD device, then yes, it would correspond to the array substrate in Shiba.
Q. All right. And we know in the very bottom line on Column 19, it says a counter substrate facing a substrate.
Do you see that?
A. Yes, I do.
Q. Is there any other mention about what the counter substrate is going to be -- strike that.

Is there any mention in the -- in Claim 54 about what is going to be on the counter substrate?
A. Claim 54 is silent on that.
Q. So the limitations about what's on the substrate -- strike that.
The limitations that follow in claim -- in Column 20 apply to what is on the array substrate, correct?
A. Except for the first limitation, I think that's correct, at least for Claim 54.
Q. And the limitation you're referring to is a liquid crystal material provided between the substrate and the counter substrate?
A. That's correct.
Q. So we know there's going to be a liquid crystal material in between the two substrates from that limitation, correct?
A. From that limitation, of course the first one where it's called the liquid crystal display device.
Q. All right. And then everything after that is applying to what's on the array substrate, correct?
A. It applies to what's referred to here as

the substrate.
Q. Which we would understand to be an array substrate based on the fact that it's got a TFT and pixel electrodes and it's for an LCD display, correct?
A. Well, that's not the language of this specification.
Q. I understand. But someone of ordinary skill in the art would understand that we're talking about the array substrate there, not the counter substrate?
A. Well, the language of array substrate is what's used in Shiba. I'm simply holding to the language that the spec in -- in the '204 which refers to these two substrates as simply a substrate in Claim 54 which, yes, would include the thin film transistors and the active matrix electronics and the counter substrate, which would be the other one. And certainly nearly all of the limitations in Column 20 apply to the substrate which would have the active matrix on it.
Q. And would that also be the same for Claim 31?
A. I'll have to verify.
Claim 31 includes in its first few

limitations a very similar set that refers to the substrate having thin film transistors and a counter substrate facing that first substrate. So what we just talked about in Claim 54 I think applies to Claim 31.
MR. GIBSON: All right. Why don't we take a break? I want to check my notes and then I'll probably wrap up.
VIDEOGRAPHER: We're going off record. The time is 4:13.
(Short recess.)
VIDEOGRAPHER: We're now back on record. The time is 4:24. Please continue.
MR. GIBSON: I don't have any further questions at this point, but I'll reserve my right to ask additional questions if you ask questions.
MR. SCHLITTER: Okay. I have a topic.
EXAMINATION
BY MR. SCHLITTER:
Q. So would you please refer to the '204 patent?
A. I've got it.
Q. Do you recall what the objectives are of the invention that's described in the '204 patent or any of the inventions that's described in the

'204 patent?
A. In the '204 patent, there's multiple objectives and one of them certainly is to provide a reduced resistance from the terminal portion to the display portion.
Q. Is there any other?
A. There's a -- another that involves the objective of reducing the gap unevenness by means of the adjustment layers that are provided.
Q. Any other objectives that you can recall?
A. There are two other objectives, as best I recall. One of them is to provide a strong adhesion of the sealant to the lower substrate. And the last objective I can recall is to provide a reliable connection to the FPC in the terminal portion.
Q. Would you refer, please, to Claim 31?
A. I've got it.
Q. Do you see that one of the limitations in Claim 31 is an auxiliary line?
A. I do see in Claim 31 the auxiliary line limitation.
Q. And another limitation is an external connection line?

A. Yes, and there's several limitations on that external connection line.
Q. What is the objective of the '204 patent with respect to the adjustment -- strike that.
What is the objective of the '204 patent with respect to the auxiliary line and the external connection line?
MR. GIBSON: Objection, scope.
THE WITNESS: Well, the objective in that case has to do with the -- reducing the resistance of the connection from the terminal portion at least partially into the sealant but potentially beyond.
BY MR. SCHLITTER:
Q. What -- are there any limitations in Claim 31 that relate to the objective of lowering resistance?
A. Well, those -- those two lines and the connection that's formed between them, the electrical connection, would serve that objective.
Q. Would they serve any other objective?
MR. GIBSON: Objection, scope.
THE WITNESS: They may. They also present a difference in height under the seal region and so they could provide a given height in

that region and that could be serving one of the other objectives I mentioned.
BY MR. SCHLITTER:
Q. You also mentioned unevenness. Is there any limitation in Claim 31 that relates to the objective of preventing unevenness of the gap?
A. Yes, certainly. There's an adjustment layer that's identified and that adjustment layer must extend under the sealant and that goes to that objective.
Q. Are there any limitations in Claim 31 that relate to the objective of providing strong adhesion of the sealant?
MR. GIBSON: Objection, scope.
THE WITNESS: Yes, there is. There's a limitation that says the sealant is in direct contact with the second insulating film and so that's toward that objective.
BY MR. SCHLITTER:
Q. Is there any limitation -- well, are there any other limitations in Claim 31 that relate to the objective of stronger adhesion?
MR. GIBSON: Objection, scope.
THE WITNESS: Well, at least indirectly, the transparent conductive film is expressly not

in contact with the sealant. There's a limitation that says the flexible printed circuit over an electrical contact with the external connection line through a transparent conductive film.
So there is a transparent conductive film involved and the next limitation that I already read about, the sealant, dictates that it should not -- it should not be under the seal.
BY MR. SCHLITTER:
Q. Are there any limitations in Claim 31 that relate to the objective of providing a reliable connection to the FPC?
MR. GIBSON: Objection, scope.
THE WITNESS: The limitation I just read about the flexible printed circuit goes to that end. It's meant to be an electrical contact with the external connection line through the transparent conductive film.
BY MR. SCHLITTER:
Q. Is there any limitation in Claim 54 relating to the objective of lowering resistance?
MR. GIBSON: Objection, scope.
THE WITNESS: Well, after this long day, I think my answer is still the same, that there's an auxiliary line that's provided, there's an

external connection line that needs to overlap it and have electrical contact to it, and this can be used toward that objective.
BY MR. SCHLITTER:
Q. Are there any limitations in Claim 54 relating to the objective of preventing unevenness of the gap between the substrates?
A. Yes, the adjustment layer that's provided in the limitation says an adjustment layer -- at least part of the adjustment layer extending under the sealant goes toward that objective.
I'm sorry. I just noticed that in the second round of questions, you started to ask me about Claim 54 instead of Claim 31 and I didn't track that. So I apologize. Maybe you should --
Q. This is why I can't find it.
A. -- re-ask -- ask me again. As I said, it's been a long day. I'm sorry. Could you perhaps ask me again?
Q. Okay. With respect to Claim 54, are there any limitations in Claim 54 that relate to the objective of reducing resistance?
MR. GIBSON: Objection, scope.
THE WITNESS: Yes, there's a first

conductive line, a second conductive line and these are both mentioned that -- to have a limitation where they are in electrical contact and this is -- these are the elements that serve that objective.
BY MR. SCHLITTER:
Q. Are there any elements of Claim 54 that relate to preventing unevenness of the gap between the substrates?
A. Yes, there's a conductive layer over the substrate that's provided for that purpose.
Q. Is there any other limitation relating to the conductive layer that pertains to the objective of preventing unevenness of the gap?
MR. GIBSON: Objection, form.
THE WITNESS: Well, the full claim limitation that mentions a conductive layer reads a conductive layer over the substrate. And then an additional limitation says wherein the conductive layer is electrically isolated from the other conductive elements that are listed.
And there's another limitation that identifies that the sealant should overlap at least part of the conductive layer to provide that -- a reduction of the unevenness underneath

the sealant.
BY MR. SCHLITTER:
Q. Are there any limitations in Claim 54 of the '204 patent that pertain to the objective of providing strong adhesion of the sealant?
MR. GIBSON: Objection, scope.
THE WITNESS: Yes, there is. There is a sealant that is limited to be in direct contact with the second insulating film.
BY MR. SCHLITTER:
Q. Do any of the other elements of Claim 54 pertain to this objective --
MR. GIBSON: Objection, scope.
BY MR. SCHLITTER:
Q. -- of providing strong adhesion of the sealant?
MR. GIBSON: Objection, scope.
THE WITNESS: The other elements refer to a transparent conductive layer that are over a first region of the second conductive line and it's clear that the FPC is meant to connect in that region as well, and that also corresponds to allowing the sealant to connect directly to the second insulating film without the ITO below it.

BY MR. SCHLITTER:
Q. Are there any limitations in Claim 54 that relate to providing a reliable connection of the FPC?
MR. GIBSON: Objection, scope.
THE WITNESS: Yes, there is. There's a limitation that reads the second conductive line and the flexible printed circuit are in electrical contact through the transparent conductive layer.
MR. GIBSON: Why don't you go off the record?
VIDEOGRAPHER: We're going off the record. The time is 4:38.
(Short recess.)
VIDEOGRAPHER: We're back on record. The time is 4:40. Please continue.
BY MR. SCHLITTER:
Q. Earlier today you were asked about Example 3 of the '204 patent and Figs. 4A and 4B and you said that redundancy was implicit in the structure that's disclosed in the '204 patent.
Do you recall that?
A. I vaguely recall that discussion.
Q. Are there any limitations in the -- in Claim 31 that relate to redundancy?

A. There are no limitations in Claim 31 or Claim 54 that require that, but if the two conductors in both of those claims are connected through the first inter-layer film or the first insulating film, there will be at least partial redundancy by that connection.

Q. Is it necessary to know the process by which a structure is made in order to determine whether it is covered by Claim 31 or Claim 54?

MR. GIBSON: Objection, form.

THE WITNESS: It is certainly not required to know the process by which it's made to determine if it meets Claim 51 (sic) or the structure in Claim 54.

MR. SCHLITTER: What specifically was your objection?

MR. GIBSON: I objected to form.

MR. SCHLITTER: In what respect? In what respect?

MR. GIBSON: The -- let me look back at the question. The question was compound and vague.

BY MR. SCHLITTER:

Q. Let me restate the question.

Is it necessary to know the process by

which a structure is -- has been made in order to determine whether it is covered by Claim 31?

MR. GIBSON: Objection, form.

THE WITNESS: That is not required.

BY MR. SCHLITTER:

Q. When I say "covered by Claim 31," do you understand that to mean whether it infringes Claim 31?

A. That's how I'm understanding your question, yes.

Q. Do you need to know the process by which a structure is made in order to determine whether it infringes Claim 54?

MR. GIBSON: Objection, form.

THE WITNESS: A person of ordinary skill does not need to know that to determine infringement of Claim 54. To be clear, does not necessarily need to know that.

MR. SCHLITTER: I have no further questions.

MR. GIBSON: I have a couple of follow-up questions.

EXAMINATION (Further)

BY MR. GIBSON:

Q. Would you agree with me that if you --

well, in 1997 it was well-known to one of ordinary skill in the art that if you had two lines running in parallel, that could lower the resistance versus just having one line?

A. That general principle was well-known by 1997 and Shiba shows a good example of that.

Q. And in terms of the -- we covered some of this in the '403 (sic) -- the '204 doesn't describe any sort of problem with sealant connections, correct?

A. In your question you referred to '403. I assume you mean the '413?

Q. I'm sorry. The '413 we talked about yesterday.

A. Well, the specification is the same in both of those patents. So whatever I said about that applies to the '204 patent as well.

Q. Right. There's nothing in the '204 patent that discusses that somehow the prior art as having trouble having the sealant connect to the substrate or bond with the substrate?

A. There is -- as I've said in our discussion about the '413 specification, that there is no explicit discussion of that in the '204 specification.

Q. And, in fact, it was well-known in the art that a sealant would bond better with an insulating layer than a transparent conductive layer as of 1997, correct?

A. As a matter of general principle, that was known, but as we talked about also in that discussion, that's subject to other constraints and Shiba shows an example of that as well.

Q. All right. But you would agree with me that it was well-known to people of ordinary skill in the art in 1997 that a sealant would bond better with an insulating layer than an ITO layer, correct?

A. As a general matter, yes.

MR. GIBSON: I have nothing further.

MR. SCHLITTER: I have nothing further.

VIDEOGRAPHER: This concludes the videotaped deposition of Dr. Michael Escuti and the end of Media Unit Number 4. The time is 4:47. We're now off record.

(Whereupon, the following proceedings were had off the video record:)

MR. GIBSON: So after discussing a couple of the exhibits that were marked, we decided to mark them with additional numbers next

in order. The '204 patent, which the witness made some annotations on, we're going to mark as Exhibit 1012. And the Shiba patent, which is Patent No. 5,684,555, where the witness made some markings on, we are going to mark that as Exhibit 1013.

MR. MANZO: You hadn't used those numbers before.

MR. GIBSON: Not today.

MR. SCHLITTER: That's fine.

(Whereupon, the proceedings concluded at 4:50 p.m.)

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

INNOLUX CORPORATION,)
)
Petitioner,)
)
vs.) IPR2013-00068
) U.S. Pat. No.
SEMICONDUCTOR ENERGY) 8,066,204
LABORATORY CO., LTD.,)
)
Patent Owner.)

I, MICHAEL J. ESCUTI, Ph.D., being first duly sworn, on oath say that I am the deponent in the aforesaid deposition taken on September 6, 2013; that I have read the foregoing transcript of my deposition, consisting of pages 1 through 193 inclusive, and affix my signature to same.

_____ as it now appears
_____ as it now appears with corrections

MICHAEL J. ESCUTI, Ph.D.

SUBSCRIBED and sworn to before me this _____ day of _____, 2013.

_____
Notary Public

CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

I, Sandra L. Rocca, a State of Illinois licensed Certified Shorthand Reporter, License No. 084-003435, do hereby certify:

That on the 6th day of September, 2013, at 9:49 a.m., 115 South LaSalle Street, Chicago, Illinois, the deponent MICHAEL J. ESCUTI, Ph.D. personally appeared before me;

That the said MICHAEL J. ESCUTI, Ph.D. was duly sworn by me to testify and that the foregoing was stenographically recorded and constitutes a true record of the testimony given and the proceedings had at the aforesaid deposition;

That the deposition terminated at 4:50 p.m.;

That the reading and signing of the deposition was not waived, and the deposition was submitted for signature. Pursuant to Rule 30(e) of the Rules of Civil Procedure, if deponent does not appear or read and sign the deposition within 30 days, or make other arrangements for reading and signing, the deposition may be used as fully as though signed, and this certificate will then evidence such failure to appear as the reason for

signature not being obtained;

That I am not counsel for nor related to any of the parties herein, nor a relative or employee of such attorney or counsel for any of the parties hereto, nor am I interested directly or indirectly in the outcome hereof.

IN WITNESS WHEREOF, I have hereunto set my hand and seal of office this day of , 2013.

SANDRA L. ROCCA, CSR, RPR, RMR, CRR
CSR License No. 084-003435
Expires May 31, 2015

&

& 2:2,8 4:6,22

0

084-003435 192:4 193:12

1

1 9:14,16 29:1,4,11 31:10 40:25 45:2 60:17 70:12,12,14 71:1,8 72:2 75:5,11 75:18 77:7,20,21 78:16 92:12 121:6 151:10 166:6,7,15 167:3,5,11,12,19,23 168:2,3,5,13 169:4 169:4 170:13 191:13
10 119:6,24 139:4 141:8
100 89:11 108:23 109:23 117:19,20 120:11 121:5
1001 100:8
1004 3:10 144:12
1005 3:11 106:9
1008 3:12 53:13,14 53:17
1009 3:14 82:6,9,9
1010 3:16 82:6,9 83:2
1011 3:17 83:20,21 83:24
1012 3:19 9:6 83:20 190:3
1013 3:20 28:20 190:6
106 3:11
107 61:10,12
108 61:16 159:10
109 61:16
11 166:1
110 61:16 83:1
1100 2:3
111 61:16 169:24 170:2
112 24:15 28:4,7
113 24:20 28:13,14 51:25 52:1,2,8 71:15 73:11 79:7 99:16 100:24 101:10 103:10 173:8
114 24:22 99:17 100:25 101:10
115 1:15 2:9 4:6 73:8 192:6
11:10 60:18
11:26 60:23
12 172:8
120 2:14
121 70:3
125 70:3
127 29:8,15,18,24 30:16 31:10,12,14 31:25 32:3,5,11,19 32:25 33:23 34:16 34:19 35:1,5,23 36:11 37:9 38:10 39:1 40:23 41:1,6 41:15,24 42:16,16 43:2,3,6,8 45:5,7 47:15,16,22 48:5,20 48:21 50:21,23,24 51:3 52:10 53:5 70:2 93:7 94:1 168:19,21 169:16 169:20,24 170:3,12 170:15
12:47 104:2
13 107:24 114:21,24
144 3:10
177 3:5
187 3:5
19 174:19
193 191:13
1997 46:3,7 88:25 89:10,13 90:4,12,16 90:25 95:16,17,20 96:7,21,22 97:8 116:12,15,24 128:14 129:1,21 144:21 145:5 188:1 188:6 189:4,11
1:51 104:5 105:5

