SEL EXHIBIT 2014

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

IPR2013-00068

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

INNOLUX CORPORATION,

Petitioner,

vs. No. IPR2013-00060

Patent 7,697,102

PATENT OF SEMICONDUCTOR,
ENERGY LABORATORY CO., LTD.,

Patent Owner.

VIDEOTAPED DEPOSITION OF MILTIADIS HATALIS, Ph.D.
Irvine, California
Friday, July 12, 2013

Reported by:
SHERRY A. CASE, RPR, CLR,
CSR No. 2989
Job No. 1683387

PAGES 1 - 178

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

INNOLUX CORPORATION,

Petitioner,

vs.

No. IPR2013-00060
Patent 7,697,102

PATENT OF SEMICONDUCTOR,
ENERGY LABORATORY CO., LTD.,

Patent Owner.

Videotaped Deposition of MILTIADIS HATALIS, Ph.D., taken on behalf of Patent Owner, at 3 Park Plaza, Suite 1100, Irvine, California, beginning at 9:03 a.m., and ending at 6:53 p.m. on Friday, July 12, 2013, before SHERRY A. CASE, Certified Shorthand Reporter No. 2989, CLR, RPR.

APPEARANCES:

FOR THE PETITIONER:

JEFFER MANGELS BUTLER & MITCHELL LLP
BY: GREGORY S. CORDREY, ESQ.
3 Park Plaza
Suite 1100
Irvine, CA 92614
949.623.7236
GCordrey@jmbm.com

FOR THE PATENT OWNER:

STEPTOE & JOHNSON LLP
BY: STANLEY A. SCHLITTER, ESQ.
DOUGLAS R. PETERSON, ESQ.
115 South LaSalle Street
Suite 3100
Chicago, IL 60603
312.577.1250
Sschlitter@steptoe.com
Dpeterson@steptoe.com
Ahomier@steptoe.com

APPEARANCES (CONTINUED):

FOR THE PATENT OWNER:

ROBINSON INTELLECTUAL PROPERTY LAW OFFICE
BY: SEAN FLOOD, ESQ.
3975 Fair Ridge Drive
Suite T20 North
Fairfax, VA 22033
571.434.6789
Sflood@riplo.com
Erobinson@riplo.com

VIDEOGRAPHER: SCOTT SLATER
VERITEXT LEGAL SOLUTIONS

I N D E X

WITNESS: MILTIADIS HATALIS, Ph.D.

EXAMINATION

E X H I B I T S

Irvine, California; Friday, July 12, 2013 09:02
9:03 A.M.
09:03

THE VIDEO OPERATOR: Good morning. 09:03

We are on the record at 9:03 a.m. on July 12th, 2013. This is the video-recorded deposition of Dr. Milt Hatalis. 09:03 09:03 09:03

I'm Scott Slater, here with our court reporter, Sherry Case. We are here from Veritext Legal Solutions at the request of the patent owner. 09:03 09:04 09:04

This deposition is being held at 3 Park Plaza, Suite 1100, in the City of Irvine, California 92614. The caption of this case is Innolux Corporation versus Patent of Semiconductor Energy Laboratory Co. dot -- or Co., LTD, Case No. IPR 2013-00060, Patent 7697102. 09:04 09:04 09:04 09:04 09:04

Please note that audio and video recording will take place unless all parties agree to go off the record. The microphones are sensitive and may pick up whispers, private conversations, or cellular interference. 09:04 09:04 09:04 09:04 09:05

I am not authorized to administer an oath. I am not related to any party in this action, nor am I financially interested in the outcome in any way. 09:05 09:05 09:05

May I please have an agreement from all parties that we may proceed. 09:05 09:05

MR. SCHLITTER: We agree. 09:05
MR. CORDREY: Yes. 09:05
THE VIDEO OPERATOR: Thank you. 09:05
At this time, will counsel and all present 09:05
please identify themselves for the record. 09:05
MR. SCHLITTER: Stan Schlitter and Doug 09:05
Peterson from Steptoe & Johnson for the patent owner, 09:05
and also Sean Flood from Robinson & Marshall 09:05
Intellectual Property Office for the patent owner. 09:05
MR. CORDREY: Gregg Cordrey of Jeffer, Mangels, 09:05
Butler & Mitchell on behalf of the petitioner, Innolux 09:05
Corporation. 09:05
THE VIDEO OPERATOR: Thank you very much. 09:05
Will the court reporter please administer the 09:05
oath. 09:05
THE COURT REPORTER: You do solemnly swear that
the testimony you're about to give in the cause now
pending to be the truth, the whole truth, and nothing
but the truth.
THE WITNESS: I do.

MILTIADIS HATALIS, Ph.D.

having been first administered an oath, was examined
and testified as follows:

EXAMINATION

09:05

BY MR. SCHLITTER: 09:05

Q Good morning, Dr. Hatalis. 09:05

A Good morning. 09:05

Q Since your deposition's been taken several times before, I will skip some of the preliminary things about depositions, but just remind you, of course, you're under oath and -- and obligated by law to tell the truth to all the questions. 09:05 09:06 09:06 09:06 09:06

Do you understand that? 09:06

A Yes. 09:06

Q And also, if I ask a question that you do not understand, please let me know. If you -- if you don't let me know that, it will be assumed that you've understood the question that I asked. 09:06 09:06 09:06 09:06

A Okay. 09:06

Q Did you do anything to prepare for your deposition today? 09:06 09:06

A I did. 09:06

Q What did you do? 09:06

A I review my declaration. I review the petition. I review the initial response, preliminary response of the patent owner. I review the decision from -- of the board. I review the relevant patent, 09:06 09:06 09:06 09:07

the '102 Patent, and the -- the prior art patent that I list in my declaration, namely, the Shiba patent and the Moriyama patent. 09:07 09:07 09:07

Q Did you review any other document to prepare for your deposition today? 09:07 09:07

A I -- I review briefly the transcripts of the last three depositions, particularly as -- as one of them related to the Shiba. 09:07 09:07 09:07

The Shiba was a prior art in another recent deposition of mine. 09:07 09:07

Q Do you remember which deposition it was? 09:07

A Was that 206? It was... 09:07

MR. CORDREY: 204. 09:07

THE WITNESS: 204. Okay. 09:07

BY MR. SCHLITTER: 09:07

Q Is that the only transcript you reviewed? 09:07

A Recently. 09:08

A few weeks ago, I review the -- the transcripts for the first three depositions that were -- were held in this room in May. 09:08 09:08 09:08