2

2 60:21 104:1 107:2 121:10,19 122:3,13 123:22,25 124:4,7 124:15 126:4,5,15 127:21,24 128:17 129:5,12,19 136:5 136:10,20,24 137:4 137:9 138:1,5
20 175:8 176:20
200 49:3,21 50:18 50:20 52:25 108:23 109:23 117:6,19,20 119:13,18,22 120:7 120:11 174:3,7
2007 59:6
2008 59:6
2011 3:21 6:2
2013 1:17 4:3 191:12,21 192:5 193:9
2013-00068 4:10
2015 193:13
204 3:15,16 5:22 8:21 9:2,8,14,17,22 10:1 25:19,19 28:17 46:8 50:11 61:1,6 63:3,7,9,11 75:1,20 91:11,21 93:20 94:5 94:10 95:7,12 100:7 106:6 157:5,6 158:4 158:16 161:9 162:1 162:25 163:22 174:8 176:14 177:20,24 178:1,2 179:3,5 184:4 185:19,21 188:8,17 188:18,25 190:1
211 48:21 49:1 50:2 50:18,20 52:25 53:1
2200 2:14
24 74:1
241 51:4,6,7,12 52:2 52:7,8 53:1 61:23 66:12 86:16
25 156:22 157:1 162:15 163:10 171:12,14,17 172:12
251 68:17
256 54:25,25
27 35:19 93:12 156:22 157:1 162:15 163:10 171:12,15 172:12
28 3:20 74:1
2a 122:22,23 123:6 123:14,16 129:4,9 130:1,2 136:24 137:12,24
2c 107:9,24 108:12 108:14 112:2,5 114:22,23 117:9,15 121:8

3

3 2:3 29:5 31:11 69:25 70:10,13 94:19 95:3,5 105:3 118:16 125:10 126:15 127:21,24 128:17 129:3,11,17 130:7 138:6 140:19 153:16 162:22 165:3,4 166:2 167:14,25 168:1,3 168:15 169:15 170:16 185:19
30 192:19,22
300 138:12 140:19
301 157:9,10,11 163:25

31 10:4,12,17,21,23 11:2,17,22 12:1 13:10 119:24 140:6 140:11,18 141:1 176:23,25 177:5 178:18,21,22 179:16 180:5,11,21 181:10 182:15 185:25 186:1,9 187:2,6,8 193:13
312 2:10,10,15,15
31a 117:6 118:25 119:1,9 140:15,21 140:25
31b 140:15,20,22,25
32 29:5
33 36:5
36 93:24
38 68:24
3:15 153:17
3:31 153:22
3a 115:2 129:24 138:9,14,21,25 139:9,12,15,18,22 157:3,5,6,8,10 158:1 163:21 164:10,13
3b 119:3,12,21,22 119:23,25 120:3,8 120:18,21 121:6 129:24 157:3,5,6,11 158:1
3c 108:20 109:9 110:2,15,20,22 111:1,18,25 114:2 114:12 115:6,25 117:5 121:6 122:19 122:21 124:12 125:1,2 127:21 129:24 134:6,15,22 134:25 135:4,7 136:19,23,24 137:4 137:9,13,20 138:6
3d 108:22 109:24 117:3,5,18 118:1,2 118:7,9,10,12,18,20 119:8,10 120:11 121:6 140:14
3e 114:25 115:1 119:3,12,18 120:1 121:7 123:21,21 124:1,2,10,12 136:3 136:11,22,24 137:4 137:7,9,11,20 138:24 139:3,19 141:5

4

4 3:18 59:1 68:12 69:15,19 71:8,16,18 72:15,20,25 73:4 75:17 77:22 78:3,4 79:24 81:19,22,24 82:17,21 95:2 99:25 100:3,4 153:20 172:23 189:19
40 3:14 141:24
400 90:20
401 24:14 27:17,25
403 24:19 28:9,10 188:8,11
413 46:8 188:12,13 188:23
42 93:24
47 31:5
49 82:10 172:9
4:13 177:10
4:24 177:13
4:38 185:13
4:40 185:16
4:47 189:19
4:50 190:12 192:16
4a 9:4,11,22 10:1,3 10:10 24:14,15,19 24:20,22 25:16 26:2 26:6 27:4,12,20 28:7 91:14,17 95:3 95:5 98:9 100:7,17 102:22 161:13 185:19
4b 185:19

5

5 3:4 31:14 32:3 68:23 73:25 147:21 147:22,23 148:7,12 148:13 149:3 150:7 150:9,15 151:1,6 154:24,25 155:3 156:4,14,18 162:13 163:1,12 164:9 165:11,11 166:25 171:14,18
5,504,601 3:10
5,636,329 3:11
5,684,555 3:20 190:4
50 3:16
501 73:2 158:7 159:8 164:17,23
502 158:8 159:10 164:17,24,24
51 186:13
52 8:10 60:25
521 81:6,10
526-1535 2:15
53 3:13
54 10:24 13:24,24 15:2,3,13 21:3 22:25 23:4,12,14,25 24:9,9,10,25 25:2 25:15,23 26:18 27:1 27:8,22 28:2,5,15 50:11 75:20,24,25 76:6,10,20 77:14 99:8,11 100:19,21 101:17 102:3,6,10 103:3 148:3 158:20 158:22 160:11,12 160:16,17,25 161:12 162:3 174:9 174:11 175:2,4,11 176:16 177:4 181:20 182:5,15,21 182:22 183:7 184:3 184:11 185:2 186:2 186:9,14 187:13,17
541 69:6,17,18,19,22 70:17 71:13 72:3,18 72:22,23 73:18,19 73:24 74:3,3 75:2,6 75:10,22 76:22,23 77:7,15,21,24 78:3 78:7,10,12,14,19,22 79:6,15,18,19,20,22 80:8,10,14,19 81:3 81:6 173:11
55 147:13,17
577-1250 2:10
577-1370 2:10
581 74:6,8,8,17

6

6 3:21 31:14 32:3 35:21 36:5 38:9 47:6,9 48:4 49:13 49:20 50:9,14,21 52:4,6,12,24 69:19 71:13,17 72:17 73:12,13,15,20,23 74:18 75:12,13,14 76:22 77:1,5,12,16 77:18 78:9,20 79:24 93:12,18,24 151:10 170:9 173:19,22 191:11
600 90:20
60603 2:10
60606 2:15
61 24:10
623-7200 2:4
623-7202 2:4
655-1501 2:15
68 24:10
6a 158:4,9 159:2,3,7 159:13,18,21 160:15,24 164:16
6b 158:4,9 159:3,7 159:13,18,22 160:15

6th 1:16 4:3 192:5

7

7 43:1 69:4 107:10 107:15,17,23 108:2 109:3 110:5,12,22 110:25 111:8,13,22 112:1,3,5,16,16,19 112:24 113:10,11 113:14,23,24 114:9 114:21,23,25 115:3 115:8 118:6,10,12 118:17,19 119:1,4 119:15 123:22,25 124:5,15 125:7,12 126:4,5 127:21,24 128:17 129:5,12 135:19
7-1 118:20 124:3,5
7-11 166:10
7-18 166:10
7-2 118:20 124:3,6
7-21 168:8 169:1
7-24 168:9 169:1
724 41:3 45:3
731 31:17,17 70:3
734 31:17
735 32:1,2
738 31:18 32:1,2
740 78:10
741 68:17,18,25 69:11,15,21 70:11 70:13,15,22 71:5,12 71:24 72:2,16,22,25 73:6,7 78:2,3,4,12 78:18 80:2 172:23 172:25 173:7
745 78:18
748 80:2
751 70:3
76 24:10
7a 110:16 115:9,11 116:2 125:4,13 126:14 129:4,8,17 132:22 134:5,7,18 134:18 135:1,7
7b 110:17 115:11
7c 111:3 129:3

8

8 94:7,10,20 107:14 107:18,22 108:1,5 108:18 109:10 110:1,13,17 111:2,8 111:13,22 112:1,15 112:25 113:10,11 113:16,24 114:9 124:8 130:11 139:16 148:13
8,066,204 1:6 4:10 191:6
8,068,204 3:19,21
80 89:11
800 167:17
82 3:15,16
83 3:18
8a 110:23 130:10,14 130:17,21,23,25 131:20 134:24 151:10

9

9 3:19 94:8,10,20 106:21 107:10 108:19 110:13 111:9 112:6,16 115:8,9,11 116:2,3 130:19,20,24 131:1 131:15,19 134:5,8 134:16,19,23 135:1 139:8,10,21 142:8 147:21 150:9,15 151:2,2 154:24 155:1,5
900 167:18
92614 2:4
949 2:4,4
9:49 1:17 4:4 192:6

a

a.m. 1:17 192:6
ability 32:25
able 16:2 20:12,13 57:8 91:5 92:18 102:18
abrupt 165:21
absence 156:6
absolute 154:12,21 155:8
accomplish 38:25 65:4
accomplishing 40:14
achieve 21:20,24 55:14
acknowledgments 58:18 59:2
act 96:17
active 29:5 54:13,20 57:14 75:25 176:17 176:21
actual 18:13 59:22 70:9 140:10
add 26:11,14
addition 6:20 41:2 58:21 92:15 148:16 150:18
additional 41:7,15 41:18 58:22 87:22 88:1,8,17 109:11 126:11,16,20,22 127:5,14,17,22 128:16 131:8 135:10 177:16 183:19 189:25
addressing 106:14 106:17
adds 151:6
adhere 74:23
adhesion 145:19 146:3 149:2 178:14 180:13,22 184:5,15
adhesive 145:10,20 146:8,12 150:3
adjacent 74:9 157:20
adjust 160:5
adjusting 148:19 149:5,11,16,21 151:3 156:6,15,21 162:15,18 163:10 170:22,23 171:11 171:14,18 172:2,12
adjustment 148:19 148:20 149:16 150:20 151:6 157:9 157:10,11,12,16,17 157:20,23,24 158:7 159:8,11 160:4,8 163:24 164:3,11,13 164:17,23 170:20 171:7 178:9 179:4 180:7,8 182:8,9,10
admit 98:13
advantage 59:9,10 93:14 94:9,21 95:11 95:22,23 96:5 125:17
advantageous 59:8
advantages 91:17 95:8,19 97:20,25 98:2,4 125:21
affect 145:11
affix 191:14
aforementioned 36:6
aforesaid 191:11 192:13
agent 52:1
ago 164:17
agree 20:7 21:1,3 23:23 24:4 27:19 30:25 32:5 35:18 36:22 38:3 45:23 46:16 51:12,14 54:1 54:24 56:3,7,15 57:20 61:19 71:19

71:21 73:13,15 74:25 75:4,14,16 76:20 77:14,19 81:19 86:9,13 94:19 100:18 101:18 103:12 106:13 107:5 110:8,11 111:6 112:10 115:12 116:3,5 121:2 129:1 130:14 130:18,20 132:5 133:17 139:14 141:22 143:11,14 143:18,22 146:11 146:13,14 147:7,11 154:1,6,8 156:4 157:18 163:14 165:17,19,24 168:11,14 170:10 170:13,20 171:8 172:2,18,19 174:5 187:25 189:9
agreed 132:24
ahead 40:8 62:12 99:22 147:25
air 112:20
albeit 8:6
allowing 184:23
alternate 36:9 169:13
alternative 95:24
alternatively 36:19 66:15
aluminum 55:13
amount 125:22
analogous 168:15
analyze 103:8,21
analyzed 97:13 103:15
angle 29:25
anisotropic 118:21 139:4,11,19 141:6 142:14
ann 2:21 4:2
annotations 190:2
answer 12:6 42:21 52:13 54:2 62:11 89:9,15,21,24 90:17 110:10 113:5 114:19 133:14 144:19 169:7 174:4 181:24
answer's 114:1
answered 110:9
answers 52:15
anticipate 20:24
apart 146:8
apologize 92:7 106:11 182:16
apparatus 156:20
apparent 101:1
appeal 1:1 4:12 191:1
appear 6:7 7:23 8:8 11:1 34:18 52:12,25 64:13 98:23 192:21 192:25
appearances 2:1
appeared 2:6,17 91:9 192:8
appears 7:23 33:14 69:18 72:25 73:7 74:8 140:25 159:23 159:25 191:15,16
appendices 6:8
appendix 6:10
applicable 1:14
applications 58:6
applied 10:21 12:20 14:1 15:16 22:6 43:5 64:4 66:12,16 82:24 163:7
applies 10:24 75:25 76:18 175:25 177:5 188:17
apply 15:13 45:9 175:8 176:20
applying 30:11 32:18 131:9 175:23
appreciate 38:2 167:21
approach 59:12
appropriate 47:24 136:23
approximately 4:4 132:20 139:13
area 75:2,3 117:23 118:3 140:5,9,10 141:10,21,22 142:10,11,16,18,23 143:9,12,19,25 145:16 152:13 154:15 166:5 168:17
areas 170:16
argument 94:17
arranged 167:5
arrangement 16:24
arrangements 192:22
array 49:4,22 174:5 174:6,12,16 175:8 175:23 176:2,10,12
arrow 135:10
art 11:5,23 20:11 21:18 23:5 33:11 40:16 44:4 45:24 46:2,17 47:2 56:23 62:2 63:4 66:3 85:3 86:10,24 87:6,20 88:1 92:19 93:2 95:19 96:8,25 97:15 97:19,23 99:15 100:24 101:19,22 106:24 109:19 112:3 114:7,8,16,20 114:20 116:12,24 117:22 120:6 121:20 123:4,10 128:16 129:2,21 135:15 137:19 138:4 144:2,14 148:11,24,25 150:5 150:16,22 151:2,13 151:17 155:1,23 161:9 162:1 165:13 176:9 188:2,19 189:2,11
article 57:2,19 58:19
articulate 8:17
artisan 8:20
artwork 155:9
aside 8:6 50:14 111:25
asked 47:13 81:18 124:24 185:18
asking 10:5,14,15 11:20 15:17 21:1 22:20 30:13 32:20 52:3 67:21 87:25 92:1 120:17 137:6,8
aspect 15:1 94:14
aspects 56:19 60:6
assembly 25:6
asserts 83:15 95:7
assume 23:1,1 26:2 64:17,20,23 65:9,25 112:5,9,13 118:11 122:3,4,11,12,14 143:7,10,15 188:12
assumed 136:22
assuming 66:24
assumption 65:9,16 143:13
assumptions 66:24 67:25 68:7 143:23
attached 7:21 8:4
attempt 82:17
attorney 193:4
attorneys 4:14
authors 53:20
auxiliary 12:16,17 27:17,21,25 170:24 171:4 178:21,22 179:6 181:25
available 140:4 141:21 142:23 143:9 144:3

average 33:14,16
avoid 127:5
avoided 131:14
avoiding 126:22
aware 129:2,6

b

b 3:16 6:10 64:25 65:4,15 66:19,20,23 67:2,5,8,14,16,19 68:3,6,9 95:5 159:2 159:22,23
back 60:20 79:19 88:25 90:4 91:11 105:8 153:19 162:12 170:19 172:21 177:12 185:15 186:20
background 5:12
backplane 54:25 55:4,20 56:3,8 57:1 57:4
backplanes 57:7 60:1
backwards 19:24
based 23:3 29:24 44:12 60:1 71:12 72:14 107:19 118:12 143:3 154:12 176:3
basing 72:12 150:7
bearing 100:21
began 91:9
beginning 8:23 45:11 60:21 105:3 117:19,21 153:20 172:9
begins 29:11 80:10 148:6
behalf 2:6,17 4:19 4:23
behavior 146:5
belief 72:1
believe 9:4 31:6 71:24 78:21 112:14 154:10 165:9
beneath 114:23
benefit 46:13
best 40:8 90:20 178:12
better 61:21,22 127:5 189:2,12
beyond 51:5 52:8 85:22 86:1 89:20 97:23 113:11,21,21 114:21,24 118:25 119:2 179:13
bias 33:13
big 63:20 140:8 168:8
bigger 85:2,8
bit 37:5 98:10 113:3
black 31:7 79:12 85:9 87:9
blackwell 2:13 4:23
blocks 168:8
blowup 25:17
blue 58:17 78:25 80:24,25 81:2 85:8 86:18,20,21,22 87:8 87:9 88:12 100:13
board 1:1 4:12 166:24 167:2,4,10 191:1
boards 167:17,17
bond 188:21 189:2 189:11
border 43:6
bottom 8:22 31:1,2 47:16 70:13 71:18 71:21 73:12,15 81:20,22 98:16 122:2,7,10,12,21 145:15 151:24 153:9 166:15 167:3 167:5,10,10,19,23 168:21 169:3 170:14 174:19
boulder 57:5,21 58:1,21
bound 145:6
boundary 72:22
box 70:14 168:2
break 60:15 103:24 105:18 153:14 177:7
breaks 105:12,15
brief 106:2
briefly 167:16
bring 46:17
broke 153:24
broken 115:3
brothers 173:1
brought 64:7
build 19:24
building 16:4 20:24
built 15:9
butler 2:2

c

c 5:10 65:24 66:10 66:19,20,23 67:1,2 67:3,4,5,8,14,16,19 68:8
c3 134:4
ca 2:4
call 47:24 55:16 62:9 64:21 65:23 69:11,21 78:2 123:24 125:12 140:17 165:20 169:12
called 1:12 48:22 49:3 51:6 52:1 58:20 73:9,24 74:12 138:2 166:5 174:5 175:20
calling 121:14
calls 43:19 44:1 45:17 47:22 49:22 70:24 79:25 121:19 122:23 130:16 157:11 170:21
capabilities 59:25
capacitive 84:7
capacitor 86:12
capacitors 84:4,6,7 84:16,23 86:7 87:21 88:3,16
caption 4:8
carefully 61:14
carrier 138:12,16,22 140:19 143:4
case 4:8,9 16:1,3 22:5 40:16 43:14 44:24 52:3 59:13 62:22 74:2 96:11 97:24 103:7 113:20 123:16 128:21 164:9 179:10
cases 42:18 156:2
catastrophic 131:13
cause 104:4
causing 86:7
centimeter 145:3
centimeters 144:25 145:3
central 108:2 148:17 151:25
certain 10:9 139:25 155:10
certainly 7:6 8:9 9:17,18 14:16,25 15:13 17:14 20:25 23:18 25:4 33:9 34:14 36:16 39:16 39:22 41:25 44:10 46:5,20 47:4 50:10 53:7 61:8,8,12,15 63:8,12 71:4 76:7 77:8 90:6 92:8 99:12 108:15 114:11,24 116:14 121:5,16 122:18 132:18 133:11 137:15 141:19 145:13 161:20 167:7 176:19 178:3 180:7 186:11

certainty 91:8
certificate 192:1,24
certified 192:1,3
certify 192:4
cetera 119:25
chance 9:15
change 153:13
changing 152:24
characterization 75:5 78:14
characterize 56:23 82:19 126:17
characterized 116:17 136:25 169:10
charge 96:17
check 25:17 177:7
chicago 1:16 2:10,15 4:7 192:6
choice 95:14,15
chosen 143:5
circuit 97:2 138:17 138:21 139:16,25 141:20 142:22 143:16 167:17,17 171:25 181:2,15 185:8
circuits 54:14 92:12 116:16
circumstances 76:19
civil 192:20
cj 86:12
claim 9:14,16,21,24 9:25,25 10:4,6,12 10:17,19,21,23,24 11:2,5,14,17,19,22 12:1,3,4,14 13:6,10 13:16,24,24 14:10 14:16 15:2,3,9,13 15:21 16:21 18:14 18:19 19:2,8 20:4,6 20:7,20 21:2,3,16 21:22,24 22:13,25 23:4,12,14,20,25 24:5,6,6,10,10 25:7 25:8,15,23 26:18 27:1,8,22,24 28:1,2 28:5,6,10,15 50:11 75:20,24,25 76:6,10 76:17,18,20 77:14 94:9,12,16,17 99:8 99:11 100:19,21 101:17,17 102:3,6 102:10,13,18 103:3 126:11 158:20,21 158:22 160:11,12 160:16,17,25 161:2 161:12 162:3 174:9 174:11 175:2,4,7,11 176:16,23,25 177:4 177:5 178:18,21,22 179:16 180:5,11,21 181:10,20 182:5,15 182:15,21,22 183:7 183:16 184:3,11 185:2,25 186:1,2,9 186:9,13,14 187:2,6 187:8,13,17
claims 10:10 20:13 25:2 50:11 76:9,13 94:12 99:8 186:3
clarify 62:11 90:1 106:16 126:12 172:15
clean 110:10
clear 9:10 16:15 38:19 53:10 69:19 71:1 77:6,20 85:14 87:3 88:5 96:3 98:5 99:18 107:13,25 109:1 112:18,23 117:22 118:18 134:10 135:24,25 137:1 173:22 174:2 184:21 187:17
clearly 12:7 20:17 38:12 72:17 110:17 113:15 135:19 140:21 145:4 151:3 151:24 164:8 166:2
clock 89:5
close 145:2
clumsy 76:16
collimate 59:7
collimated 59:15
collimation 59:17
color 26:12 79:1 82:17 142:3
colorized 9:10
column 29:5 31:14 31:14 32:3 35:21 36:5 38:9 39:10,11 68:23 73:25 93:12 93:18,24 94:7,8,20 162:22 165:11 166:25 172:8 174:19 175:8 176:20
columns 90:16 94:10,11
combination 39:15 72:21
come 15:11 17:4,13 18:6 44:11 54:22 90:10,13 91:1 99:16 125:14
comes 10:11 36:17 45:1 50:15 80:16 108:4,5 109:12 112:20 173:9,10
coming 9:2 19:15 45:3 51:16 80:5 147:16
comment 42:14 43:7 62:10 96:5 98:8 99:19
commenting 15:20 42:25 45:17 85:24 97:5
comments 105:19 154:19
commercial 58:2 60:8 97:9,12
common 14:25 31:15 58:16 62:14 62:18 120:14 128:16 137:15 138:5,8 155:21 167:9
commonly 49:23 116:8 130:11 154:8
company 57:5 58:20 58:22,25 59:4 60:1 60:2,3,4
compared 42:10,12 95:22,23 127:1,2 148:11,24 150:4,9 151:1,16
comparing 96:4 154:25
comparison 150:15 154:21,22
compensate 149:6 149:17
complement 145:14
complete 7:20
completed 102:5
completely 81:10 163:12
complicated 30:20 32:19 127:23 128:3
compound 186:21
comprehensive 11:21
compromise 145:18
concept 92:4
concise 111:11
concluded 190:11
concludes 189:17
conclusion 44:12 153:2
conduct 160:13
conducting 71:2 73:10 96:14 102:16 118:21 139:4,11,19 141:6 142:14
conductive 14:2,2,5 14:11,15 15:6,11,14

15:19,24 16:4,9,14 16:17 17:3,5,7,8,12 17:18,21,25 18:3,5 18:7,9,20,21,23,25 19:5,13,15,16,18,20 20:1,2 21:6,23 22:1 22:5 23:6,9,11 24:13,17,18,22 25:24 26:3,9 27:2 27:17,21 28:1,8,11 34:8 45:22 47:9 69:12,25 73:8 95:9 96:2,12 102:15 139:15 140:22 158:16,20,24,25 159:6,8,16 160:14 160:18,25 162:3 180:25 181:4,5,18 183:1,1,10,13,17,18 183:20,21,24 184:19,20 185:7,9 189:3
conductor 37:11 43:12,21,22 50:13 74:16 95:13 107:14 108:5 124:8 130:11 136:10,14 161:4
conductors 40:13 45:11 46:9 84:21 96:18 141:7 160:1,4 186:3
confidence 90:12
configuration 137:16,20 138:5
configured 133:11
confirm 6:5
conforms 100:18
confused 48:12
connect 31:15 41:7 42:2 46:7 76:4 97:1 123:18 124:20,25 125:6 126:3,4,5 136:24 137:7,12 139:17 141:3 161:16 167:8 184:21,23 188:20
connected 12:10 31:18 34:7 39:3 43:25 44:5,20,21 45:10 73:7 84:11,14 84:16,16 118:7 124:4 132:21 168:25 186:3
connecting 46:6 68:25 70:24 72:13 76:23 80:1,2 136:22 137:3,8 138:6 141:6 142:17 172:25
connection 12:16 21:8 24:17 28:9 34:1 40:24 41:16,22 45:1 72:7,8,14 85:8 124:13,14 129:4,12 137:2 157:19,21,25 158:3,12 159:10 160:2 161:5,14 164:7,11,15,22 178:16,25 179:2,7 179:11,19,20 181:3 181:12,17 182:1 185:3 186:6
connections 34:8 45:3 72:6 97:21 160:2 166:11 188:10
connectors 70:23
connects 32:4 121:3 166:19
consequence 107:6 125:22 151:8
conserve 125:18
consider 7:5,9,13,18 9:20 49:5,13,20 50:1 63:15,18 90:3 93:1 94:7 108:12 121:10
considerations 146:10
considered 106:5 144:15
considering 83:17
consistent 66:14 67:2 70:6
consisting 191:13
constant 151:11
constitutes 192:12
constituting 36:13
constraints 143:4 145:23 147:2 189:7
contact 44:9,17 46:11 47:8 50:22 69:2,9 71:14,19,25 73:1,13,16,22 77:24 78:6,21 79:6,7,13 79:17 81:21,23 85:1 102:14,16 106:15 106:22 124:6 125:11,24 126:14 127:20,24 128:17 128:18 129:3,11,18 139:20 140:5,9,10 140:10 141:10,21 142:9,10,11,19,20 143:17 180:17 181:1,3,16 182:2 183:3 184:8 185:9
contacting 73:4,6 87:9 173:4
contacts 76:1 102:11 125:18,23 173:8
contain 61:8
context 13:5 15:1 49:19 90:8 116:18 126:10 141:15
contexts 131:12
continue 60:23 81:13 105:5 107:10 112:6,15 153:22 177:13 185:16
continued 112:5
continues 81:14
continuous 133:3,6 133:12 135:20
contrast 162:21
contributions 58:24
convenience 149:25
conventional 56:8 56:16
conversations 105:25
convey 92:3 155:16
copies 7:24 8:2,7 100:2,4
copper 140:20
copy 6:4 26:6 31:7 78:23 99:25
copying 8:5
corner 31:1,3
corp 4:8
corporation 1:3 191:3
correct 9:3 14:8 24:24 25:12 29:9,24 30:16 31:4,9 35:2 39:4 45:16 46:19,23 48:15 56:10,12 63:13 71:6,20 72:9 78:3,4,13 80:14 82:13 83:14 84:1 91:20 93:15 95:4 96:22 101:25 102:24 103:4,6,19 106:6 111:14,15 114:21,25 115:10 116:10 117:7,12 118:3 119:22 120:3 120:4 121:3 126:6 126:22 129:13 130:24 134:24 135:2,5 138:13 140:1 141:12 142:24 153:11 156:16,25 158:8 160:18 166:16 167:15 168:22 169:2 170:17 171:13,23 172:1,24 173:5 174:1 175:9

175:11,15,18,24 176:5 188:10 189:4 189:13
corrections 191:16
correspond 27:21 28:6 66:25 67:16 70:5 75:10,15,23 171:15 174:16
corresponding 20:25 75:12 132:19
correspondingly 107:19
corresponds 28:4,14 74:10 79:22 80:10 121:6,12 184:22
corrosion 106:24 107:12 112:15,19 112:20 113:15,16 113:20 115:13,24
counsel 7:13,18 193:2,4
counter 12:11,13 31:20 34:2,12 69:3 69:5,6 70:18 71:14 71:15 72:4,18,23 73:24,25 74:2,3 76:2,6 78:15 109:13 172:24 173:1,4,13 173:15,21,23 174:19,24 175:2,14 176:11,18 177:3
couple 133:21 147:15 187:21 189:24
course 10:21 17:22 41:23 42:21 47:21 51:3,23 52:8,18 53:5 55:12 62:23 64:12 70:13 76:3 81:15 94:11 95:14 97:16 98:24 101:16 102:3 108:22 109:24 110:17,18 110:22 112:10 118:10 121:18 125:3 130:7 138:13 140:2 142:7 144:4,5 148:22,25 154:16 156:2 157:21 159:2 160:19 169:21 170:4 175:19
court 4:16
cover 10:7 62:20 64:9 107:19 113:24 169:24
coverage 108:3,7,18 109:3,12 112:19 113:2
coverages 108:4
covered 103:3 111:8 115:8,9,11 131:1 186:9 187:2,6 188:7
covering 107:15,23 110:12,25 111:2,3,8
covers 10:10 170:2
create 62:14 63:1,6 68:4 85:4,7 87:13 129:15 148:23 160:6
created 61:25 64:19 66:13
creating 20:18
critical 35:5
cross 47:21 53:4 77:5,10,19 85:24 100:9,10 101:2 108:20 113:9 115:1 115:4 159:22,22 168:19
crossed 100:17,18 100:21
crr 1:15 193:12
crystal 3:13 12:7,12 33:14 53:18 55:21 55:25 56:9,16,23 58:3 74:9,20 81:3 131:6,10,18 156:19 163:6 175:13,17,20
crystalline 55:7 56:1
csr 1:15 193:12,12
curious 53:25
cv 7:21,22 8:6

d

d 2:13 3:1 66:15,25 67:7,14,15
darker 142:4,6,7
dashed 70:16,21 78:16
data 35:20,24 36:12 36:18,24 37:11,15 37:21 38:6,11,23 39:13 41:21 43:3 45:13 48:2,5,15,16 48:17 124:20 125:1 125:3,4,25 132:25 133:2,10,23 134:1 137:4,7,9 165:10,13 165:20,24 166:7,11 166:12,17,20 167:13,22 169:8 171:16
date 4:3 104:5
day 1:16 181:23 182:19 191:21 192:5 193:8
days 192:22
dc 33:13
dealing 5:22 57:18
deals 54:25
dealt 54:13
decided 7:2,5,9 189:25
declaration 3:15,16 3:21 5:23 6:6,7,8,11 6:14,17,19,25 7:22 8:11 9:11 24:8 25:11 28:23 31:5 61:1,6 65:18 81:25 82:11,16 83:13 89:20 100:3,5 106:6 139:23 141:25 142:5 147:14,19
decreasing 149:4,15 152:5
define 30:19,22 32:10 42:13 72:22 108:9 146:24 147:2
defined 66:24
defining 146:19
definition 37:15
delay 92:7
depend 11:13 114:17 149:10
depending 36:6
depends 21:9 49:9 49:12,16,19 63:19 72:21 85:4 88:18 90:7 108:9 116:18 128:3,11 131:7 144:24 146:18
depicted 129:3
deponent 191:10 192:7,20
deposit 13:8 14:7 21:19 102:8,24
deposited 11:8 14:21 16:20 19:16 19:22 21:6,7 22:2 23:7,8,9 24:14,15 24:19,20,23 41:18 41:21 48:5,17 51:19 62:16 63:5 64:14,18 65:10 66:11,17 103:9 121:24 159:9
depositing 11:25 62:21 63:25
deposition 1:11 3:9 4:5 5:13,18 11:18 14:15 19:20 22:15 22:24 23:12,15,24 24:2 35:24 37:10 47:23 60:22 62:24 64:8,11 70:4 82:5 83:10 96:19 99:16 101:9 103:4 104:3 105:4,15,16,20 153:21 189:18

191:11,13 192:14 192:15,18,18,21,23
describe 13:15 20:9 24:5 39:16 52:20 80:4 84:23 155:10 188:9
described 23:17 39:19 57:10 75:23 76:8 126:13 172:3 177:24,25
describes 13:1 29:4 111:22
describing 17:19 40:7
description 35:16 43:17 74:8 94:22 138:1
descriptions 13:14
design 35:4 114:18 143:1,1 149:11
designated 107:24
designed 33:13 57:11 143:5 155:10
designs 171:10
desired 34:11
determine 100:24 101:9 102:19 114:16 186:8,13 187:2,12,16
determined 143:3
development 60:7
device 12:8 112:22 174:16 175:21
diagonal 32:7,17,22
diagonally 30:8 173:10
dictates 181:7
dielectric 48:22 50:2 50:16 51:17
difference 19:8 103:9,16,19 120:1 121:14 157:15 160:5 168:18 179:24
different 10:25 20:19 21:15 40:23 52:15 66:2 67:2 69:22 70:1,5,9,9,11 77:10 79:24 81:10 89:4 146:8 159:4
differently 16:13 82:24 137:25
difficult 38:1 140:12
dimension 29:22 30:4,14 32:22 88:19 88:20,23 139:25
dimensional 88:22
dimensions 29:23 88:21 140:3 153:5,5 153:11 154:12,14 155:2
direct 15:5 23:14 44:9 47:8 50:22 73:1,21 78:6 102:14 139:20 142:19 180:16 184:8
directed 13:7 75:1 76:21 77:15 106:18 107:3
directing 15:3 23:12
direction 11:24 15:8 40:5 46:13 92:25 130:8 131:12 135:11
directly 81:3 173:24 184:23 193:5
directs 23:15
disagree 71:9 72:11 136:12
disclose 35:22 37:19 74:11 92:22 109:16
disclosed 21:4 23:6 24:11 25:2,6,14 29:3 30:21 37:13 38:13 41:1 43:4 52:20 71:4,8 82:25 93:5 107:1,18 109:15 112:11 114:12 122:19 124:18 125:1 134:11 135:19 138:23 148:11 152:11 154:16 167:6 172:20 173:18 185:21
discloses 31:13 34:5 36:22 38:4 48:6 93:14 97:20 98:6,7 109:21 152:9 170:20,22
disclosing 38:17
disclosure 35:16 38:8 51:21 72:2 83:5 93:11 107:6,7 107:13,20 111:24 112:17 113:6 119:16 121:25 125:5 136:1 137:23 148:18 150:9
disclosures 98:3
discuss 82:23 105:17,22
discussed 39:9 57:2 61:4 83:25 105:11 105:14 109:18 125:17 154:20 156:24 157:1
discusses 108:1 172:10 188:19
discussing 61:17 67:18 95:3 107:22 189:23
discussion 47:11 54:7 97:25 98:13 152:14 185:23 188:23,24 189:7
display 12:7 29:13 32:8,17 34:6 45:2 53:6 59:12 64:7 69:10 70:17 72:24 75:6 77:8 81:15,17 89:5,13,14 90:4,7 90:15,22 97:9,12,14 103:7,14,18 108:16 108:21 109:13 110:11,16 111:9,13 111:22,25 113:23 113:25 114:4,10,18 116:1 117:18,23 118:3 121:3 124:11 125:10 129:16 131:25 132:1,3,7,12 132:17 133:3,3,13 134:8 136:6,9,12,16 136:18 143:20 144:24 146:7 156:19 159:24 161:15,17 162:8,20 162:21,23 163:4,15 163:16,19 166:4,5 166:14 168:12,17 173:11 175:21 176:4 178:5
displays 14:24 33:13 54:14 58:6 88:25 90:19 145:1 146:4 154:17
distance 32:6,11,13
distinctive 155:11 156:5
distortion 35:10,11
divide 41:25
divided 45:12
document 6:1 9:5 28:19 53:14 83:21 106:8 144:11
documents 82:5
doing 45:24 148:22 151:18
domestically 60:8
dopings 55:13
double 37:20 38:4 39:8 42:8,12 47:18 108:3,7,18 109:2 112:18 113:2 115:23
dr 4:13 60:22 83:5 105:4 153:21 189:18