Q Your depositions, you mean? 09:08

A Right, my depositions in re to '480 and '978. 09:08

I didn't read those ones for today's deposition. 09:08 09:08

And I also met with a -- with my counsel. 09:08

Q When did you meet? 09:08
A The last two days. 09:09
Q Who specifically did you meet with? 09:09
A Mr. Glenn Cordrey and his colleague, Ali Shalchi. 09:09 09:09
Q Other than reviewing those depositions and the meeting you had for the last two days, did you do anything else to prepare for your deposition today? 09:09 09:09 09:09
A I -- I don't recall. No. 09:09
Q Okay. I've put in front of you what was previously marked as Exhibit CMI 1005 captioned "Declaration of Miltiadis Hatalis, Ph.D." 09:09 09:09 09:09
Do you recognize this? 09:09
A Yes. This is my declaration in support of the petition for the Patent '102. 09:10 09:10
(Exhibit 1005 was previously marked for identification and is attached hereto.)
BY MR. SCHLITTER:
Q Referring to Appendix A, which is your curriculum vitae, is this accurate and up to date? 09:10 09:10
A More or less as of the time of -- of the writing, which was in November. 09:10 09:10
Q Was there a change you would make to update it as of today? 09:11 09:11

A There are some few additional papers and grants that I received. 09:11 09:11

Q Did any papers pertain to liquid crystal displays? 09:11 09:11

A They were related to isometric displays, in particular the active matrix organic light-emitting diode displays. 09:11 09:11 09:11

And some of the papers are related to TFT, to a new TFT technology called IGZO, and this new technology can be applied both to liquid crystal displays as well as to active matrix or LED displays. 09:11 09:11 09:12 09:12

You had requested at the last deposition that you took from me an updated vitae, and I have provided that to my counsel, which is updated as of June 2013. 09:12 09:12 09:12

MR. SCHLITTER: Could you provide a copy to us, please? 09:12 09:12

MR. CORDREY: Yeah. 09:12

MR. SCHLITTER: Okay. 09:12

BY MR. SCHLITTER: 09:12

Q Is there anything else that you are aware of that should be added to update and make current your curriculum vitae, Appendix A? 09:12 09:13 09:13

A In addition to the scientific papers, there is a patent that has been issued in the spring that I'm a co-inventor. I also need to update in the patent 09:13 09:13 09:13

litigation cases this case, regard this case. 09:13
And in the area of -- of the grants, research funding, which is the -- the last section in mine, I receives two additional research gifts since the time that this vitae was prepared. 09:13 09:13 09:13 09:14
Q Were any of the grants that you've received recently that are not listed on this Appendix A ones you received from industry? 09:14 09:14 09:14
A They were all from industry. 09:14
Q Were any of them from any company outside the United States? 09:14 09:14
A No. 09:14
These are U.S.-based companies. Some of them may have international divisions, but they are U.S.-based companies. 09:14 09:14 09:14
One of them -- actually, that one, I think, was listed. 09:14 09:14
One gift was from Supralaboratories of America, SLA. They're -- it's a U.S.-based company. 09:15 09:15
But the other company is Sharp in Japan. 09:15
Q Did you read every word of this declaration before you signed it? 09:15 09:15
A This is my declaration. Of course I read every word, to make sure there are not inaccuracy and stuff like that. 09:15 09:16 09:16

But I have also prepared this declaration. 09:16

Q What was the process that you went through to prepare this declaration? 09:16

A I review the '102 Patent. I review prior art, literature, namely, patents. And I received guidance from the -- from the counsel related to the format and the -- the process of preparing because this is a new proceeding. 09:17

By the time of '102, I have already prepared one or two. They may be not the sequence. This is probably the third or the fourth in -- in a series of five that I worked on in the fall of 2012. 09:17

Q Did you do any prior art searching in connection with preparing this declaration? 09:17

A I was provided with a folder of -- that included several pieces of -- of prior art, and I became familiar with those pieces of prior art, and I selected the ones most relevant to prepare this declaration. 09:18

Q Who provided you that folder of prior art patents? 09:18

A The counselor, Oblon. 09:18

Q Who specifically? 09:18

A Scott McHugh is the lead counsel. I -- I -- I worked with other attorneys at Oblon. 09:18

If my memory is correct, the '102 involved also Tom Fisher. 09:18 09:18

Q Did you select any patent from that folder -- let me start over. 09:19 09:19

Did you select the Shiba reference from that folder? 09:19 09:19

A Yes. 09:19

Q Did you select the Moriyama reference from that folder? 09:19 09:19

A Yes. 09:19

Q Did you select any other reference from that folder? 09:19 09:19

A I reviewed references from that folder here. As I said, all them, those are ones that were selected in this final document. 09:19 09:19 09:19

Q Have you had any prior experience with respect to the '102 Patent prior to your work in connection with preparing this declaration? 09:19 09:20 09:20

A What do you mean by "prior experience"? 09:20

Q Had you seen that patent before? 09:20

A I do not recall. I do not think so. 09:20

Q Who prepared the first -- 09:20

A Just to make sure that I am fully answer your questions, the -- when you said "prior," I would assume it is prior to the beginning of these five 09:20 09:21 09:21

declarations of mine, which means -- which means prior to the onset of these preparations, which means prior to, I guess, September of 2012. 09:21 09:21 09:21

Before working on the '102 Patent, I worked on the '480 Patent, and the '102 and '480 share the same specifications. So right before '102, I became familiar with the '480. 09:21 09:21 09:21 09:21

But prior to the September of 2012, I do not recall seeing these -- any of these patents. 09:21 09:21

Q Who prepared the first draft of this declaration? 09:22 09:22

A The outline, the format of what needs to be done, the different sections, because I've never done this before. As I said, these are new proceedings, was provided by the Oblon. 09:22 09:22 09:22 09:22

But the content in the different sections, these were my content. This is content that I provided. 09:22 09:22 09:23

Q So I have handed you a copy of United States Patent 7697102, Hirakata, et al. It's marked previously as CMI Exhibit 1001. 09:23 09:23 09:23

Is this the so-called '102 Patent you've been referring to? 09:23 09:23

A Yes. 09:23

(Exhibit 1001 was previously marked 09:24

for identification by the court reporter and is attached hereto.)

BY MR. SCHLITTER:

Q Do you understand that this '102 Patent discloses first, second, and third internal conducting lines? 09:24 09:24 09:24

A Yes. 09:24

Q So, for example, Claim 15 refers to a first internal conducting line and a second internal conducting line. 09:24 09:25 09:25

What do those correspond to, in your opinion, in the '102 Patent? 09:25 09:25

MR. CORDREY: Objection. Form. 09:25

THE WITNESS: The '102 Patent is describing connections between an extractor terminal and the common contact portions, and there are four sets of common contact portions that provide a signal to the counter electrode. 09:25 09:25 09:26 09:26 09:26

Starting from the extractor terminal -- 09:26

BY MR. SCHLITTER: 09:26

Q Are you referring to a figure? 09:26

A Figure 13 is the common contact portions, and Figure 3 lists the four sets in common contact -- the presence of four sets contact -- common contact portions. 09:26 09:26 09:27 09:27