drain 125:2 130:9
draw 79:8,13 80:23 82:17 99:18 118:9
drawing 82:10 155:17
drawn 154:2,6,11 154:13 155:5,8
driver 166:21,24 167:2,4,10,16,17 168:7
drivers 169:1
driving 54:14 92:12
duly 5:2 191:10 192:10
dye 59:23

e

e 3:1 5:10 105:1,1 192:19
earlier 42:7 71:11 136:13 185:18
easier 68:21 88:11
easiest 42:23 100:6
edge 64:6 120:14 133:8,9 163:15,19
edward 2:13 4:22
edward.manzo 2:16
effect 131:18 153:8
efficiently 59:15
effort 145:14
eight 34:7 70:20 72:5 75:8 78:18
either 8:5 15:5 22:7 33:18 40:17 49:18 68:8 85:14 105:12 118:1 119:23 120:3
electric 131:7
electrical 21:8 24:16 46:10 92:8 94:13 106:21 124:6 126:14 142:20 179:20 181:3,16 182:2 183:3 185:8
electrically 12:9 84:10 133:20,23 170:24 171:17,19 171:21,24 183:20
electrode 31:21 34:2 34:12 69:5,6,8,18 69:18 70:18 71:14 71:15 72:5,23 73:24 74:1,2,3 76:5,6 78:15 84:10,11,13 84:13 85:1,2,18,19 110:24 122:24,25 123:17 130:2,4,10 130:15,17,19 131:9 131:21 132:19 134:23 137:12
electrodes 12:9 96:11 130:10 132:6 132:12 174:15 176:4
electron 103:20
electronically 68:21
electronics 176:18
element 12:23 14:6 16:7,13 17:6,24 19:4,5,6,12 26:13 28:7,14 32:19 41:3 45:3 48:21 49:3 51:4,25 52:1,2,7,8 52:25,25 70:5 72:18 73:8,19 75:6,10,22 76:22,23 77:7,20,24 78:7,19 81:10 101:10 103:10 111:2,3 113:10,10 114:24 117:6 119:6 121:6 136:10,24,24 137:24 138:1 139:10 140:18 141:1,8 157:15 174:3,7
elements 12:23 13:2 18:2,19 20:5 50:20 62:21 109:12 119:24 120:10 130:8 155:17,20,22 155:24 157:1 158:10 159:13 166:10 183:4,7,21 184:11,18
eliminate 87:21 88:2 88:15
emblematic 163:2
embodiment 10:3,7 29:6 36:9 150:21 156:20 172:13,14
embodiments 150:19
embody 9:21
employee 193:4
employees 60:5
enable 21:7 24:16 129:4
enabling 129:12
ends 45:10 61:15 74:21 79:23 119:9
energy 1:6 4:9 191:6
engineering 155:17
enters 114:10
entire 78:16 111:1 134:9 144:5 170:14
entirely 14:20
entitled 104:4
enumerate 53:9
environment 109:4
equal 148:23,25 162:19
equally 146:2
equivalent 27:17,19
error 7:25,25
escuti 1:12 3:2,15,16 3:21 4:13 5:1,11 60:22 105:4 153:21 189:18 191:9,18 192:7,9
especially 99:8
essentially 165:16
established 146:16
estimate 144:23
et 119:25
etch 86:10,14,25 87:6 99:1 101:14,24 102:24
etched 62:17,17 63:6 85:6 86:19 88:13 98:25
etching 65:14 103:4
evenness 153:9
event 143:25
evidence 192:25
exactly 24:4 35:22 40:17 54:17 55:1 69:1 112:18 143:6 150:11
examination 1:13 5:4 105:6 177:18 187:23
examined 3:3 5:2
example 6:23 10:18 11:17 14:23 21:21 22:4 23:18 31:17 34:22 40:25 41:3,9 41:17,19,23 42:24 42:25 43:5 44:25 45:2,9 47:10 51:9 52:22 56:5,10 63:9 64:3 65:14,23 66:10 70:2 77:22 83:14 86:15 90:19,20 94:19 95:3,5 102:12 107:2,9 108:12 114:2,22 115:18 119:3 122:20 125:4 126:3,8 138:24 140:6 141:5 145:14 147:5 149:1 154:24 154:25 161:20 163:1,16 165:11 166:25 169:18 170:13 185:19 188:6 189:8
examples 40:16 42:8 53:2 90:18 98:2 150:19
exclude 43:18 45:15
excluded 43:17

excuse 83:2
exhibit 3:9 6:1,8 9:5 28:19 53:14,17 82:3 82:6 83:1,21,24 100:8 106:8 144:11 190:3,6
exhibits 3:7 6:9 189:24
existing 41:15
exists 66:4
exotic 62:5
expanded 70:14
expansion 168:1
expect 14:13 19:24 118:19,24 119:1 134:18 137:18 155:5 168:24
experience 62:7
expert 127:19
expires 193:13
explain 36:10
explained 84:3 151:19,22,23
explaining 61:7
explicit 76:5,17 94:22 95:10 134:14 188:24
explicitly 68:1 69:5 82:21 83:15 92:20 94:14 99:9
explored 15:1
exposed 106:14 109:4 142:9
express 19:9 34:20 169:14
expressed 6:19
expressing 25:5
expressly 123:1 124:18,22 180:25
extend 41:4 74:17 79:25 80:22 107:10 113:14,16 118:25 119:1,8 131:20 132:7,13 133:15 135:15,20 136:15 162:7 164:4,5,19 168:15 169:9 180:9
extended 112:24 113:1,21 135:8
extending 41:2 73:19 113:23 114:21 134:17,19 135:9 182:11
extends 29:12 52:8 69:3 74:19 75:2 77:7,9,21 78:8 81:6 114:23 134:7 135:13 139:4
extensive 54:7
extent 59:21,23 94:23 151:23
external 12:16 28:9 65:11 97:21 157:19 157:21,25 158:3,12 158:14 159:10 160:1,2,3 164:6,11 164:15,22 178:24 179:2,7 181:3,17 182:1
extra 87:18 110:5 125:18,23 127:6,6 128:9
eye 58:6

f

f 105:1
fabricate 20:12,13 59:24 60:1
fabricated 8:22 19:11 20:10 57:1,12
fabricating 58:15 59:22
fabrication 9:1 18:13 20:18 21:13 75:1 83:16 101:10 112:21 113:19
facing 12:11 76:2 174:20 177:3
fact 92:23 93:18 176:3 189:1
factor 148:13
factors 146:4
failure 192:25
fair 9:19 35:15
fairly 59:15 90:21 163:2
familiar 97:19 123:9
far 34:23 52:8 80:22 103:5 113:1 119:8 136:21 147:18
fashion 135:20
fax 2:4,10,15
feasible 99:5
features 10:1 155:11 155:11 156:5
fed 166:14 168:12
field 46:23 47:3 131:7
fifth 24:21
fig 3:14,16,18 9:4,11 10:1,3,10 24:14,15 24:19,20,22 25:16 26:2,6 27:4,12,20 28:7 29:1,4,11 31:10,10,11 40:25 45:2 47:6,9 48:4 49:13,20 50:9,14,21 52:4,6,12,24 59:1 66:10,25 67:1,3,4,7 67:14,15 68:12 69:15,19,19,25 70:10,12,12,13,14 71:1,8,8,13,16,17,18 72:2,15,17,20,25 73:4,12,13,15,20,23 74:18 75:5,11,12,13 75:14,17,18 76:22 77:1,5,7,12,16,18,20 77:21,22 78:3,4,9 78:16,20 79:24,24 81:19,22,24 82:17 82:21 91:14,17 92:12 95:2,3,5 98:9 99:25 100:3,4,7 102:22 107:2,9 108:14,20,22 109:9 109:24 110:2,15,20 110:22 111:1,18,25 114:2,12,22,23 115:1,25 117:5,9,15 118:1,2,9,10,12,16 118:17,18,20 119:8 119:10,12,25 120:1 120:3,21 121:6 122:19,21 124:1,2 127:21 129:3 134:4 134:6,15,22,25 135:4,7 136:11,22 136:23 137:7,13,20 138:6,6,14,21,25 139:3,9,12,15,18,22 141:5 147:21,21,22 147:23 148:7,12 149:3 150:7,9,9,15 150:15 151:1,2,2,6 151:10,10,10 154:24,24,25 155:1 155:3,5 156:4,14,18 159:2 160:15 161:13 162:13 163:1,12,21 164:9 165:3,4 166:2,6,7 166:15 167:3,5,11 167:12,14,19,23,25 168:1,2,3,3,5,13,15 169:4,4,15 170:9,13 170:16 171:14,18 172:23 173:19,22
figs 119:3,7 129:24 159:21 185:19
figure 30:15 47:15 47:17,19,20 71:18 73:20 85:5,12 99:20 99:21 101:2,7,8 102:23 103:1,5,11 103:13 115:15 153:8 155:20,21 156:1,22
figure's 9:2

figures 30:21 35:22 40:19 48:7 61:3,17 61:19,23 65:17,21 67:13 92:22 118:13 129:24 147:15,17 148:15 151:15 153:10,25 154:1,3,5 154:9,21,23 155:8 155:15 158:17,18 159:18,21 163:1,13
fill 80:23
filled 163:7
film 12:2,3,8,10,18 12:20 14:3,3 15:23 16:14 17:6,7,17,20 18:4,8,21,24 19:7 19:14,19,21 20:2 21:7 23:7,10,11 24:15,20,22 26:19 26:22 27:9 28:3,5 28:12,13,15 45:16 45:22 46:1,10 50:3 50:5,6,10,15 56:21 66:16 74:10,23 103:10 110:13 118:21 139:4,8,11 139:16,19 141:6,8 142:15 157:11,17 168:16 174:14 176:17 177:2 180:17,25 181:4,6 181:18 184:9,24 186:4,5
films 10:23 13:18 45:22 86:15 87:14
final 20:4 21:17 22:11 23:16,16 24:7 25:6 109:8
find 47:10 49:25 87:5 92:18 115:17 138:7 140:21 147:1 159:25 166:23 182:17
finding 69:2 74:7,12 76:14
fine 50:1 66:1 79:2 98:14 158:22 190:10
finished 22:17 62:12
first 5:2 10:11,18,20 11:1,6,24 12:1,2,17 12:19,19,21,25 13:4 13:6,13,17,21,25 14:1,3,5,11,14 15:6 15:11,14,14,19,19 15:23,24 16:4,9,13 16:14,17,19,19,24 17:3,5,6,6,12,13,17 17:18,20,21 18:3,4 18:4,6,11,17,19,20 18:21,24,25 19:5,6 19:10,13,16,19,21 20:2 21:5,22,23 22:1,5 23:6 24:13 24:13,14,17 25:24 26:2,9,19,21 27:16 27:21 28:1,3,5 35:19 40:12,20 41:17 44:18,25 47:22 50:2,4,6,8,10 50:12,25 51:1 62:16 65:9 66:10,16 99:16 101:3,13 123:9 125:13 146:5 148:10 157:23 158:3,15,19,23,25 159:7,16 160:13,17 160:24 161:4 162:2 164:23 172:14 174:12 175:10,20 176:25 177:3 182:25 184:20 186:4,4 191:9
flat 78:5
flexible 14:23 97:1 138:16,20 139:16 139:24 140:6,18,23 141:1,11,20 142:22 143:5,8,15 171:25 181:2,15 185:8
flip 33:18
focus 9:18
focused 107:8
foil 140:20
follow 18:1 23:19,24 127:10 175:7 187:22
followed 23:9,10
following 172:10 189:21
follows 5:3 21:5 24:12 25:3,7,11,14
forced 149:6,18
foregoing 191:12 192:11
form 10:8 11:9 13:9 17:9 22:19 26:4 29:16 30:1,17 32:9 33:2 35:13 37:1 41:22 42:3 55:22 57:13 62:2 64:2 65:13 76:25 77:17 79:25 81:7 84:18 85:10,20 87:10 88:4 91:2 101:3,4,12,13 102:9 112:8 117:13 118:14 120:9,20 124:16 125:10,19 127:8,25 130:5 132:10 133:4 135:3 137:10 141:1,13 143:21 153:2 155:13 156:7,17 159:7 161:11 162:4 163:17 170:25 172:4,6 183:15 186:10,17 187:3,14
format 89:13,16 90:1,4,7 96:11
formation 62:9 64:21
formats 89:14,18
formed 14:21 22:1 35:19,23 36:2,7,11 36:18,19,20,24 37:9 37:15 38:10,22,25 39:12,13 47:22 51:9 51:22 52:10 61:20 61:21 70:4 71:3 74:14 100:25 102:12 130:10 139:7 143:17 179:19
forming 6:18,24 20:6 35:20 36:2,8 36:12 38:22 40:13 52:11 62:3 63:24 64:24 65:2,24 110:23
forms 159:9
forth 11:19 61:11
foundation 8:23 11:12 33:4 35:14 66:6 91:3 97:3 115:14 127:9 128:1 128:19 146:17 155:12 171:2 172:7
four 170:3
fourth 24:19
fpc 97:22 106:15,21 118:16,20 119:6,24 178:16 181:12 184:21 185:4
frame 32:25 33:5,11 33:12,20,20,22,24 33:25 34:17 35:2 88:24 89:8
frequency 88:25 89:8
frequently 154:2,6
front 25:21 82:12
full 5:10 183:16
fully 24:25 52:20 192:23
function 13:16 14:22 34:4 70:25 76:12 133:20
further 3:5 87:24 112:16 177:14 187:19,23 189:15

189:16

g

gallium 58:8,14 59:20
gap 117:6,11,14 118:7 148:23,25 149:5,11,16,21 151:3 156:6,15,21 160:7 162:6,15,18 162:19 163:10 170:21,23 171:6 172:2,12 178:8 180:6 182:7 183:8 183:14
gate 48:22 50:2,16 51:16 121:12 122:2 122:7,8,12,21,23,24 123:6,8,10,13,17 130:1,2,3 137:12
general 34:10 56:25 128:8 133:24 138:18 143:23 146:12,13 147:7,11 151:9 154:5,7 188:5 189:5,14
generally 8:22 11:20 33:12 125:24 131:10,13 143:1 166:16 172:11
getting 59:23 62:23 68:18 165:15
gibson 2:3 3:4,5 4:19,19 5:5 6:3 9:7 10:13 11:10,16 13:19 17:23 22:22 26:7 28:21 29:20 30:5,24 32:12 33:7 35:17 37:4 53:12,16 56:2 60:24 64:16 66:7 77:3 78:1 79:2 79:9 81:11 82:2,8 83:19,23 84:24 85:16,20 86:2 87:17 88:10 90:2 91:10 97:6 101:11 102:20 103:23 105:7 106:10 112:12 115:20 117:16 118:23 120:16 121:1 124:19 126:1 127:13 128:6,22 130:13 132:15 133:7 135:6 137:17 141:17 143:24 144:13 146:20 147:4 148:3,5 153:13,23 155:18 156:10,23 161:18 162:9 163:20 171:5 172:17 177:6,14 179:8,22 180:14,23 181:13,22 182:24 183:15 184:6,13,17 185:5,10 186:10,17 186:20 187:3,14,21 187:24 189:15,23 190:9
give 11:21 29:23 52:15 90:18 101:8 144:23 146:14
given 135:16 146:15 179:25 192:12
glass 49:21,24 55:11 56:4,6,21 57:13 64:8 73:2
go 12:5 34:9 40:8 61:14 62:12 68:5 72:23 99:21 124:9 124:11,12 136:8,11 136:17,21 147:24 167:13,24 168:16 168:25 185:10
goes 13:17 36:10 37:19 39:2 45:5 69:15 74:5 75:6 80:11 103:5 112:4 112:16 139:11 143:2 145:14 161:14 172:15 180:9 181:15 182:11
going 5:13 6:4 9:8 13:8 14:7 15:8 17:4 18:6,7,8,22 21:5,19 22:11 23:5 29:21 44:4,5 60:16 80:17 82:2 91:4 92:24 93:19 103:25 111:7 113:11 117:18 118:3,6,6,24 119:1 119:8 120:7,19 121:21 124:12,14 124:25 126:21 127:20 132:5,7,8,11 132:13,16 134:8 135:7 136:5,7,8 137:9 138:21 139:25 141:3,10 153:15 166:3 167:22 168:11 169:5 174:24 175:2 175:16 177:9 185:12 190:2,5
goldeneye 58:20,23 59:4,19
good 5:6,9 35:8 68:20 69:24 74:22 116:7,12,17,19 132:3 147:10 188:6
gotten 20:20
gray 142:4
great 80:25
green 31:6,8 58:17
ground 12:6
guess 20:16 52:17 166:5

h

halfway 79:23 139:13
hand 6:4 9:8 79:19 135:18 168:12,25 193:8
happen 19:21 22:25 111:25 114:13 133:25
happened 7:25
happening 62:22
hard 40:5 91:4 96:4
harder 80:4
hatalis 83:5
hatch 100:9,10
hear 165:16
heard 20:8 33:8
height 160:5 179:24 179:25
held 4:5
hereof 193:6
hereto 193:5
hereunto 193:7
hertz 89:11
high 34:16,19 56:19 74:4 90:21 145:8
higher 131:11
highest 98:18
highlight 31:9
highlighted 147:20
highlighting 79:15
hold 96:17 166:10
holding 176:13
hole 126:5 127:20 127:24
holes 128:17 129:3 129:11
horizontal 98:18 130:7 170:14
hour 1:17 7:11
hours 7:10 165:22
husch 2:13 4:22
huschblackwell.co... 2:16
hypotenuse 29:22 30:6,11,12
hypotheses 87:15
hypothesis 83:5,6,7 85:13,23 87:23 88:8 88:17 143:14

i

idea 31:23 53:11 109:16 115:16
identical 136:12
identification 53:15 82:7 83:22
identified 12:23 42:19 51:9 54:9,10 54:12 57:5 70:1,15 92:9,17 118:22 137:25 156:22 165:6 167:16 172:23 180:8
identifies 36:9 78:17 117:22 183:23
identify 4:15 13:17 29:18 54:2 79:5,6 91:5 108:10 121:5 139:22 159:2
il 2:10,15
illinois 1:16 4:7 192:2,7
illustrate 31:5 36:4 37:8
illustrated 29:19 40:18 48:4 49:2 50:9,20 52:6 53:1 61:24 65:22 73:23 81:15 84:14 136:11 138:23 144:7 148:14 155:3,4 161:13 164:3,14,24 166:2,9 167:1,20 168:10
illustrates 113:9
illustrating 149:24 149:25 152:19
illustration 135:10
illustrations 113:7 152:10 153:7
image 35:11 162:20 162:21
imagine 35:8 40:25 41:12,25
imagined 154:18
immediately 74:9 74:21 130:6 166:11
impact 32:24 33:23
implement 19:2 39:21 40:5,11,23 53:11 93:23
implementation 41:13 44:22
implementations 39:18 55:2
implicit 76:7,10,15 94:23 185:20
imply 12:24
importance 107:22 108:1
important 35:1,4,6 58:17 59:16 146:4 168:18
improve 162:20
improved 93:25
improvement 92:19 93:2
improves 149:2
include 108:14 118:17 158:9 176:16
included 32:2 119:13
includes 61:16 78:15 125:2 176:25
including 58:6 109:13 130:9
inclusive 191:14
inconclusive 103:1 103:14
incorporated 58:23
incorrect 124:22
incorrectly 124:24
increase 144:2
independent 3:13 53:18 60:3
indicate 86:19
indicated 27:16
indicates 31:10
indicating 26:16,23 27:6,13 81:1 100:12 142:8
indirectly 180:24 193:6
indium 113:10
individual 133:19
industry 116:9 117:1 122:16,18 123:10
information 30:22 60:13 97:13 101:8 128:4,24 135:16
infringement 187:17
infringes 187:7,13
initial 146:8
initially 57:12
innolux 1:3 4:8 191:3
inside 41:14 108:21 110:15 113:17 116:1,1 125:9 129:16 161:16 170:4
instance 12:19 111:16,17
instructing 89:23
insulating 10:22 12:2,3,18,20 13:18 14:3,3 15:23 16:13 17:6,7,17,20 18:4,8 18:21,24 19:6,19,21 20:2 21:6 23:7,10 24:15,20 26:19,22 27:9 28:3,5,12,15 43:15 45:15,21 46:1 46:10,12 48:23,24 49:7 50:2,4,6,10,15 51:10,13,14,17,23 62:14,24 63:1,4,15 64:13 66:16 74:13 74:15,15 84:21 86:15 87:13 97:17 101:24,24 103:10 107:4 110:13 116:15 130:24 134:5 139:8 180:17 184:9,24 186:5 189:3,12
insulation 19:13 64:1,18
insulator 43:21 46:6 108:19 112:6,16 125:10 126:15 130:7 131:1
insulators 46:7 131:8
intention 8:9
inter 28:13 186:4
interchangeably 138:19 165:18
interested 193:5
interface 79:5,10,11
interfaces 103:22
interposed 12:18
interpret 11:18 33:11
interrupt 109:7
invention 29:7 108:2 151:25 153:8 156:21 177:24
inventions 152:4 177:25
inverse 14:17,19 15:22,25 16:3
inversion 33:1,6,11 33:12,22,24 34:1,17 35:2
invert 33:19
inverted 20:10,14 123:12
involve 125:3
involved 59:19 181:6
involves 39:17 62:19 106:19 178:7
involving 54:20

ipr 4:10
ipr2013-00068 1:5 191:5
irvine 2:4
isolated 133:18,20 133:23 134:1 170:24 171:17,19 171:21,24 183:20
issue 12:15 88:3,16 172:10
item 172:23
ito 55:11 65:19,22 65:24 66:10 68:14 68:15 69:4,6,12,20 71:3,6,12,12,14,20 71:24 72:8,13 73:4 73:14,16 74:4,24 77:24 81:21,23 82:23 95:8,11,13,19 95:25 96:5,9,13,25 97:8,15,20 98:9,15 98:19,22 99:14 101:3,12,14,23,25 103:9 110:22 111:2 112:6 115:22 139:20 142:9 173:4 173:9,16,20,23 174:1,6 184:24 189:12
ito's 66:17

j

j 1:11 3:2 5:1 191:9 191:18 192:7,9
james 5:10
japanese 60:9
jeffer 2:2
jmbm.com 2:5
johnson 2:8 4:6,22
joined 163:8

k

keep 47:25 67:9 152:16
keeping 41:1
kind 15:4 33:20 36:6 40:17 49:23 58:4 64:5 65:11 85:17 96:1 99:4 128:4 131:11 138:24 155:16
kinds 170:22
knew 29:22 30:6,14 102:7 103:3
know 8:14 14:23 40:3,8 46:21 49:15 57:16 58:1 59:19 79:16 82:22 86:10 86:14,24 87:12,13 87:20 88:24 89:12 90:15 93:7 95:7,19 97:24 99:4,15 102:6 102:22,23 103:2 110:6,7 120:5,6,19 126:10 127:11 128:23,24 131:2 135:17 136:7 142:2 144:17 174:18 175:16 186:7,12,25 187:11,16,18
knowledge 46:18 97:8,11
known 45:24 46:2,5 46:7 90:6 96:13,20 96:22,23 116:11,14 129:20,22 188:1,5 189:1,6,10
knows 86:14 120:12

l

l 1:14 98:11,12,16 99:2,10,14 192:2 193:12
lab 4:9 60:4
label 26:5,12 27:20
labeled 70:14,17,22 78:7 99:23 160:1 168:2 173:11
labels 29:10
laboratory 1:6 191:6
language 10:17 18:14 20:6 22:13 23:25 34:13 73:25 99:11 158:24 176:6 176:12,14
large 131:24 145:2
largely 54:21 96:15 111:15 118:20 119:25 169:20
larger 143:16 144:5 145:1 152:18 155:3
lasalle 1:15 2:9 4:7 192:6
lastly 66:13
late 3:12 53:17
lay 12:5
layer 14:8,21 22:12 28:13 33:15 36:14 36:23 37:3,7,10,14 37:20,20,21 38:4,5 38:6,12,18,21,24 39:8,9,12,13 42:6,8 42:11,12 43:4 46:3 46:12 47:9,18,19,23 47:24 48:15,19,21 48:23,25 49:2,5,7 49:11,14 50:2,8,23 51:1,13,15,17,23 52:2,6 62:15,16,24 63:1,5,16 64:1,13 64:18 65:10,19,19 65:22,24 68:1,4,14 68:17 69:4,12,15,25 71:2,6,24 72:3,8,14 73:4,14 74:9,13 78:9 79:15,16 80:7 80:10 81:21,23 82:24 95:9 96:2 97:17,20 98:10 101:3,4,13,13,14,15 101:23,24,25,25 102:16 106:21 107:4,14,15,17,18 107:21,22,23 108:1 108:2,18 109:3,10 110:1,13,17,22 112:1,7,24,25 114:9 114:9 115:22,23 116:2,2,7,13,25 118:6,10,12 119:1 121:13,13,16,19,24 122:9 123:24,25 124:2,7 125:11 126:14 127:21 129:3,17,18 130:19 130:20,24 131:7,18 134:5,16,23 135:1 139:21 142:8 157:9 157:13,16,23,24 159:6,9 160:18 163:24 164:11 170:20,22,23 171:14 173:4,9,9,20 174:1 180:8,8 182:8 182:10,10 183:10 183:13,17,18,20,24 184:19 185:9 186:4 189:3,4,12,12
layered 36:21 39:20 40:11,14 43:15,19 43:23 44:1,13,14,15 44:23 45:15,18 93:19
layering 111:8
layers 8:24 11:7,25 13:8,11 20:15,18,22 21:4 23:6,16 24:11 25:3,6,14 39:1,3 44:20 45:20,21,25 49:7,8 50:24 55:12 65:20 68:15 83:16 97:8 100:24 103:21 148:19,19,20 149:5 149:12,17,22 150:20 151:3,6 156:22 157:10,20 158:7,16,20 159:3,8 159:11,16 160:4,8

160:14,22,23,25 161:10 162:3,15,19 163:10 164:3,13,17 164:23 171:7,11,18 172:3,12 178:9
lcd 29:6 76:11 143:19 144:18 162:23 174:15 176:4
lcds 96:10
lead 148:21 151:4 171:19
learn 161:9
leave 165:4
leds 58:11,15 59:2,7 59:14,20,22
left 29:11,12 31:1 43:8 69:7,15 70:13 73:19 74:18 78:5 79:20 80:11,18 81:14 82:21 85:7 98:23,23 110:23 118:2,25 119:5,5,8 119:14 125:9 130:3 130:6 131:22 136:15 157:23
length 29:14,18 30:6 30:16,19,23 134:9
level 89:7
leverage 60:5
license 192:3 193:12
licensed 192:3
lifetime 146:5,7
lift 68:2
light 58:3 59:2,7,13 59:14,17
likewise 90:17
limit 10:14 20:21 42:21 121:25 144:7
limitation 12:25 14:11 15:18,21 16:18,21 17:2,17 21:22,25 27:24 28:2 28:6,10 101:17 102:12 175:10,12 175:18,19 178:23 178:24 180:5,16,20 181:1,6,14,20 182:9 183:3,12,17,19,22 185:7
limitations 12:5,15 15:9 19:2,8 24:11 102:11 141:15 159:1 160:16,19 175:5,7 176:20 177:1 178:20 179:1 179:15 180:11,21 181:10 182:5,22 184:3 185:2,24 186:1
limited 10:12 23:20 23:20,21 57:9 61:12 76:14 140:5,11 141:11 173:6 184:8
limiting 143:12,19 144:1
limits 20:20 21:2 24:6
line 12:16,17,17 14:2,2,5,12,16 15:6 15:12,14,19,24 16:4 16:9,14,17,19 17:3 17:5,7,8,12,18,21,25 18:3,5,7,9,20,21,23 18:25 19:5,13,15,16 19:18,21 20:1,2 21:6,23 22:1,5 23:7 23:9 24:13,18 25:24 26:3,9 27:2,17,22 28:1,8,11 29:5 30:7 34:19,22 35:19 36:18 38:6,10,24 39:1 40:12,14,23 41:14,20,24 42:16 42:16 43:1,4,5,6 48:2,3,6,15,16 53:5 68:23,24 70:3,16,21 78:16 79:11,12,13 86:12 93:12 102:15 112:5 121:11,15,17 121:18,21 122:3,13 122:13,22 123:1,5,7 123:15,18,19 124:21,21 125:25 132:25 133:2,11 134:7 135:7 136:5 136:13,20 137:1,4,7 137:9,13,14 138:5 157:25 158:3,25 160:2 165:11 170:24 171:4 172:9 174:19 178:21,22 178:25 179:2,6,7 181:4,17,25 182:1 183:1,1 184:20 185:7 188:4
lines 10:21 24:18 27:18,21 28:1,9 34:21 35:20,23,25 36:3,5,7,8,11,12,13 36:19,24 37:6,11,13 37:16,16,17,21,22 38:7,11,11,22,23 39:13,14 41:3,16,21 41:21 45:12,13,13 48:1,18 52:11,23 74:1 90:16,20 93:8 93:8,16,17,24 94:2 121:14,25 125:1,3,4 133:12,17,19,22,23 134:1 138:2 157:19 157:21 158:12 159:10 164:7,12,15 164:22 165:6,9,10 165:14,20,24 166:7 166:8,11,13,17,20 167:13,22 168:6,9 168:11,23,24 169:5 169:8,9,16,24 170:3 170:4,12 171:16 172:5,16 179:18 188:2
linked 13:12
liquid 3:13 12:7,11 33:14 53:18 58:3 74:9,20 81:3 131:6 131:10,18 156:19 163:6 175:13,16,20
list 6:21 7:19 25:8 32:3 66:2 90:11,25
listed 91:16,18 183:21
listen 45:19
lists 53:19
literally 64:5
little 37:5 70:20 98:10 100:20 142:15 145:16 151:12
llp 2:2,8,13
local 42:19
located 4:6 29:19 157:18 162:24 164:2,18 165:25
long 87:1 96:13 109:3 165:22,22 181:23 182:19
longer 32:7,15,21 86:12,23 109:10 113:3
look 6:5,10,22 8:10 9:13,15 13:24 15:23 17:24 18:2,19 20:12 24:8 25:16 27:14 28:16 29:1 43:21 46:25 47:2,6,14,14 60:25 61:18 63:11 68:12 69:24 75:20 91:11,14 92:5 103:17,21 107:9 115:6 117:3,9 119:21 121:8 123:21 124:9 129:23 136:3 138:9 139:3,9 144:9 147:13 149:1 157:3 157:4,4 158:4 162:12 163:21 165:1 166:6,23 169:15 172:21

173:19 174:8,9,12 186:20
looked 7:2,4,14,15 93:13,18 94:5 164:16
looking 7:8 15:2 18:14 21:14 22:11 22:17 49:20 58:8 63:2 65:17 68:23 75:19 102:21 108:11 111:18 112:2 125:15 126:19 129:23 137:20 139:15 151:15 153:24 164:9 169:3 170:19
lot 9:17 82:22 85:12 165:4
lots 132:2 135:18
low 34:25 35:3,7,9 35:12 91:18 94:8
lower 19:4 42:9 55:11 79:18 121:19 123:23,24 124:6 126:15 129:18 131:18 159:6 178:14 188:3
lowered 43:7,10,11
lowering 179:16 181:21
lying 44:5,7

m

m 2:3
magnification 82:14
majority 73:22
making 59:20 154:22
mangels 2:2
manner 168:14
manufactured 14:14
manufacturing 60:9 127:7
manzo 2:13 4:22 79:1 190:7
mark 78:20 82:2,4 83:19 86:17 87:8 88:6,11 99:19,21,24 189:25 190:2,5
marked 6:1 9:5 28:19 53:12,14 80:12,17 81:2 82:5 83:21 88:12 99:22 106:8 144:11 189:24
marking 86:18,20 86:21
markings 190:5
mary 2:21 4:2
mask 62:19 63:17 63:23,25 64:4,18 65:11,12
masked 68:2
matched 136:19
matches 118:18
material 12:12 14:21 15:15 22:6 36:24 37:21,22 38:5 38:7 41:20 43:15 48:24 51:11 55:5 58:14 64:14 73:9 74:15 79:22 84:21 96:13 107:11 116:16 145:11,25 146:15 147:6 149:10 172:4,11,14 172:16 175:13,17
materials 6:13 102:8 145:17 146:2 150:4
matrix 29:6 54:13 54:20 57:14 75:25 176:17,21
matter 5:23 18:17 21:16 28:17,24 61:1 61:6 77:10 82:3 83:13 109:25 138:18 189:5,14
mean 9:23 14:18 18:10 19:23 21:9,11 24:1 29:22 30:3,19 32:11 33:3,5 34:12 35:7 37:3 44:7 50:4 50:17 51:18 53:4 55:5,24,25 60:12 68:22 72:4 77:1 79:10 88:6,7 90:1 92:23 95:21,25 105:17 106:16 109:7 118:8 125:21 125:23 127:11,17 133:5 135:18 137:18 140:8 148:7 148:17 153:3 156:8 156:11 159:18 165:21 166:19 187:7 188:12
meaning 40:12 148:10
means 10:12 33:17 57:9 178:8
meant 51:1 155:16 157:4 181:16 184:21
measurements 153:1,4
media 60:17,21 104:1 105:3 153:14 153:16,20 189:19
medium 90:22
meet 39:18 40:6 99:8 101:17 102:3 102:17 117:20 143:5
meets 28:10 42:4 160:16 186:13
memory 91:24 159:20
mention 7:1 95:10 116:6 174:23 175:1
mentioned 41:16 42:7,11 53:24 58:7 76:6 92:10,11 98:3 166:24 180:2,4 183:2
mentions 38:9 39:5 39:14 76:2 183:17
met 28:7,12 99:11 102:6
metal 14:20 24:13 24:18 41:18 43:5 48:5,16,17 64:5 110:16 121:12,13 121:16,19,24 123:6 123:13,24,25 124:2 124:7 125:12 126:15 129:18 135:19 159:3
metals 38:25 96:17
michael 1:11 3:2 4:13 5:1,10 60:22 105:4 153:21 189:18 191:9,18 192:7,9
microdisplay 55:15
microdisplays 3:13 53:19
microelectronics 116:8 117:1
microscope 103:20
middle 30:8 42:3 163:16
millimeters 144:22 144:25 145:8,9
mind 10:11 47:25 67:9 86:6 90:10,13 91:1 125:14
minimizing 149:4 149:15
minute 92:5 164:16
missed 37:25
missing 98:22
misspoke 129:8
misstates 101:5
misunderstand 18:10 101:20
mitchell 2:2