Q Where are the common contact portions shown in Figure 3? 09:27 09:27
A These are the 206a, 206b, 206c, 206d. 09:27
Q Are extractor terminals shown in Figure 3? 09:27
A The ones connected to the common contact portions are the 205a and the 205b. 09:27 09:27
Q Are there other extractor terminals in Figure 3, other than 205a and 205b? 09:27 09:27
A Yeah. 09:27
There are a plurality of -- of... 09:27
Q Do you understand that numeral 205 was a lead line going to inside of a dashed line to encompass extractor terminals, to identify extractor terminals? 09:27 09:28 09:28
A Give me one second, please. 09:28
There are many extractor terminals highlighted or labeled as 205 that provide electric power and control signals from the outside to the various parts on the substrate 201, and those parts are the peripheral circuits that drive the display. These are the -- peripheral circuits are the 203 and 204. 09:29 09:29 09:29 09:29 09:29 09:30
And two of those extractor terminals are connected and provide the power to the common contact portions which I have identify a moment ago, 206a, b, c and d. 09:30 09:30 09:30 09:30
Q Are the two extractor terminals that provide 09:30

power to the common contact portions labeled in Figure 3? 09:30 09:30

A These are 205a and 205b. 09:30

Q Are 205a and 205b referred to in the '102 Patent as common terminals? 09:31 09:31

A That is correct. 09:31

That is in Column 8, Line 15. It is electrically connected with common terminals 205a and 205b, respectively. 09:31 09:31 09:31

Let me read the whole quote. Column 8, Line 14, it reads, 09:31 09:31

"The internal lines 207a and 207b extend to the extractor terminals 205 and are electrically connected with common terminals 205a and 205b, respectively." 09:32 09:32 09:32 09:32 09:32

So the bigger question, of course, related to the first internal conducting line and the second internal conducting line. These are lines that are used in these internal lines 207a and 207b. 09:32 09:32 09:32 09:32

Q If you look at Claim 15, one of the elements of Claim 15 reads as follows, 09:32 09:33

"A first internal conducting line electrically connected to the common terminal in the contact hole wearing 09:33 09:33 09:33

the first internal conducting line and 09:33
a gate electrode of the thin-film 09:33
transistor are created by a first 09:33
processing step." 09:33
Is the first internal conducting line shown in 09:33
Figure 3? 09:33
A It is the line 207c. 09:33
And in Column 9, Line 61, it reads, 09:34
"The internal conducting lines 207c 09:34
and the gate electrode 307 were 09:34
created by the same processing step." 09:34
Q Referring again to Claim 15, another element of 09:35
Claim 15 reads as follows, 09:35
"A second internal conducting line and 09:35
a source electrode and a drain 09:35
electrode of the thin-film transistor 09:35
created by a second processing step." 09:35
Is a second internal conducting line shown in 09:35
Figure 3? 09:35
A It is shown. 09:35
Q Where is that shown? 09:36
A For example, line 207a. 09:36
Q Claim 39 includes the following element, 09:36
"A third internal conducting line 09:37
formed from a same layer as the source 09:37

electrode and the drain electrode of 09:37
the thin-film transistor, the third 09:37
internal conducting line electrically 09:37
connected to the first internal 09:37
conducting line and the third internal 09:37
conducting line electrically connected 09:37
to the common terminal." 09:37
Is a third internal conducting line shown in 09:37
Figure 3? 09:37
A Let me first complete my answer to your 09:38
previous question and I will answer this question. 09:38
Your previous question was is a second internal 09:38
conducting line shown in Figure 3, and I answered it 09:38
is shown. 09:38
And you asked me where is that shown, and I 09:38
gave you an example of line 207a. 09:38
Within the context of the limitations described 09:38
in Claim 15, another example of the second internal 09:39
conducting line is the line 207b. So if we look at 09:39
the Claim 15, there are two lines that meeting the 09:39
limitations of the second internal conducting line. 09:39
Turning to the latest question, related to 09:39
Claim 39, in the third internal conducting line, 09:39
the -- one of those two lines, namely, 207a or 207b, 09:40
can be viewed as the third internal conducting line. 09:40

So within the context of the Claim 39, one of the 207a and 207b is the third internal conducting line and the other is the second internal conducting line.

Q You identified terminals 205a and 205b as the common terminals, correct?

A That is correct.

Q What material are those terminals formed from in the '102 Patent?

A The claims refer to the common terminal as being formed from the same layer as the pixel electrode, but the common terminals 205a and 205b, as shown in Figure 3, are electrically connected to the wiring that leads to 206a and 206d, and that wiring -- since 207a and 207b, which we have identified them as the second internal conducting lines is made by the same material as the drain electrodes and the source electrodes, the layer of the common terminal made by the pixel electrode material is connected to the layer of material made by the source and drain electrode.

So the common terminal or the extractor terminal is the multi-layer structure. The upper layer, referred to as the common terminal, is made by the pixel electrode layer, whereas the lower layer is made by the source and drain electrode layer.

In this particular embodiment. It could be made with another material as well. It could be made with the same material as the -- as that used to make the first internal conductor lines. It is not clear how it is made. 09:44 09:45 09:45 09:45 09:45

The claim specifies that the common terminal, the layer which is made by the pixel electrode material, is electrically connected to the first internal conducting lines. So someone skilled in the art could see that one way to do that is to have a layer of the first internal conducting lines being connected -- electrically connected in the extractor terminal region itself. 09:45 09:45 09:45 09:46 09:46 09:46 09:46 09:46

The specifications are not clear, and I believe they're not providing a cross-section of the extractor terminals itself. There is enough detail in the cross-sections provided for the common contact portions. 09:46 09:46 09:46 09:46 09:46

Another approach is to have the lower level -- 09:47

Q Stop right there. 09:47

Where in the specification is there a disclosure that the common terminals are more than a single layer of material? 09:47 09:47 09:47

A In the specifications or in the claims? 09:47

Q In -- in the '102 Patent specification. 09:47

A For example, in Column 10, Line 15, it reads, 09:50
"Moreover, the contact holes for 09:51
connecting the internal conducting 09:51
lines 318," and in parentheses, "207a 09:51
and 207b," close parentheses, "with 09:51
the common terminals 205a and 205b at 09:51
the extractor terminals 205 were 09:51
formed." 09:51
So in this section here, Column 10, Line 15 to 09:51
18, it indicates that in the extractor terminal we 09:51
have the common terminals, and there is a contact hole 09:51
in the extractor terminal that connects with another 09:51
layer, and that layer could be the same layer as that 09:52
used to make the internal conducting lines 207a and 09:52
207b. 09:52
So someone skilled in the art would understand 09:52
that you have the common terminal and there is a 09:52
contact hole, there must be another layer below it, 09:52
and hence it is disclosed is a multi-layer structure. 09:52
Q But yet, you mean -- you think the common 09:53
terminal is multi-layer or do you mean this whole 09:53
composite of things in that sentence is multi-layer? 09:53
A That the extractor terminal is a multi-layer 09:53
structure. And one layer, which you have it in the 09:53
files, a common terminal, is the Indium tin oxide. 09:53