modes 76:11
modification 9:11 57:6,22 83:4,24 84:4 147:18
modified 3:17 57:24 81:25 83:2 101:7 102:21,25 107:17 107:19
modulators 58:3
moment 8:13 49:18 74:7 172:22
morning 5:6,9 105:20,22,25
motivated 96:25
motivation 97:5
move 47:12 57:16 71:17 116:22
multi 46:3
multiple 10:10 34:8 34:21 47:25 60:4 92:9 93:7 129:22 145:3 157:10 159:7 162:25 171:6 178:2

n

n 3:1 105:1,1,1
naas 2:21 4:2
nakamoto 97:17 98:1,6
name 4:2,13 5:7,7,9 5:10
narrow 150:12
near 58:6 102:12 167:5,10 171:15
nearly 176:19
necessarily 21:4 23:24 24:12 25:3,7 25:11,14 35:7 77:8 121:23 187:18
necessary 65:3 109:3 113:17 124:20 137:15 186:7,25
need 5:17 30:19 33:18 96:12 102:18 111:13 112:15 132:2 147:6,10 152:18 169:8 187:11,16,18
needed 8:25 59:14 109:11 115:23 143:6
needs 33:15,15 35:7 35:8,9 59:13 107:11 113:15 133:25 150:2 163:4 182:1
negative 131:12
neither 138:1 146:21
never 43:20 64:14 87:14 97:13
nevertheless 40:22 44:24 99:7
new 3:17
news 3:12 53:17
night 105:13,18
nine 154:15,17
nitrate 116:4
nitride 51:10 58:9 58:14 59:20 116:4 116:24
nominally 123:12
nonfunctioning 124:23
nonlinear 57:6,21 58:1,22
nonresponsive 47:12 57:17 116:22
normal 20:23
normally 14:13 16:16 30:10,12
nos 82:6
notary 191:23
note 44:18 97:14 134:15 150:10
notes 177:7
notice 1:13 35:21 47:7 61:14
noticed 182:13
nuanced 151:12
number 3:8 4:10 6:2 7:10 9:6 28:20 39:21 53:14 60:17 60:21 83:21 89:2 104:1 105:3 106:9 132:6 144:12 153:16,20 189:19
numbered 167:1,20
numbering 137:25
numberings 78:18
numbers 31:17 68:16 70:2,5,22 189:25 190:8

o

o 105:1,1,1
oath 105:9 191:10
object 64:7 76:25 89:19 137:10 140:2 143:21 163:17
objected 186:17
objection 10:8 11:9 13:9 17:9 22:19 26:4 29:16 30:1,17 32:9 33:2 35:13 37:1 55:22 64:2 66:6 77:17 81:7 84:18 85:10,20 87:10 88:4 91:2 97:3 101:5 102:9 112:8 115:14 117:13 118:14 120:9,20 124:16 125:19 127:8,25 128:19 130:5 132:10 133:4 135:3 141:13 146:17,23 155:12 156:7,17 161:11 162:4 170:25 172:6 179:8 179:22 180:14,23 181:13,22 182:24 183:15 184:6,13,17 185:5 186:10,16 187:3,14
objective 178:8,15 179:3,5,9,16,20,21 180:6,10,12,18,22 181:11,21 182:3,6 182:12,23 183:5,14 184:4,12
objectives 177:23 178:3,10,12 180:2
observe 93:22
observing 84:19,22 94:15 148:10,16 151:14 153:7
obtained 193:1
obvious 66:19 83:16 85:14 87:15
obviously 13:3 96:21
occurs 79:17
offered 43:14 44:25 126:24
office 1:1 4:6,11 60:3 191:1 193:8
offset 120:14
oh 10:22 26:14 47:7 99:12 147:19 165:3
okay 4:1 8:3 9:19 10:14 15:2 19:12 26:16,17 28:16 33:10 48:14 54:5 56:13 61:18 62:6,9 62:13 63:11 64:17 65:1,23 66:18 71:16 81:12 86:3 87:18 88:24 89:25 92:5,6 93:1,4 100:13 103:23 119:21 122:6 123:3 127:16 140:14 143:25 157:24 158:24 159:5 167:21 177:17 182:21
once 5:6 112:3 114:9
ones 90:12

ongoing 105:15
open 101:14 106:20 106:25 107:23 126:4 127:20 128:17
opening 20:14 24:21 46:6 61:20,24 62:2 62:17 63:20,20,24 64:1,13,24 65:3,13 66:13,16 68:4 102:14,17 106:20 125:10,11 126:15 127:23 129:2,10,16 129:17,19 139:7,10 139:21 142:8,20,21 163:4,5
openings 46:11 62:14 63:1,6 64:19 86:14 87:13 163:6
opinion 10:5 45:18
opinions 6:18,25
opposed 58:11 95:11 96:1
opposing 133:9
opposite 22:4
optical 131:17
optimum 146:15,19 147:1
option 36:25 39:8,9 39:15,16 116:5 129:14,14,15 144:3
options 39:7,12 129:22
order 11:7,18 13:7 13:10,22 17:18 21:20 22:24 66:23 82:4 100:24 170:1 186:8 187:1,12 190:1
ordering 67:22
ordinarily 8:20
ordinary 11:4,4,14 11:23 14:13 16:2,16 17:11 19:17 20:11 20:24 21:18 23:4,19 33:10 38:15,16 40:2 40:10,21 43:20 44:3 44:10 45:19 46:17 47:1,4 52:21 53:11 56:22 62:1 63:3 66:3 85:3 86:9,13 86:24 87:6,11,16,19 88:1 94:25 95:18 96:8,24 99:15 100:23 101:18,22 102:2 103:15 109:19,22 112:2 114:6,8,8,15 116:12 116:15,23 120:6,12 120:22 121:20 122:4 123:3 125:15 128:15 129:2,21 135:14 136:16 137:19,21 138:3,7 144:2,4 146:25 161:8,25 165:13,17 176:8 187:15 188:1 189:10
orientation 74:10 78:9
original 8:4 142:2
orthogonal 164:25 169:10
outcome 193:6
outside 109:4 113:18 142:19
overall 29:14 30:16
overcoat 51:8 61:20 61:23,25 62:2,3 64:22,25 66:12 85:7 86:11,16,19,21,23 87:7,19,25 88:2,13
overlap 111:17 138:21 139:17 159:12 163:10,12 163:13 182:1 183:23
overlapping 12:17 45:5,6,8 111:22
overlaps 130:21 138:23
overlays 142:15
owner 1:7 2:17 4:23 191:7
oxide 96:14 113:11

p

p.m. 104:5 190:12 192:16
package 138:12,16 138:22 140:19 143:4
pad 32:1 70:2 72:3 97:9
pads 31:15,15,20 32:3 34:7 69:9 115:4
page 3:1 31:5 60:25 82:10 88:23 141:24 147:13,17,24 148:1 148:3
pages 191:13
panel 29:6
paper 3:12 53:18,24 53:25 54:2,13,24
papers 54:1,10
paragraph 8:10 24:9,9,25 36:17 61:10 172:10
paragraphs 61:7,14 61:15
parallel 48:1 164:6 164:11,14,21,24 169:11,19,20 188:3
park 2:3
part 12:3,4 41:14 57:16,18 59:4 62:23 62:25 68:19 72:3 73:11,15 75:5 77:13 78:5 79:18,20 80:5 80:14 98:16 99:14 106:14 107:6 108:12 110:7 111:3 114:3,3,12 122:25 123:4,6,19 130:22 130:22,23 138:23 139:12 140:23 165:2 173:7 182:10 183:24
partial 40:24 186:5
partially 39:3 43:24 44:4,19,20 45:7 52:7 67:1 74:19 92:24 130:21 163:13 173:24 179:12
particular 20:14 53:24 56:14 57:3,15 57:18,19 67:24 103:17 109:25 143:2 150:24
particularly 12:15 94:8 96:7 155:23
parties 4:15 193:3,5
partner 60:9
partnership 57:4
parts 41:17 118:15 124:3
pat 1:5 3:10,11,19 3:20,21 191:5
patent 1:1,1,7 2:17 4:9,10,11,12,23 5:22 8:21 9:3,8,14 9:17,22 10:2,11 25:20 28:17 46:9,22 46:25 50:11 63:3,7 63:9,11 69:21 75:1 75:20 91:12,22 93:20 94:5,17 95:7 95:12 100:8 106:5,6 154:4,9 158:5,16 161:9 162:2,25 163:22 165:20 174:8 177:21,24 178:1,2 179:3,5 184:4 185:19,21 188:17,19 190:1,3,4 191:1,1,7

patents 6:22 7:4 28:22 40:19 46:4,18 46:22 47:2 154:5 155:10,15 188:16
path 20:17
paths 20:19
pattern 30:20,23 32:20 34:9 98:15
patterned 16:20 21:7 22:2,2 23:8 24:16,21,23 66:11 66:17 98:21 159:4,9
patterning 19:20 35:24 42:1 47:23
peaks 149:2
pen 78:20,25
peninsulas 70:19
people 189:10
perform 34:4
performance 143:19
performing 66:4
periodically 33:19
peripheral 54:14 92:12
periphery 163:3,19
permitted 47:2,5
person 11:4,4,14,23 14:12 16:2,16 17:11 19:17 23:4,18 38:15 38:16 40:20 43:20 44:10 45:19 46:17 47:4 53:11 56:22 62:1 63:3 66:3 87:11,16 95:18 96:7 99:15 100:23 116:14 120:5,12,22 122:4,18 125:14 128:15 129:1 135:14 146:25 165:17 187:15
personally 192:8
pertain 184:4,12
pertains 183:13
petitioner 1:4,12 2:6 4:20 191:4
pg 3:14,16
ph.d. 1:12 3:2 5:1 191:9,18 192:7,9
phrase 17:11 126:9
physical 60:6 140:2
pictured 170:9
piece 55:18 56:14 100:20
pieces 70:6 97:15 144:15
pixel 12:9 33:18 54:25 69:17,18 81:16 84:10,13 85:1 85:18 110:23 124:23 130:10,14 130:17,18 131:21 131:25 132:6,12,19 134:16,23 174:15 176:4
pixels 132:3,17,18 154:16,17
place 120:14 134:22
placed 64:6
places 15:7 92:9 169:25
plan 29:5 156:19 159:24
plaza 2:3,14
please 4:14 26:8,14 60:23 78:24 91:25 105:5 153:22 177:13,20 178:18 185:16
plenty 140:4
plurality 132:16,18
point 54:23 63:21,24 90:6,9 94:1 109:8 109:11 114:9 118:9 135:21,22 166:23 177:15
pointed 133:21 169:1
pointing 16:22 27:20
polarization 3:12 53:18
polymer 74:14,23
portion 41:6 62:20 69:4,7,8 74:21 75:13,15 77:6,14,19 79:15 80:11 81:2 84:12 85:1 97:16 98:17,18 100:11 106:20 108:8,10,13 108:15,17,21 110:11,16 114:4 116:20 117:18 118:16 119:4,15 120:23 121:3,3,15 122:24 124:11 125:6,7 129:16,17 130:12,25 131:22 131:24 132:7,8,13 132:14,17 134:18 135:8,11 136:1,6,9 136:12,16,18 138:24 139:1,5,18 140:9,22 141:4,7 143:6 144:5 151:4 161:15 162:8 164:8 166:4 168:4 170:2 170:14 178:4,5,17 179:12
portions 75:11 77:9 77:21,23 110:2 121:4 124:5 125:9 135:18 148:21 169:21 170:11 171:20
position 109:24
positioned 122:8 169:5
possibilities 53:9 122:17
possibility 14:24 82:23 102:2 137:22 142:24 161:13
possible 14:20 36:25 42:5 44:21 68:7 79:4 86:16 95:14 99:3 101:12
possibly 83:18
potential 72:5 112:20 113:20 131:10
potentially 179:13
power 31:15,25
practically 99:5
precise 29:23 30:4 48:18 89:2 99:5 117:21 124:1 170:21
precisely 117:24 118:17
predominantly 55:11
prefer 19:3
preferable 17:14
preference 128:21
preferred 14:25 63:8
prepare 6:14
prepared 14:15 15:15 16:19 22:6
preparing 6:17,19 6:25 28:23
prescribed 22:14
presence 148:18 149:5,16 156:11
present 2:20 13:12 29:7 156:21 179:24
presented 3:8 6:2 9:6 28:20 106:9 144:12
presumed 46:21
prevent 115:13
preventing 180:6 182:6 183:8,14
previous 16:7 147:24
previously 6:1 9:5 28:19 106:8 144:11 174:4

prime 159:23
principally 13:12,17 113:17
principle 133:24 147:7,11 150:11 152:15 188:5 189:5
printed 97:1 138:16 138:21 139:16,24 141:20 142:22 143:16 171:25 181:2,15 185:8
printing 8:1
printout 79:12
prior 40:16 92:19 93:2 97:15,19,23 106:24 114:20,20 117:22 144:14 148:11,24,25 150:4 150:15,22 151:2,13 151:16 155:1 188:19
probably 48:18 68:24 88:11,18 99:6 100:2 116:18 155:25 177:8
probing 109:25
problem 34:24 188:9
problems 106:23
procedure 192:20
proceed 4:18 5:19
proceedings 189:21 190:11 192:13
process 19:1 20:7,18 22:9 24:6 64:9,10 68:3 99:16 101:19 143:1 186:7,12,25 187:11
processing 8:25 59:25 62:4 68:6
produce 59:7 60:8
produced 59:14 131:8
product 22:17 58:4 60:7
products 57:23 58:2 60:9 97:10,12
project 57:9,23 59:13
projection 68:25 69:6
projections 70:24 80:2
projector 59:3,18
projects 58:8
properties 145:10 145:15 146:3,9
proportions 151:15
proprietary 97:13
protect 107:12 115:23 116:16
protecting 107:3 108:1 113:12
protection 110:5 113:15,16 116:7,13 116:25
protective 51:8 61:19,23 64:22,25 66:12 85:7 86:11,15 86:18,20,23 87:7,19 87:25 88:2,13
prototype 57:10
protrude 79:25
protrusion 73:1 172:25
protrusions 70:20 72:4 75:8,8 78:17 80:1
provide 41:7 46:13 58:5 59:16 108:3 110:5 113:2 117:24 162:19 178:3,13,15 179:25 183:24
provided 7:13,17 12:12 13:14 33:25 42:9 44:13 57:20 153:12 154:9 175:13 178:9 181:25 182:9 183:11
provides 58:2
providing 180:12 181:11 184:5,15 185:3
public 60:13 191:23
publication 54:19
publish 57:8
purpose 6:24 31:12 31:13 34:20 39:1 61:5,8,11 115:18 159:16 160:6,9,11 160:12,21 161:2,7 161:10,19 162:2,5 162:10,17,18 183:11
purposes 159:4 161:21
pursuant 1:13,13 192:19
put 20:1,1,2,3 31:6,7 37:6 68:1,4 80:14 86:18 100:22 101:23,23 120:22 167:7
putting 8:6 50:14 61:5

q

quality 35:11 162:21
quantitative 153:1,3
question 23:2 30:3 32:19 37:23,25 47:13 54:9 66:9 69:24 80:20 87:1 89:22 97:14 100:15 101:20 103:11 109:9 111:10 112:18 116:21 137:6 140:7,13 156:13 161:23 169:7 174:4 186:21 186:21,24 187:10 188:11
questions 54:3 177:15,16,16 182:14 187:20,22
quite 10:9 33:19 82:22 116:21 136:21 139:6 146:8 155:21

r

r 105:1
raise 88:3
raised 88:16
range 89:10 144:22 152:12
rate 88:24 89:6,8
rates 89:5
reach 34:11
reached 19:10
reaches 45:7
read 8:14,16 16:16 17:2,11 19:18 40:11 147:25 181:7,14 191:12 192:21
reading 9:18 11:15 45:14 161:9 162:1 192:17,22
reads 11:5 183:17 185:7
real 103:7
reality 103:14
really 12:15 52:20 58:11 99:5
reason 5:18,20 74:22 84:25 151:19 151:21 154:10 192:25
reasons 34:22
recall 7:4,6,19 54:6 54:16,17 59:21 63:9 95:10 98:6 105:23 105:24 152:8 166:22 177:23 178:11,13,15 185:22,23