There will be another layer, and the two will be connected. 09:53 09:53

Q They will be connecting in the contact hole? 09:53

A There will be a contact hole. 09:53

The -- the common terminal may be physically touching the other metal, and then there is -- 09:53 09:54

Q "Other metal" meaning what? 09:54

What other metal? 09:54

A Like the metal that is making the 207a and 207b, for example. 09:54 09:54

Q Do you mean in the contact hole? 09:54

A Well, in general, there are -- in making a display, there are multiple layers, multiple metal layers, and there are three such metal layers. There is a metal layer used to make the gate lines or the gate electrodes, the metal layer used to make the data lines and the source and drain electrodes, and there is the metal layer used to make the pixel electrodes. Two of those layers are used in the extractor terminals. 09:54 09:54 09:54 09:54 09:54 09:54 09:55 09:55 09:55

Now, in addition to those layers, those conductive layers, there are two insulating layers. 09:55 09:55

Q Where are the two layers -- where is it disclosed that the extractor terminals are two layers? 09:55 09:55

Let me back up and withdraw that question. 09:55

A Because I can answer it, if you still want to place it. 09:55 09:55

Q If you look at Column 10, Line 36, beginning at Line 36, it reads -- well, let me start at Line 31. 09:55 09:55

"A thin metal film which would later be made into pixel electrodes 322 and the conducting pad 323 were formed to a thickness of 100 to 400 nanometers." 09:56 09:56 09:56 09:56

Then there's -- that's a quote. Then there's another sentence which has to do with -- then there's another sentence after that that reads: 09:56 09:56 09:56 09:56

"Then the thin metal film was patterned to form the pixel electrodes 322 and the connecting pad 323. This pad 323 measured 1.1 millimeters by 1.1 millimeters was rectangular and covered the contact holes 321." 09:56 09:56 09:56 09:56 09:56 09:57

Then the following sentence: "The extractor terminals 205 were also patterned." 09:57 09:57

Do you understand that to mean that the extractor terminals were patterned from the same film as the pixel electrodes? 09:57 09:57 09:57

A One layer of the extractor terminals was made and patterned at that time, and -- and that's the 09:57 09:57

claims refer to as the common terminal. That is -- that's the upper layer. The upper exposed metal layer. 09:57

But the section I quoted -- 09:58

Q Meaning Lines 15 through 18? 09:58

A Right. It says that at the extractor terminals there are contact holes, and that the internal conducting lines and the common terminals are connected in the extractor terminal regions. 09:58

So there are multi-layer structures that are connected. Different layers are connected in the extractor terminals. 09:58

Q What do you understand is meant in Lines 15 and 16 by the phrase "contact holes for connecting the internal conducting lines 318," paren, "207a and 207b," close paren, "with the common terminals 205a and 205b"? 09:59

That's actually Lines 15 to 17. 09:59

A As I stated earlier, there are three metal layers and there are also two insulating layers. The one insulating layer is the gate electric. Oh, actually, to be clear, it depends upon the device structure, there may be three insulating layers. 10:00

For the -- the structure depicted in the -- in the prior art, which is a top gate TFT, the three 10:01

dielectric layers are the gate dielectric, the incremental dielectric between the scan line material, the gate dielectric metal, and the drain electrode metal. And then there is the passivation layer that's the third dielectric. All these are above the TFT structure. 10:01 10:01 10:01 10:01 10:01 10:01

Q Are you referring to a figure? 10:01

A Figure 13. 10:01

Q The gate dielectric in Figure 13 is unlabeled, correct? 10:01 10:02

There's not a number by it? 10:02

A No, it's not labeled. 10:02

Q But it's the one that would override the gate lines or the gate electrodes? 10:02 10:02

A It would be below the gate electrodes. It would be between the gate electrodes and the semiconductor that makes the thin-film transistor. That's the gate electrode in these structures here. 10:02 10:02 10:02 10:02

In amorphous silicon technology, which they have the bottom gate, in that technology the gate electrode is above. The gate electrode, in this technology, is below the gate electrode. 10:02 10:02 10:02 10:02

Q Is this a bottom gate or top gate technology? 10:02

A In Figure 13, it is a top gate. 10:02

Do you want me to show you on the figure where 10:03

it is? 10:03

Q Is it under the crossed-hatched rectangle towards the left -- bottom left of Figure 13? 10:03 10:03

A If you're referring to the gate electrode in the middle of the transistor, yes. 10:03 10:03

Q The first white strip right under the crossed-hatched gate electrode would be the gate dielectric, correct? 10:03 10:03 10:03

A Right. 10:03

It's a very thin layer in this schematic. 10:03

Q Then there's a second dielectric, also unlabeled, that overlies both the gate dielectric and the gate electrode in this Figure 13, correct? 10:04 10:04 10:04

A Correct. 10:04

Q That's what you referred to as -- did you say intern metal -- 10:04 10:04

A Right. It's -- the -- consider the gate electrode is a metal and the source and drain electrode is also made by metal, then that dielectric serves the two metals being in electrical isolation. 10:04 10:04 10:04 10:04

So then the gate lines and data lines do not have electrical connection when they're crossing, and there will be many such crossings in the display area. 10:04 10:04 10:04

Q Is the third insulating layer that you mentioned the passivation layer shown in Figure 13? 10:04 10:05

A The third is label 18, the element 18 in Figure 13. So there you have the three metal layers. And in this technology here, the three insulating layers. 10:05 10:05 10:05 10:05

And referring to the extractor terminal, one possible way of making the extractor terminal will be exactly the same as that shown in Figure 13 as the common contact portion. 10:05 10:05 10:05 10:05

And in a way, it -- it -- someone skilled in the art will look at the common contact portion, and there are four such areas where these common contact portions are made, and then will implement the exact same structure in the extractor terminal. 10:06 10:06 10:06 10:06 10:06

And in this technology where the metals are laying in this particular order and the dielectrics, the insulating layers that we referred to are also put down in this specific order, then, in the extractor terminal, the -- what will be the common terminal, which is a layer made of the pixel electrode, will go down to an opening, which we'll call it contact hole, and will then touch, as shown in Figure 13, the lower layer, which is made of the source and drain electrode material, and the structure there would be similar here. So the upper layer will be like layer element 22 of Figure 13, and the lower layer will be like the 10:06 10:06 10:06 10:06 10:07 10:07 10:07 10:07 10:07 10:07 10:07 10:07

element 21 in Figure 13, and then there will be a 10:07
contact hole as shown in Figure 13. 10:08
But that's one of -- of -- of possible two 10:08
implementations in this particular embodiment, in this 10:08
particular way of putting the material down, this is 10:08
how it would be made. 10:08
Q You said this is one of two possible 10:08
implementations. 10:08
What is the other possible implementation, in 10:08
your opinion? 10:08
A The other possible implementation will be to 10:08
have the -- so we start from the metal -- the source 10:08
and drain metal layer. And looking at Figure 13, it's 10:08
the element labeled 21. 10:08
There are two layers above that metal layer 10:08
labeled 21. It is the insulating layer label 18 and 10:09
the metal layer that forms element 22 and 19, which is 10:09
the pixel electrode layers. In this particular 10:09
embodiment, at least the 18 -- the insulating layer 10:09
above 21, and 19 and 22 above 18. 10:09
The other way to build this structure is to 10:09
reverse the order and put the pixel electrode layer 10:09
that forms the elements 19 and 22 after patterning 10:09
right above element 21 and right above the source and 10:09
drain electrode shown in the pixel region, and then 10:10

put the insulating layer 18 above them. 10:10

You will still need to have an opening so that the conductive particles 26 will make a contact to the counter electrode, element 24. 10:10

In the second approach that I just highlight, one would have to adjust the design so that the element 19 that you see in the pixel region will not extend and will not overlap with the other device terminal, will only make physical contact with one of the device terminals. And the other one -- 10:11

Q By "device terminals," you mean source or drain? 10:11

A Right. 10:11

The -- the device is very symmetric. We'll call them one source and the other drain. And one side is connected to the data lines and the other side is connected to the pixel electrode. 10:11

In the embodiment that you put 19 right on top of the, say, drain electrode, you want to make -- if we call the ones touching the drain electrode, the other one, we will call it source, will be connected to the gate lines, and 19 should not touch the source electrode because then it will be connected to the data lines. 10:11

So you need to adjust the -- the layout so that 10:11

19 will only touch one of the two electrodes. 10:12

In any way, that region which overlaps the -- the source electrode and the gate line -- the drain lines, these are not -- non-illuminating regions because the metal blocks the light. 10:12 10:12 10:12 10:12

So stopping the pixel electrode short of touching the other metal, the other side of transistor, will not have any effect on the properties of the transmissive display because the -- the metal, anyway, will -- will be blocking the light. 10:12 10:12 10:12 10:12 10:12

Q So Figure 13, which is labeled prior art, that you're talking about, in your modification you would make layer 22 the same layer as the pixel electrode and eliminate -- on the outside of the pixel region, you would eliminate insulating layer 18; is that correct? 10:12 10:12 10:13 10:13 10:13

A No. I would not eliminate 18. 18 will -- will be over that extra layer. 10:13 10:13

Q Okay. You would put it on top of layer 22 instead of beneath it? 10:13 10:13

A Correct. 10:13

And then you will form the opening so the conductive particle 26 makes the electrical connection to the counter electrode 24. 10:13 10:13 10:13

Q Then, are you -- are you saying the pixel 10:14

electrode 19 would be at the same -- be formed from 10:14
the same layer as the layer 22? 10:14
A Yes. 10:14
You still have three metal layers. 10:14
Q So at the same time you lay down the pixel 10:14
electrodes, you -- you would lay down layer 22, 10:14
correct?
A Well, 19 and 22 are from -- from the same 10:14
initial metal layer. 10:14
Q Would they both -- 10:14
A After -- after patterning, the elements 19 and 10:14
22 are formed. 10:14
Q If you put the drain on -- I mean, the pixel 10:14
electrode 19 beneath the insulating film 18, 10:14
insulating layer 18, would the spacers 25 then be 10:15
riding on top of the insulating film 18, in your 10:15
modified version, in the pixel region? 10:15
A If I understand your question, well, that would 10:15
depend upon whether in the pixel region you leave the 10:15
layer 18, that insulating layer, intact; in other 10:15
words, you do not form an opening to expose the pixel 10:15
electrode 19. And in that case, the insulating -- the 10:15
spacers 25, they would be above 18. 10:16
Q So they would just rest on 18 in your modified 10:16
version? 10:16

A Well, my modify version has, in that particular region, two other modifications. In one modification is what we just discussed, in which the 18 stays intact. And in that case, 25 are above 18. 10:16 10:16 10:16 10:16

The other modification that one can do in the pixel region is to create an opening on top of the pixel electrode same way that you have the opening in the common contact portion, in -- in where, above the pixel electrode region, you will remove the insulating layer 18. 10:16 10:16 10:16 10:16 10:17 10:17

In that case, the spacers 25, they will be on top of the pixel electrode 19. In that case, they could be the same size as 26. 10:17 10:17 10:17

Q None of that is disclosed in the '102 Patent, is it? 10:17 10:17

A Well, all that are natural extensions of -- of -- of what was known in the prior art, and here it shows one particular implementation, one particular embodiment, one particular structure. 10:17 10:17 10:17 10:17

The motivation for removing 18 above the pixel electrode is to reduce the driving voltage, the operating voltage for the display. All those -- all those things were well known in the art. 10:17 10:18 10:18 10:18

Q What is the function, in Figure 13, of the insulating layer 18 in the pixel region? 10:18 10:18

A Well, it serves to provide a protection and a passivation to the thin-film transistor and to the conductive lines that are on the display. 10:18

There are hundreds or thousands of data lines that go across the display and interconnect each pixel to the circuit or to the external drivers, so then the -- each pixel will receive the right signal. And those lines, they will need to be protected and be locally isolated. 10:19

Q Does the transistor labeled 17 in Figure 13 show a source and drain electrode? 10:19

A Yes, it shows them. They're not labeled, but it -- it shows them. 10:19

Q And then one of them is connected to the pixel electrode 19, correct? 10:20

A Yes.

Q The other one is not connected to pixel electrode 19, is it? 10:20

A Correct. 10:20

Q Would the device function if both the source and drain electrodes were connected to the pixel electrode 19? 10:20

A As I said -- as I said a few lines above in my previous answer, that the pixel electrode 19 will have to be modified so it will not touch the other 10:20

transistor terminal. 10:20

Q So it won't function if it touches the other transistor terminal, correct? 10:20 10:20

A It will not function. 10:20

And that's why it has to be isolated from it, and that's a simple change in the mask, and that's how all pixels designs that employ such structure have been referred to in -- in the literature. They always were known, and it was shown in -- in the path, even the one side used that are not touching it, even if they are right above it. 10:20 10:20 10:21 10:21 10:21 10:21 10:21

Q In Figure 13, isn't it correct that insulating layer 18 serves to electrically isolate the source and drain electrodes from each other? 10:21 10:21 10:21

A The source and drain electrodes are -- are not connected in -- in Figure 13 with or without the insulating layer 18. 10:21 10:22 10:22