recess 60:19 153:18 177:11 185:14
recessed 104:4
reciting 24:10
recognition 34:14
recognize 65:18 66:4 116:24 138:4
recognizes 34:24
recognizing 7:3 92:13,21 94:25 150:8 153:8
recollect 91:23
record 4:1 5:8 60:16 60:20 103:25 105:2 153:15,19 177:9,12 185:11,13,15 189:20,22 192:12
recorded 192:11
rectangle 30:10,15 32:7,21 42:17,17 75:7 167:18 168:21
rectangles 115:4
rectangular 132:20
red 79:2,13 80:14,17 142:4
reduce 162:6
reduced 92:8 151:7 178:4
reducing 92:15 94:13 151:24 178:8 179:10 182:23
reduction 183:25
redundancy 91:18 91:22 92:2,10,15 93:5,15,25 94:3,10 94:14,21 185:20,25 186:6
redundant 93:8,21
refer 91:22 94:13 154:20 160:17 177:20 178:18 184:18
reference 31:19,21 41:8 58:19,21 71:11 158:18
references 68:22 171:4
referred 93:23 137:14 156:18 165:10 175:25 188:11
referring 11:7 18:11 37:7 80:9 89:6 93:7 93:9 98:17 105:21 117:15 139:2 148:2 150:24,25 154:3 158:20 160:23,24 175:12
refers 16:24,25 20:4 25:23 26:19 27:1,8 38:11 68:24,25 95:5 176:15 177:1
reflective 58:2
refresh 159:20
regard 7:20 103:1 128:5 152:9
regarding 105:25 147:22,23 156:15
regardless 140:8
region 31:16 41:5 46:15 50:21 64:9 70:21 75:9 78:16 81:4 96:15 97:9 106:25 107:23 108:22,24 111:9,14 111:23,25 113:24 113:25 114:10 133:3 134:8,16 136:6 139:6,22 144:18,21 145:7,12 145:18 148:13,21 149:7,9,18,21,24 150:2,12,21,22 151:8,11,13,16 152:18 155:1 165:25 166:1,4 167:13,24 169:24 170:2,4,11 179:25 180:1 184:20,22
regions 42:19 70:1 75:18 111:4 154:14 156:6,16 161:6 166:20 173:12
relate 102:11 179:16 180:12,22 181:11 182:22 183:8 185:3 185:25
related 92:23 193:2
relates 180:5
relating 181:21 182:6 183:12
relationship 12:22 13:1 17:20 22:8 81:9 112:1 155:16 161:4
relationships 20:5 20:21
relative 20:5,21 21:16 22:8,10 23:21 154:20 155:1 161:3 169:6 193:3
relatively 74:4
reliability 146:6
reliable 178:16 181:12 185:3
relying 113:4
remember 54:3,8 84:5 90:21 91:19 98:13
remind 100:14
reminded 92:6
removal 87:24
remove 100:11 131:15
removed 64:12 86:11,20 87:18 88:1 131:3,19 150:1 152:17
removing 149:4,15
reorder 66:21
reorganize 83:16
repeat 5:13,15
repeating 49:15
rephrase 30:2 87:1 111:10 140:7 156:9 161:23 169:8
reporter 4:16 192:1 192:3
represent 4:16 82:20 88:6
representative 9:21 9:24 10:16
represented 75:17
reproductions 147:18
require 12:22 14:16 16:21 19:14 21:16 44:19 125:17 152:2 186:2
required 8:24 15:18 17:15,19 19:7 21:8 24:16 126:21 152:13 186:12 187:4
requirement 76:14
requires 15:21 17:7 20:8 49:24 63:8,10 71:3 131:10 145:21 146:12
requiring 17:13 19:19 137:24
research 60:7
reserve 177:15
resin 28:13 73:8,10 101:4,13,14
resist 65:12 68:3
resistance 32:24 34:16,19 35:1,3 42:9,14 43:7 74:4 91:18 92:9,16 94:9 94:13 143:12,16 144:1 178:4 179:11 179:17 181:21 182:23 188:3
resolution 90:5,21 90:22
resources 60:6

respect 17:1 76:22 92:11 179:4,6 182:21 186:18,19
respectively 36:13 167:19 171:16
response 131:6
rest 15:9 22:9 53:6 80:7 98:22 125:4
restate 101:21 156:12 186:24
results 147:10
resumed 105:6
reveal 101:25
reverse 22:21 170:1
reversed 22:16
review 6:16,20
reviewed 6:14 9:16 28:23 148:4
right 5:21 9:13 11:3 12:6 13:3 15:4,10 19:23 25:5 27:14 29:13,24 30:11,25 31:2,7 34:25 35:9 41:2,18 43:8 44:21 45:2,14 47:16 48:19 50:19 52:18 56:6 59:1,5,17 60:15,25 63:2 65:9 67:4 68:2 69:16,17 70:10,23 72:8,24 73:12,21 74:18,19 78:7,8 80:13,16,16,20 83:1 86:19 88:9,21 94:4 99:2 106:23 109:5 110:25 111:21 115:21,24 116:9 118:11 119:25 120:2 121:22 124:9 127:7 130:23 132:2 132:22 134:7 138:24 139:1,12 146:11 147:6 148:6 148:14,20 149:8 150:13 151:21 156:14 157:8 162:11 166:21 167:19 168:12,20 168:25 169:4 174:18 175:22 177:6,15 188:18 189:9
rightmost 139:5,5
riverside 2:14
rmr 193:12
rocca 1:15 4:17 192:2 193:12
rough 89:1,3
roughly 75:7 172:9
round 182:14
rpr 193:12
rule 152:22 192:19
rules 1:14 5:12 192:20
running 188:2
runs 30:7,7 31:1 52:2 70:16

s

s 5:10 105:1,1,1
sandra 1:14 4:16 192:2 193:12
satisfy 27:23 28:1
saves 126:25 127:1
saying 13:4 14:24 15:10 17:4 18:5 38:20,21,24 61:10 80:13 102:25 108:17 113:15,24 126:20 131:24 149:20 151:4 173:6 173:20
says 8:19,19 15:6 23:4 25:1,11,13 36:5,17,20 44:20 52:19 71:5 74:2 95:12 102:13 111:7 152:8 162:21 172:11 174:19 180:16 181:2 182:9 183:19
scale 145:3 153:12 154:2,6,8,11,13 155:6,8
scan 36:19 41:2 52:11 121:11,13,15 121:17,18,21,25 122:3,13,22,25 123:5,7,14,18,19 124:21 125:25 133:12,17,19,22 136:5,13,20 137:1 137:14 138:2,5 168:5,11,24 169:9 171:16
scanning 36:2,8,12 37:13,16,17,22 38:7 38:10,22 39:14 41:16,21 43:4 45:13 48:3
schematic 3:14,16 3:17
schlitter 2:9 3:5 4:21,21 10:8 11:9 11:12 13:9 17:9 22:19 26:4 28:18 29:16 30:1,17 32:9 33:2,4 35:13 37:1 55:22 64:2 66:6 76:25 77:17 81:7 84:18 85:10 87:10 88:4 89:19,23 91:2 91:6 97:3 101:5 102:9 112:8 115:14 117:13 118:14 120:9,20 124:16 125:19 127:8,25 128:19 130:5 132:10 133:4 135:3 137:10 141:13 143:21 146:17,23 148:1 155:12 156:7 156:17 161:11 162:4 163:17 170:25 171:2 172:6 177:17,19 179:14 180:3,19 181:9,19 182:4 183:6 184:2 184:10,14 185:1,17 186:15,18,23 187:5 187:19 189:16 190:10
scope 89:19 91:6 179:8,22 180:14,23 181:13,22 182:24 184:6,13,17 185:5
screen 89:6
seal 31:16 108:22,24 109:4 113:13 144:17 145:7,10,12 145:18 146:1,15 148:12 149:10 150:2,3,12,21,22 151:8,10,13 152:16 152:18 154:14 155:1,3 163:7 170:2 170:4,14 179:24 181:8 193:8
sealant 12:12 41:5 45:6 47:8 71:10,11 71:15,19,25 72:13 72:16,17 73:4,5,11 73:14,16,18,22 74:21 75:3 76:1,3 77:24 78:22 79:7,21 79:23 80:6 81:20,23 98:24 108:24 109:14,15,20,21 110:4 112:24 113:2 113:18,22 119:14 119:19 120:7,13,18 120:22,23 147:6 149:7,18,24 151:5 152:2,7,20,23 159:12,14 160:3 161:15 162:7,24 163:11,15 164:2,18 164:20 166:3 167:13,24 168:16 169:6,9,11,19,21,25 170:11,17 173:3,8

173:16,19,24,25 174:6 178:14 179:12 180:9,13,16 181:1,7 182:11 183:23 184:1,5,8,16 184:23 188:9,20 189:2,11
sealant's 120:2
sealants 146:9 152:25
sealing 52:1 148:21 149:9,20 151:16 152:12,13 165:25
searching 68:20
second 10:18,20 11:1,6,24 12:2 13:6 13:13,17,21,25 14:2 14:3 16:25 17:25 19:13,15,18,20,25 23:9,10 24:14,17,18 24:19 27:1,8 28:8 28:11,12,14 42:24 42:25 75:5 97:17 101:4 102:15 107:15 156:20 157:22 158:15,19 159:8,11,16 160:13 160:18,24 161:4 162:3 180:17 182:14 183:1 184:9 184:20,24 185:7
section 47:21 53:4 61:17 77:5,10,19 85:24 101:2 108:20 113:9 115:1,4 159:22,22
see 6:12 8:12 10:1 13:6 16:3 25:17 29:10 36:15 47:15 47:16 51:6 53:21 59:1 67:12 68:13,14 68:15 69:17 70:12 70:15,15 74:20 76:5 76:21 79:14 80:3 85:23 87:8 88:14 91:15 93:6 94:22 96:16 98:12 103:18 115:3,7 117:4,10 118:1,12 119:17 121:9 122:16 123:23 125:21 129:25 132:22 135:1,1 136:4 137:5 137:23 138:10 139:3,10 140:14,14 140:20 142:6 151:8 158:6 160:15 162:16 163:23,24 164:1 166:6,8 168:5 168:7,9 169:16,17 169:23 170:16 173:7 174:21 178:20,22
seeing 164:10
seen 7:3 87:14 100:5
sees 122:18
semiconducting 122:9
semiconductor 1:6 4:9 62:4 191:6
sense 49:6 62:13 94:16
sentence 25:1 38:9 38:12 39:5 44:22 52:19 148:6
sentences 39:18 40:4 42:5 44:12 93:24
separate 13:18
separated 45:25
separation 115:5
september 1:16 4:3 191:11 192:5
sequence 12:4,22,24 13:11 14:7 15:18 18:11,12 21:4,10,13 21:14,17 22:10,14 22:16 23:5,12,14,15 23:17,21 24:1,11 25:2,5,13 51:22 65:7 66:8,19 67:18 68:6 84:20 101:9
series 84:9,17,23
serve 14:22 160:4 161:15 179:20,21 183:4
serving 180:1
set 11:19 145:17 177:1 193:7
sets 61:10
sgibson 2:5
shade 142:4,6,7
shaded 143:11,18,25
shape 132:20
shapes 103:21
share 54:23
shiba 3:18 28:16 29:1,4 30:21 31:10 31:13 33:24 34:5,23 35:16,18,21,22 36:4 36:22 37:8,13 38:3 38:8,13,17 39:9 40:3 44:18 45:17,23 47:6,21 49:10,22,24 50:9 51:22 52:18,18 68:10,11,25 70:6,24 71:3 72:2 74:11 75:22 77:2,5,18 78:17,21 79:25 82:18,21,25 83:3,17 83:25 93:4,6 145:13 149:1,1 150:11 165:1 166:5,18 169:16 172:21 173:18 174:17 176:13 188:6 189:8 190:3
shiba's 69:10 83:4
shooting 70:19
short 60:19 153:18 168:22 177:11 185:14
shorthand 192:1,3
show 80:4 110:15 114:14 115:23 118:16 119:3 120:21 155:11,19 155:20,22,25 156:5 156:14 158:7 163:1
showing 84:20 85:22 135:11 149:23 150:23 156:19 157:9
shown 48:25 72:10 84:8 88:8 91:17 110:20,21 115:18 117:11 118:10,19 119:10,13,18,19,20 119:22,23 120:2,8 120:11,18,24 124:13 125:7 134:10,21 137:2 138:14,25 139:10 139:21 141:5 142:3 151:16 157:25 158:2 159:7 167:14 167:25
shows 66:10 69:15 71:13 72:2,17,20,20 75:6,11 78:3,4 107:2 108:20,22 114:2,21 123:21,23 123:24 124:1 135:7 135:9 148:7 152:3 157:10 164:13 188:6 189:8
shrink 145:17
sic 31:10 134:4 186:13 188:8
side 19:4 29:12,12 29:13 30:15 33:18 41:2 45:2 69:7,16 69:17 72:25 73:20 73:21 78:5,7 80:11 98:23 133:15,15 135:12 139:12 158:14 164:4,19 167:8,19 168:13,25 169:3,4 173:14,15 173:17

sides 30:9 32:7,14 32:15,21 34:6 42:17 75:9 113:12 148:9
sign 192:21
signal 35:10,11 165:6,14 166:18 172:5,16
signals 89:5
signature 191:14 192:19 193:1
signed 192:24
signing 192:17,23
silent 109:17 110:3 110:19 111:6,12 152:25 175:4
silicon 51:10 54:25 55:4,8,12,17,19,20 55:21,24,25 56:1,8 56:9,17,23 57:1,7 57:12 116:4,24
similar 24:10 93:20 96:17 154:15 168:15 177:1
similarly 78:8
simpler 126:7
simply 15:5,20 16:22 79:5,13 92:15 94:24 176:13,15
single 36:23 37:3,10 37:10,14 39:8,12,13 41:3 42:6,11 43:13 47:18,23,24 54:13 55:20,25 56:9,16,23 69:25 114:19 131:25 136:14
sisters 173:1
situation 99:13 123:11 138:8
six 41:24 45:12 51:3 52:23 93:8 94:2
size 140:5,11 141:11 143:2 144:2 145:7
sized 145:1
skill 11:5,14,23 14:13 16:2,16 17:11 19:17 20:11,24 21:18 23:4,19 33:10 38:15,17 40:2,10,21 43:20 44:3,11 45:19 46:17 47:1,4 52:21 53:11 56:22 62:1 63:3 66:3 85:3 86:10,13,24 87:6,11 87:16,19 88:1 94:25 95:18 96:8,25 99:15 100:23 101:19,22 102:2 103:16 109:19,22 112:3 114:6,8,15 116:12 116:15,23 120:6,12 120:22 121:20 122:4 123:3 125:15 128:15 129:2,21 135:14 136:16 137:19,21 138:3,7 144:2,4 147:1 161:8 162:1 165:13,17 176:9 187:15 188:2 189:10
skilled 8:20
slightly 119:5
small 7:10,10 34:12 34:22 73:10 84:12 146:22 169:22
smaller 131:16 141:21 142:23 143:8 155:2
sorry 6:8 10:22 37:16,25 43:3 48:10 48:13 55:24 60:11 62:11 69:4 74:3 78:11 80:1 113:18 119:12 127:3 167:15 182:13,19 188:13
sort 188:9
sound 88:7
sounded 15:17
sounds 65:8 131:23
source 59:3,18 84:11,12 85:2 125:2 130:9
south 1:15 2:9,14 4:6 192:6
space 60:4 125:18 125:22 126:25 127:1,6 128:10 152:2,3,6
spacial 58:3
speak 152:24
speaking 14:9
speaks 115:16 161:3
spec 176:14
specific 10:6 29:21 54:9 64:4 97:4,11 97:24 113:8 161:24
specifically 11:22 18:12 50:11 54:3 81:16 92:1 93:5 120:17 186:15
specification 68:19 69:14,20 71:7 91:21 92:20,22 109:2 113:6 123:2 152:15 156:25 159:21 176:7 188:15,23,25
specifications 40:18 143:17
specified 25:8
speculate 40:6 85:25
speculation 99:7 110:7
spell 5:7
spelled 5:9
spend 7:2,8
spent 9:17
split 34:20,23 94:2,2 124:2
spread 34:6
sschlitter 2:11
stan 4:19,21
stand 8:20 24:25 25:1,15 79:2
standard 46:4 56:20 57:7,23,25 62:4,6,8 63:16,19,22 89:16 89:17 90:5 95:15 96:19
stanley 2:3,9
start 19:25 42:2,22 71:16 117:24 133:8 159:19
started 182:14
starts 45:4
state 5:7 24:9 192:2
stated 82:15
statement 8:19 14:4 94:18,20 128:4 147:23 148:8 150:6 150:17
states 1:1 4:11 11:5 95:8 150:10 191:1
stays 74:20
steady 31:19,21,22
stenographically 192:11
step 15:4 35:20,24 36:2,7,12 37:10 38:22 48:6 52:11 64:22,25 65:4,13,15 65:15,24 67:5,5,5 68:3,5 70:4 127:7
steps 11:19 22:15,24 23:13,15,24 24:2 42:1 51:24 65:3,7 66:5,19,22,25 67:4 67:7,10,19 102:7,23 103:4
steptoe 2:8 4:6,22
steptoe.com 2:11
stop 114:9
stopped 114:25
storage 85:19
strange 132:1
street 1:15 2:9 4:7 192:6
strength 150:3 152:17