The insulating layer 13 -- 10:22

Q You mean 18? 10:22

A Yes. Yes, insulating layer 18. 10:22

The insulating layer 18 provides further protection in those two layers and protection against corrosion or mechanical scratches. And if it is moisture, maybe removes conductive paths through the moisture. That is not that the source and drain 10:22 10:22 10:22 10:22 10:22

electrode are isolated, because 18 is right above it. 10:22
But even in the modification structure that I 10:23
have described, you still use layer 18. You -- you 10:23
have a modified 19, and then you will still put 18 10:23
above it. So the purpose of 18 will still be 10:23
maintained to provide the protection and further 10:23
isolation of the TFT structure. 10:23
Q Which of the terminals in Figure 13 of the 10:23
transistor connects to the pixel electrode 19? 10:23
A Looking at the figure, it is the terminal on 10:23
the right. 10:23
Q Call that the drain? 10:23
A We can call that the drain. 10:24
Q Okay. So the drain in Figure 13 of the TFT 17 10:24
connects to pixel electrode 19, correct? 10:24
A Correct. 10:24
Q In Figure 13, is it correct that pixel 10:24
electrode 19 needs to be electrically isolated from 10:24
the other terminal of the transistor, the TFT 17, 10:24
which would be the source electrode? 10:24
A It has to be isolated. And that's why, if you 10:24
have 19 above the drain electrode, 19 will be -- will 10:24
have a different shape, an outline than the one shown 10:24
in Figure 13. It will not extend over it. 10:24
See, this particular display structure is shown 10:25

in Figure 13, is a reflective type display. This was a -- a special type of -- of -- of displays not commonly used. And in a reflective display, you would like to maximize the area where the light gets reflected.

So in -- in making a reflective display, you will probably choose to make the structures as shown in Figure 13, where you would choose to put the insulating layer first, 18, and then put the pixel electrode 19. So then you can overlap other metal lines and maximize the amount of light that you will reflect from the top surface.

And that's why the section that you -- you skipped earlier, it causes the pixel electrodes -- it is a metal layer and we call it highly reflective metal layer that includes aluminum.

Q Where did you see that?

A See what?

Q The aluminum. The pixel electrode layer includes aluminum.

A So if we look at Column 10, I believe that is the section that you were still reading a moment ago, and you skip some sections.

So in Column 10, line 31, it reads:

"A thin metal film which would

later be made into pixel electrodes 10:27
322 and a conducting pad 323 were 10:27
formed to a thickness of 100 to 400 10:27
nanometer," period. 10:27
"In the present example, the thin 10:27
metal film was made of an aluminum 10:27
film containing one weight percent 10:27
titanium from deposit to a thickness 10:27
of 300 nanometer by spattering. Then 10:27
the thin metal film was patterned to 10:27
form the pixel electrodes 322 in the 10:27
conducting pad 323." 10:27
The extractor terminals -- few sentences 10:27
below -- were also patent, and that's what you read, I 10:27
believe, a moment ago. 10:28
So in this particular type of reflective 10:28
displays, you need to maximize the pixel electrode 10:28
area on the surface because the light will come from 10:28
the top, and it will be reflected also from the top. 10:28
In a transmissive display, and the great 10:28
majority of -- of displays that we use are 10:28
transmissive displays, the light will -- will come 10:28
from one side of the display and will emerge through 10:28
the pixel electrode, will travel through pixel 10:28
electrode. They will merge from the other side 10:28

of the -- of -- of -- of the other glass, the counter substrate. 10:28 10:28

In those -- in -- in the transmissive displays, any metal layer which is used to form the source electrode, drain electrode, gate electrodes and data lines and scan lines, they all are blocking the light. So there is no motivation for 19 to extend, in a transmissive display, over the other transistor terminal because the light there will already be blocked by the underlying metal. 10:28 10:28 10:28 10:28 10:29 10:29 10:29 10:29

And because the electron functionality requires not to be connected, it serves no purpose to -- to extend it. The display will equally function fine. 10:29 10:29 10:29

It will function, actually, without being extended, and you will not suffer any limitation in a transmissive display if you do one structure or the other structure. The performance of display, it will be exactly the same if you put 19 above 18 or if you put 19 below 18. For a transmissive display, the performance of display, the visual performance will be exactly the same. 10:29 10:29 10:29 10:29 10:29 10:29 10:30 10:30

Q You have been describing your proposed modifications of the prior art structure that's shown in Figure 13. 10:30 10:30 10:30

But looking now at the -- at the structure that 10:30

is the subject of the '102 Patent, that's in Figures 3 and Figure 5, A through G, do you see that Figure 5 shows also three insulating layers?

A Yes.

Q And those would be the gate dielectric, which would be on top of the substrate, correct?

A The gate dielectric is -- what's shown in Figure 5A is element 303.

Portions of those films, as you see, are extended below the gate electrodes, element 305, and, hence, takes its name gate dielectric because it's between the gate and the semiconductor, which is the element label 302.

Q And there's an insulating layer 315 also, correct?

A Right.

This is what we call early in our discussion as the first incremental dielectric.

Q And then there's a third insulating film labeled 319, correct?

A Correct.

We'll call that passivation layer.

Q In Figure 5G, passivation layer 319 serves to electrically isolate the pixel electrode 322 from the source electrode that is the electrode on the left of the TFT, correct? 10:32

A In this particular embodiment, which is stated is a reflective display, you would need to maximize the -- the size of the pixel electrode 322 because light will come from the top and they will be reflected again outwards. So light will come in from the top and would go out from the top. 10:32 10:33 10:33 10:33 10:33 10:33

In that case, you do need to maximize the area where you have metal that will reflect the light. And 322 is such highly reflective metal -- as you read, it's aluminum -- and in this type of display, someone skilled in the art will know that this is the preferred embodiment because you will maximize the pixel electrode. 10:33 10:33 10:33 10:33 10:33 10:33 10:33

But that's -- approach, that structure, it -- it is -- is not the approach you will take if you have a transmissive display. You will not need -- you will not gain anything by overlapping 322 above the source electrode because the source electrode and the drain lines, they will block the light from -- from below. 10:33 10:33 10:34 10:34 10:34 10:34

And you could use them as a black matrix. That's another -- another approach. But normally there is a black matrix already on the display, on the counter substrate. 10:34 10:34 10:34 10:34

Q Let me ask the question again, which you did 10:34

not answer. 10:34

In Figure 5G, is it correct that passivation layer 319 serves to electrically isolate the pixel electrode 322 from the source electrode that is the electrode on the left of the TFT? 10:34 10:34 10:35 10:35

A In this particular embodiment, where you need to maximize the 322, the layer 319 does serve to electrically isolate the pixel electrode 322 from the source electrode. 10:35 10:35 10:36 10:36

Q Is it your opinion that in a transmissive type liquid crystal display, it's not important to maximize the area of pixel electrode? 10:36 10:36 10:36

A You need to maximize the area of the pixel electrode from the areas that light will go through. And if you have a metal line, such as the scan line and the data line and the source electrode, light cannot go through those areas because the metal lines will block the light. 10:36 10:36 10:36 10:36 10:37 10:37

So you would not gain advantages by overlapping the pixel electrode to, say, the data lines. 10:37 10:37

Q Do you understand, with reference to Figures 5A through G, that the gate electrode is 308? 10:37 10:37

You can see that in Column 8, Line 67. 10:37

A Yeah, I see that in Figure 5C, label 308. That's a gate electrode. 10:37 10:37

Q Because I think earlier you mentioned 305 is the gate electrode. 10:37 10:37

A It is shown as the 305 in Figure 5A. 10:37

Then there is some processing done in this -- again, in this particular embodiment, there is some processing done. There is some anodization step that grows an oxide to 305. That oxide is labeled 306 in Figure 5B. After -- and that narrows down the initial gate electrode 305. 10:37 10:37 10:38 10:38 10:38 10:38

The remaining material after that step is what is labeled as a 308. 10:38 10:38

Q Okay. 10:38

MR. SCHLITTER: Let's take a break here. 10:38

THE VIDEO OPERATOR: Off the record? 10:38

MR. SCHLITTER: Sure. 10:38

THE VIDEO OPERATOR: We are off the record. The time is 10:38 a.m. on July 12, 2013. This is the end of Video No. 1 of the continuing deposition of Dr. Milt Hatalis. 10:38 10:38 10:38 10:38

(Recess taken.) 10:38

THE VIDEO OPERATOR: We are on the record. The time is 11:02 a.m. on July 12, 2013. This is the beginning of Video No. 2 of the deposition of Dr. Milt Hatalis. 11:02 11:02 11:02 11:02

BY MR. SCHLITTER: 11:02

Q In Column 10, the language we looked at before the break, Lines 15 through 18 talks about "contact holes for connecting the internal conducting lines 318," paren, "207a and 207b," close paren, "with the common terminals 205a and 205b at the extractor terminals." 11:02 11:02 11:02 11:02 11:02 11:02

With reference to Figure 5 of the '102 Patent, in what layer do you understand the contact holes are formed? 11:02 11:03 11:03

A Well, in this particular embodiment described in detail in Figure 5, in the schematics of Figure 5, the contact holes will be in the final passivation of layer, which -- which is labeled two different numbers of -- in Figure 5 is -- so it's -- that -- sorry. It is labeled as 319. 11:03 11:03 11:03 11:04 11:04 11:04

Q Not a different number, it's just 319? 11:04

A Yes. It -- it is shown in Figure -- it is labeled in Figure 5 as 319. 11:04 11:04

Q That's an insulating layer, right? 11:04

A That is an insulating layer. 11:04

In this particular embodiment, the order with which you lay down the layers is such that on top of the -- say the wiring 318 made from the source and drain electrode material, you lay down the insulating layer 319 above it, you open the contact holes, and 11:04 11:04 11:04 11:05 11:05

then you put down the pixel electrode material. 11:05
Q Do you understand the language that we just 11:05
quoted in Column 10 to mean that the common terminals 11:05
formed from the pixel electrode layer are connected to 11:05
the internal connecting lines 207a and 207b by the 11:05
contact holes? 11:05
A Well, in this particular embodiment, where you 11:05
have an insulating layer between two conductive 11:06
layers, without the contact holes the two layers will 11:06
not -- will not be in contact. There will be one 11:06
above the other one, but there will be an insulating 11:06
layer in between them. They will not be able to touch 11:06
each other to form an electrical connection. 11:06
Q Is it appropriate to put a passivation layer 11:06
over a pixel electrode? 11:07
MR. CORDREY: Objection. Form. 11:07
MR. SCHLITTER: Let me restate the question. 11:07
That objection was well-taken. 11:07
BY MR. SCHLITTER: 11:07
Q Is it appropriate to put a passivation layer on 11:07
top of a pixel electrode so that the passivation layer 11:07
is between the pixel electrode and the counter 11:07
substrate? 11:07
A The -- the structure that you describe is in 11:07
one of the structures that have been reported in the 11:07

prior art quite extensively. And that was... 11:08
Q Are you finished? 11:08
Let me ask a related question. 11:08
Is the passivation layer typically transparent? 11:08
A Yes. 11:08
You're talking about the insulating layer, 11:08
correct? Like the element 319 in the figure of 5A? 11:08
Q Do you understand 319 to be a transparent 11:08
layer? 11:09
In Figure 5? 11:09
A I think it's made of a silicone oxide, a 11:09
silicone nitrite, and these are transparent layers. 11:09
Q Does this -- 11:09
A Actually -- 11:09
Q Go ahead. 11:09
A There are -- there are -- as we've discussed, 11:09
there are a multi-layer -- there are multiple 11:09
dielectric layers. Some of them are the silicone 11:09
oxide and silicone nitrite, or combinations of those 11:09
two. 11:09
And some of them, this particular one, 319, 11:09
which is the second interlayer dielectric film, that 11:09
is an organic material. Important to be like -- in 11:10
Column 10, it refers to be as a polymite. 11:10
Q Is that also a trans -- transient light -- 11:10

transparent light? 11:10

A Organic -- organic coatings can be made to be transparent. In this particular display type, where you're talking about a -- a reflective display, that's not a requirement. 11:10 11:10 11:10 11:10

But in transmissive displays, where light will come from one side, connect the other side, the -- all the dielectrics have to be, you know, transparent. 11:10 11:11 11:11 11:11

Q Is it desirable to have the pixel electrode near to the counter electrode on the counter substrate? 11:11 11:11 11:11

MR. CORDREY: Objection to form. 11:11

THE WITNESS: Earlier on in the art, it -- it was not placed near. You had the passivation layer on top of it. 11:11 11:11 11:11

It became evident in the art that if you -- if you do so, you need higher operating voltages, and that may have a higher power consumption. And in the art, the advantages of -- of putting the pixel electrode on top of the insulating layer were also recognized. 11:11 11:11 11:11 11:12 11:12 11:12

And in between those two structures you have -- have the other structure, which I've describe earlier, where you remove the passivation layer on top of the 11:12 11:12 11:12

pixel electrode and you eliminate it, and -- and that is almost behaving as you have it on the top. It's only a wave by the thickness of a dielectric layer from the counter substrate. 11:12 11:12 11:12 11:12

BY MR. SCHLITTER: 11:12

Q So it puts the pixel electrode a little farther away from the counter electrode if you put the passivation layer on top of the pixel electrode, correct? 11:12 11:12 11:13

A If you put it below -- 11:13

Q The question is if you put it above. 11:13

A If you put it above it, your gap -- your distance is whatever is distance of your spacers. If you put it below, it is the distance -- you've got the distance of the spacer plus the thickness of the dielectric. 11:13 11:13 11:13 11:13 11:13

If you remove the passivation layer on top of the pixel electrode -- let's say it's below, but you etch it, you open an opening above it -- then most of the area is determined by the -- by those openings. And if you change your spacers, you could adjust the -- the -- the gap based on the spacer thickness. 11:13 11:13 11:13 11:13 11:13 11:14

I mean, these are all variations that were -- were implemented in -- in the prior art. They're all different structures that have been reported, and 11:14 11:14 11:14

advantage, disadvantages of -- of each were well 11:14
understood by people in the art. 11:14