strictly 14:9
strike 13:22 47:12 57:16 86:7 95:2 112:4 116:22 124:10 128:12 174:24 175:6 179:4
strong 146:2 178:13 180:12 184:5,15
stronger 145:20 146:1,12 152:20,22 180:22
structure 19:7,9 20:20 21:15,17,20 22:11 23:16 24:7 30:9,11 36:14,21 38:12,18,21 39:20 40:11,14 42:4,7,12 43:15,20,23 44:2,13 44:14,16,17,23 45:15,18 46:9 52:23 70:12 76:21 84:20 85:17,22,24 87:14 88:22 92:14 93:19 93:21 100:16,22 102:5 103:3 115:23 122:15 123:12 125:16 160:16 185:21 186:8,14 187:1,12
structures 42:8 70:9 84:8 91:17 94:23 106:22
structuring 145:15
studied 96:20
study 49:25
subject 145:22 189:7
sublines 41:24 51:4
submitted 5:23 83:13 192:19
subscribed 191:20
subsequent 61:13
subset 78:19 142:11 142:13
substantial 106:3 170:2
substantially 148:12 154:15 155:2
substrate 8:23 11:11 12:8,11,11,13,13 14:5,10,12,14,23 15:7,8,11,15,19 16:10,17,18 17:3,12 17:13,22 18:4,6,20 18:23,24 19:3,10 20:3 21:23,25 22:6 22:12,13 49:3,4,10 49:14,21,22 50:7 54:15 55:3,9 56:4,6 62:20,23 64:6,8 65:10 69:3,5,9 71:15,21,23 72:18 73:2 76:1,2,3,24 78:6,8 81:5,13,22 109:13,23 119:13 119:18,20,22,23 120:7,11 121:5 140:6,19,24 141:2 141:12 142:23 143:5,8 151:25 153:9 156:6,15 158:25 163:10 166:12 172:12,24 173:2,5,13,15,17,21 173:23 174:1,3,5,7 174:12,13,14,17,20 174:20,24 175:3,6,9 175:14,14,23 176:1 176:3,10,11,12,16 176:18,20 177:2,3,3 178:14 183:11,18 188:21,21
substrate's 17:4
substrates 54:21 55:10 108:23 148:23 162:20 163:8 175:17 176:15 182:7 183:9
successful 85:14 96:21
sufficient 26:15 115:13,17
suggest 134:12
suggested 126:21 127:18
suggesting 42:5 87:22,24
suggestion 126:24
suggests 134:14
suite 2:3,14
sukegawa 46:14 66:14 67:3 97:16 98:1,5 106:4,13 107:1,3,7,13,20,22 107:25 108:17 109:2,21 110:1,7,12 111:5,12 112:17,23 113:4,14,24 115:17 116:6,18 117:23 121:18 122:19,23 124:18 125:5,15 130:16 136:2 137:23 138:9,11
summarize 61:9
supplied 31:20 34:10
supply 31:15,25
supplying 31:25
support 32:25 33:25 34:9,17 35:2,4 41:8 150:17
suppose 29:23 85:11 114:17
sure 7:24 8:3 18:15 29:17 30:3,13 49:24 55:23 60:11,13 63:7 63:21 66:9 67:15 68:17 79:4 82:19 86:16 91:8,23 98:5 100:4,16 107:5 110:10 111:12 114:19 118:8 123:1 125:20,23 126:9 135:22 140:8 143:10 159:24
surety 90:14
surface 79:12 145:15,16 149:3 151:5
surrounding 113:11
suspect 74:11 155:7
svga 90:8
swear 4:17
switch 131:11
sworn 5:2 191:10,20 192:10
system 143:18
systems 57:6,21 58:1,22

t

t 5:10 105:1
take 6:5 20:19 27:14 32:13,16 42:23 60:15 71:10 92:5 94:4 103:23 128:9 144:9 153:14 177:7
taken 1:14 102:23 191:11
takes 34:11 127:6
talk 19:3 21:14 37:9 43:24 46:4 49:7 51:1 92:21 94:8 106:4
talked 37:5 40:18 54:1 65:20 78:14 94:24 98:9 99:9 120:15 136:13 165:3 177:4 188:13 189:6
talking 21:12,22 34:15 40:3 53:24 56:13 62:15 63:23 65:2,3 67:12 70:8 75:2 77:11,12 96:10 107:21 122:2 129:10,11 151:1 154:23 174:3,11

176:10
talks 93:12
tape 138:12,15,22 140:19 143:4
teach 110:12 116:19
teaches 110:14
teaching 109:1 112:25
technical 151:19,21
technique 59:16 62:18
techniques 63:18
technology 59:6
tell 9:23 18:6,22 37:2 39:25 60:12 86:3,5 95:21 103:8 103:16,18 119:7,11 119:11 127:16 147:19
telling 14:6
temperature 146:6
tens 145:8,8
term 33:8 123:10 126:11 127:3 138:11 148:20
terminal 8:21 23:17 24:7 25:6 34:8 41:3 41:5,15 45:1,5 46:15 70:3 75:9,10 75:13,15 77:6,9,14 77:19,21,23 97:1,9 97:16 106:20 108:8 108:10,13,14 110:2 115:2 116:20 118:16 119:12,15 120:23 121:2 125:5 125:7,9,24 130:12 131:21 132:8,13 134:17 135:8,11,18 136:1,6 137:6,11 139:6 140:9 141:4,7 143:3,6 144:5 161:16 166:20 178:4,16 179:11
terminals 15:14 97:21 144:6 164:5 166:3
terminate 133:9
terminated 192:15
terminates 81:6
terminology 157:16 157:17
terms 11:24 12:2 42:6 49:10 67:17 76:16 98:10 103:11 103:13 112:15 114:20 138:19 158:19,21 188:7
testified 5:3 111:19
testify 192:10
testimony 83:10 101:6 105:11,14 106:1 149:8,13 192:12
testing 106:15
text 69:13,14 92:18 111:7,22 152:12 156:24 157:2
tft 56:24 60:1 81:16 108:20 115:25 122:3,7,8,10,12,21 123:8 129:7 130:1,2 130:9 132:21,22 133:25 176:3
tfts 36:6 54:6,8,20 57:13 58:9,12 89:7 123:10 171:22
thank 26:25 27:15 28:18 69:2 100:14 141:9 144:10
thicker 43:12
thin 12:8,10 56:21 74:23 174:14 176:17 177:2
thing 8:2 19:11 20:9 21:14 33:20 38:19 42:23 43:16 54:22 57:25 62:5 69:23 99:4 100:6 119:11 125:14 165:16
things 7:1,9,12,14 7:15,17 16:25 17:1 40:6 67:22,23,24 82:22 91:7 106:19 108:6 114:18 122:1 140:17
think 10:7,24 14:12 16:1,15 17:10 19:7 19:8,17 20:7,8,19 20:23 21:1 22:3,15 23:3,18 28:17 30:10 30:22 31:22 32:22 34:13,23 35:15 37:5 37:8 38:15 39:17,23 40:1,2,10,20 43:16 46:2 47:24 49:23 51:21 52:13,22 53:2 53:8,23 54:5,12 55:23 57:19 58:7,18 61:13 62:19 65:6 68:24 69:13,19 71:3 73:9,17 75:4 78:13 78:14 83:15 85:25 87:15 88:17 89:2,9 89:10 90:11,19 91:16,18 92:6,12 93:17 94:25 95:12 96:18 98:5 99:3 100:6 102:1 103:6 103:15 105:21 106:3 107:7,11,13 107:25 109:1 110:14 112:17,23 114:1 117:24 124:22 128:7,9,12 131:4,23 132:11,24 133:21 136:16,22 136:23 137:3,23 138:3,7,11 139:23 142:3,25,25 144:21 145:1,6 147:13,19 147:22 150:10 157:15 158:23 162:11 163:2 165:3 165:15 166:25 167:6,8 169:13 171:3 172:11 175:10 177:4 181:24
third 24:18 39:15,16 41:23 45:9 57:4 88:23 126:3,7,9,17 127:2,3,11
thought 41:11 99:25 147:23
thoughts 40:9
three 13:1 30:9 32:6 32:14,15,20 39:12 39:23,25 42:17 43:15 44:14 45:12 45:13 66:4,18,22 67:22,23,24 84:20 84:22 88:22
time 4:3,14 7:2,8,11 9:18 16:24 34:11 44:17 45:23 51:19 59:5 60:17,22 91:5 96:14 104:1 105:4 133:10,14 153:16 153:21 177:10,13 185:13,16 189:19
times 133:22
tin 113:10
tired 165:15
titled 53:17
today 5:19 71:11 105:12 185:18 190:9
today's 4:2
top 16:4,20 20:3 22:2,6,9 29:12 31:1 40:13 41:18,22 42:20 43:5,8 44:5,7 51:5 72:15 73:17 75:11 76:24 81:5,12 85:18 115:2 123:8,9 130:24 135:2
topic 177:17

touches 173:11
touching 72:15,18 73:18 79:21 173:16 173:20,24 174:1,6
track 182:16
trademark 1:1 4:11 191:1
transcript 191:12
transfer 73:9
transistor 56:24
transistors 12:9,10 55:14 56:7,9,15,17 56:21 174:15 176:17 177:2
transparent 23:11 24:22 47:8 69:11 95:9,13 96:1,12,15 102:15 107:14 108:4 124:7 130:11 139:15 180:25 181:4,5,18 184:19 185:9 189:3
transverse 169:12 169:18
traveling 32:6
traverse 32:15,16,16
traverses 42:16
trend 151:9
trial 1:1 4:12 191:1
triangle 29:25 32:14
triangles 30:12
tried 79:8 155:24
trouble 32:18 99:6 188:20
true 32:23 54:18 92:13 94:15 102:19 102:22 126:23 131:1 134:25 145:5 150:8 151:9 152:15 154:7 156:2,3 168:2 168:3 169:22 192:12
try 169:7
trying 8:17 18:18 19:9 20:17 22:23 31:9 38:1 72:12 82:20 87:5 127:10 140:12 148:22 149:19 156:5,14
turn 40:21,25 141:24
two 7:24 8:1,7 13:18 16:25 17:1 18:2,19 21:24 22:8 29:10 36:14,21 38:12,18 38:21,24,25 39:1,7 39:15,18,20 40:4,11 40:13,14 41:10 42:5 42:19 43:19,23 44:1 44:13,15,23 45:15 45:18,20,20,22,25 46:7,9 55:10 61:3 61:18 65:7,17 67:13 67:20 68:5,7,15 75:9 82:4 84:4,6,7,7 84:23 86:7 87:21 88:3,15,21 91:16 92:23 93:19,19,23 97:15 108:23 115:4 115:5 124:3,5 140:17 146:2,9 148:9 158:10 159:3 160:1 161:10 162:19 163:7 164:17 170:3 171:8 171:10 175:17 176:15 178:12 179:18 186:2 188:2
type 76:21 103:2
typical 89:12,15,18 138:8 144:17,20,21 162:23
typically 33:21 74:14,16 89:10 154:18 163:3,14,18

u

u 5:10
u.s. 1:5 3:10,11,19 3:20,21 191:5
ultimately 162:20
unbiased 33:16
unclear 38:14,16
uncommon 62:19
unconventional 56:18
underneath 50:13 98:24 118:20 122:9 151:5 159:14 164:20 168:16 183:25
understand 11:6,23 13:5,20 14:6 15:3 16:18 18:16,16,18 19:14 22:23,25 23:5 27:23,25 28:4 31:24 36:1 43:22 44:4 45:20 49:11 60:14 63:4,12 66:9 69:7 80:9 85:21 93:4 105:8 109:19,22 112:3 118:5 121:21 123:4 135:15 136:17,20 137:5,19 137:22 138:15,20 140:13 149:19 155:9 156:1,13 157:12,14 159:15 160:10 162:1 163:9 165:12,23 167:2,12 167:23 176:2,8,9 187:7
understanding 29:2 89:1,3 122:6 155:15 160:21 187:9
understands 8:21
understood 83:7,9
uneven 149:3 151:4
unevenness 150:1 151:7,24 152:6,17 162:6 178:8 180:4,6 182:6 183:8,14,25
uniform 160:6
unit 60:17,21 104:1 105:3 153:16,20 189:19
united 1:1 4:11 191:1
university 60:5
unpublished 54:22 56:11
update 89:6
upper 41:20 55:10 71:23 78:6 98:17 107:16 123:13,25 124:2 125:11 145:6
upside 98:11,12,16 99:1,10,14
use 12:21 13:12,13 16:23,25 17:1 25:18 25:19 34:21 42:24 55:20 95:25 96:9,25 97:12 101:19 103:20 112:22 113:19 126:3,9 127:3,22 128:16 131:16 145:17 147:5,9 158:22 165:13 174:12
uses 10:17 31:22 34:13 138:11 150:12 152:20
usual 22:3
usually 132:4 155:19

v

vague 186:22
vaguely 185:23
valleys 149:2
variation 83:6
variations 53:7 68:8 85:12 146:6
varies 51:5
various 55:13 58:5
verify 176:24
veritext 4:2,17
version 83:2
versus 4:9 188:4

vga 90:3,8
video 90:5 189:22
videographer 2:21 4:1 60:16,20 103:25 105:2 153:15,19 177:9,12 185:12,15 189:17
videotaped 1:11 189:18
view 29:5 70:14 72:13 73:3,5 75:12 96:24 114:7 115:2 128:14 156:19 159:24
virtual 60:3
visible 96:15
voltage 31:19,21,25 33:14 34:9,11 41:8 56:19 131:16,17
voltages 33:18 131:11
vs 1:5 191:5

w

wafer 55:17,19,21 55:25
waived 192:18
want 11:20 18:15 23:1 25:17 26:5 42:14 43:7 79:1 80:23 96:8 100:11 125:12 126:17 127:3 147:2,5,9 165:4 177:7
wanted 99:2
wants 112:18 152:16
watanabe 144:9 147:16,21 148:12 148:18 149:3,9,14 151:3,22 153:25 154:4 162:12,12 163:11 170:19,20 171:4,9,12 172:3,20
way 8:4 10:25 15:5 17:14 20:10,14,23 22:7 25:9,9,10 41:12 48:18 49:18 59:8 61:21,22 62:15 62:25 63:12,16 66:24 69:16 73:20 77:15 80:11 82:20 82:23 84:23 86:3,5 86:21 87:8 97:7 100:17 103:8 110:14 113:13 125:8 126:21 128:23,25 131:21 133:10 134:20 135:15,17,20 136:8 136:9 139:7,12 141:23 143:1 146:24 162:7 167:8 167:9,14,24 169:9 169:13
ways 21:24 39:21 40:23 60:2 62:5 66:2,21 67:17,19 93:22 125:6 167:6
we've 49:6 62:15 67:18 115:21 120:15 165:3
weight 145:11
welcome 105:8
went 5:12 8:7
whereof 193:7
white 31:7
wholly 65:10
wide 144:17 146:21 167:18
widen 149:7,18
widening 149:20 150:1
wider 148:12 149:25 150:3,20,22 151:9 151:12 152:2,3,6,12 152:13
width 145:11,17,21 146:12,15,21 149:9 151:11 152:18
wind 22:7 124:23
wire 29:24 30:16 37:14 107:4 110:12 111:7,8 124:15,15
wires 42:19 92:24 170:17
wiring 16:19 29:8 29:11,15,18 30:20 30:25 31:12,14,25 32:3,5,11,25 33:23 34:5,25 35:1,5,19 35:23 36:7,11,23,23 37:3,6,9,20 38:4,10 38:24 39:1 40:11,14 40:17,23 41:1,14,24 42:25 43:6,8,12,13 45:4,25 46:3,14 47:15,16,22,25 49:7 52:10 53:5 70:2 93:7 106:14 107:10 107:16,16 110:5,25 112:3,5,19 113:11 114:23,25 115:3 118:19 119:4,15 121:10,19 122:13 123:22,22,25,25 124:2,4,5,7 125:7 125:12 126:3,8,10 126:15,16,20,22 127:2,4,6,12,14,17 127:22 128:16 129:5,5,19 140:6,18 141:2,11 168:16,19 168:20 169:16,20 169:24 170:3,11,15
wirings 55:13 126:18 140:20 168:8
witness 3:1 4:13,17 10:9 11:13 13:10 17:10 22:20 26:5 29:17 30:2,18 32:10 33:3,5 35:15 37:2 55:23 64:3 77:1,18 79:4 81:8 84:19 85:11,21 87:11 88:5 89:21,25 91:4,7 97:4 101:7 102:10 112:9 115:15 117:14 118:15 120:10,21 124:17 125:20 127:10 128:2,20 130:6 132:11 133:5 135:4 137:11 141:14 143:22 146:18,24 148:4 155:14 156:8 156:18 161:12 162:5 163:18 171:1 171:3 172:8 179:9 179:23 180:15,24 181:14,23 182:25 183:16 184:7,18 185:6 186:11 187:4 187:15 190:1,4 193:7
word 12:19,21,24 13:4,13,13,16 15:7 16:5,6,12,23 31:22 49:6 68:20 92:1 127:14 174:13
words 10:19,20,25 11:1,24 13:6,21,25 18:17 19:25 24:24 26:11,14 33:15 92:3 131:15
work 12:6 54:5,8,20 54:21 56:11 129:7 133:25
working 55:2
worse 74:23
worth 99:6
wrap 177:8
write 26:1,21 27:4 27:11
wvga 90:8

x
x 3:1 35:25 167:16 **x1** 165:6 166:9 **x2** 165:7 166:9 **x3** 165:7 166:9 **x4** 165:7 **xi** 35:20,25 36:13,24 37:21 38:6 48:2,10 48:11,14,16 **xj** 48:6,9
y
y 37:16 167:17 **yeah** 10:6 35:16 51:15 60:12 64:20 87:3 89:8 90:24 98:3,4 99:12 122:18 145:6 148:4 165:17 169:14 **yesterday** 5:13 7:1 7:22 8:7 37:6 47:10 53:23 54:11 61:4 65:21 82:15 83:25 84:3 88:16 91:16 97:18 98:10,13 109:18 188:14 **yesterday's** 105:20 106:1 **yj** 36:3,8,12 37:13 37:22 38:7 48:3,8 52:11
z
zero 33:15