Q With reference to Column 10, Lines 15 to 18, 11:14
and Figure 3 of the '102 Patent, how do you understand 11:14
the connection is made between the internal conducting 11:14
lines 207a or 207b? 11:14

Or -- well, let me just restate that. 11:14

The connection between 207a and 205a, how do 11:14
you understand that connection to be made? 11:14

A One possible way to make that connection -- and 11:14
there are many ways to make that connection. 11:15

One possible way to make that connection is as 11:15
shown in Figure 5. If you replace the element 318 11:15
with the element 207a and you extend 207a all the way 11:15
out to the extractor terminal regions, that will be 11:15
one way to make that structure. 11:16

Q In that case, what role does the contact hole 11:16
for connecting the lines 207a and 207b to the common 11:16
terminals 205a and 205b play? 11:16

A In this case, where you have an insulating 11:16
layer put on top of the contacting line, the opening 11:16
in the insulating layer allows the upper metal layer 11:16
to go down the hole and touch the metal layer at 11:16
the -- in -- in the region which is between the walls 11:17
of the opening, and, thus, the two metal layers stop 11:17

contact.

Q For example, common terminal 205a would go down a contact hole -- or some metal from common terminal 205a -- or the same layer as common terminal 205a would go down a contact hole and make contact with internal conducting line 207a?

A The metal would -- forms the common terminal, or the metal from which the common terminal is made of will go down the edges of the hole, as shown in Figure 5, and they will attach the other metal layer which is used to make the lines 207a -- the line 207a.

Q That corresponds to layer 318 in Figure 5E, correct?

A That is correct.

If we take that particular embodiment and we use that approach discussed in Figure 5 to make the common terminals, that will be one way to make that connection.

Q Is there any other embodiment that's explicitly disclosed in the '102 Patent?

A Well, the claims -- all the claims require that the first internal conducting line electrically connected to the common terminal in the contact hole, while one way to make the first internal conducting line to be electrically connected to the common

terminal is to make the lower metal layer, which extends into the extractor terminal, made from the same metal that is used to make the first internal conducting line, and that metal would be the metal that is used to make the gate electrode of the thin-film transistor. 11:20 11:20 11:20 11:20 11:20 11:20
Q If you did that, then you would not need a contact hole; is that right? 11:20 11:20
A Why do you say that? 11:20
Q Well, if the extractor in the common terminal is same metal and the same layer as internal conducting line 207a, then they would already be connected, wouldn't they? 11:20 11:20 11:21 11:21
What -- how would you connect layers or two -- two elements in the same layer with a hole? 11:21 11:21
How would you do that? 11:21
A I hope I didn't misspeak. I simply say you still have a common terminal made from the same layer as the pixel electrode. And that layer made from the pixel electrode, called common terminal, in the extractor terminal will make an electrical connection to the first internal conducting line in the common terminal region. 11:21 11:21 11:21 11:21 11:21 11:22 11:22
And as we see -- 11:22
Q Well, will it make that connection in a -- in 11:22

the contact hole?
A You require it to have the contact hole because a first internal conducting line, which is made by the material of the gate electrode, is also below an insulating layer. So there are insulating layers above the first internal conducting line, and, thus, you would need to have a contact hole to make that connection.
Q And that same -- that's also true with respect to the second integral conducting line, 207a or 207b, for example, and the common terminal 205a and 205b, right?
They also are separated by an insulating layer in the '102 Patent?
A In the particular embodiment in '102 Patent, that is true.
In the case of the first internal conducting line, there will be insulating layers above the gate electrode. We -- we -- we see that -- that a layer 315 is above the gate electrode layer. And if we visualize that the 318 shown in Figure 5A is not made by the same material as the source and drain electrode, but it is made by the material of the gate electrode, then that element 318 will be below 315.
And the layer 315 is a required layer. That

layer serves to isolate the data lines and the scan lines. So it is -- that order there is -- is an explicit required order because the data lines and scan lines will have to be isolated. 11:24 11:24 11:24 11:24

So no matter what is the technology, whether it's a top gate or a bottom gate, there's always -- there's always an insulating layer between the gate electrode layer and the source and drain electrode layer. In that case, a contact hole is -- will be required. 11:24 11:24 11:24 11:24 11:25 11:25

In the case of the -- where the 318 layer is made from the same as the -- same as the source and drain electrode, in that case there are two options to make -- to put the common terminal above that one. One is shown, and which we discussed, that you have the insulating layer above it. You open the -- 11:25 11:25 11:25 11:25 11:25 11:25

Q That would be 319 in Figure 5? 11:25

A Correct. 11:25

You would open the contact holes and then you put down the pixel electrode layer, or you put the pixel electrode layer first and then you open the -- then you put the passivation layer 319. 11:25 11:25 11:25 11:25

Q But that's not disclosed in the '102 Patent, correct? 11:26

A In the particular embodiment shown in this 11:26

Figure 5, that's not disclosed. 11:26
But that was disclosed in the prior art, and both embodiments were well-known in the art. 11:26 11:26

Q Do you understand, with respect to Figure 3, that the internal conducting line 207c is made from the -- or formed from the same metal as the gate electrodes? 11:26 11:26 11:26 11:26

A And I believe I refer you to the quote. Like in Column 9, Line 61, it reads, 11:26 11:26

"The internal conducting lines 207c and the gate electrode 307 were created by the same processing steps." 11:26 11:27 11:27

Q Did you also understand that internal conducting lines 207a and 207b are formed from the same metal layer as the source, drain electrodes? 11:27 11:27 11:27

A Correct. 11:27
As discussed here, that is how they are stated, and I read you that section earlier. 11:27 11:27

Q Is it correct that internal conducting line 207c runs between the common contact portions 206b and 206c? 11:27 11:28 11:28

A In the embodiment shown in Figure 3, that wiring 207c is the only one that has been identified as having been made by the material of the gate electrode. So in this particular embodiment, that 11:28 11:29 11:29 11:29

will be correct. 11:29
However, the claim language is more broad 11:29
because the claim language -- that is Column 17 of 11:29
Line 60 -- 11:29
Q You're consulting your declaration for this? 11:30
A I want to refer you to one of the claims, that 11:30
it is part of this proceeding. I don't -- there are 11:30
many numbers, I didn't remember all of them, and this 11:30
is not marked. I don't want to refer you to a claim 11:30
that is not part of this proceeding, so... 11:30
I believe I refer you to Claim 31, which is not 11:30
part of the proceedings. 11:30
Q Well, Claim 15 is part of it. 11:30
A All right. Yeah. 11:30
15 doesn't talk about where those lines are 11:30
extended. Some of the other, later claims provide 11:30
that language. 11:30
Q 27 is another claim in the proceeding. 11:31
A Yes. 11:31
So if we look at Claim 27, and that's in 11:31
Column 17, Line 24, it reads, 11:31
"Wherein the first internal conducting 11:31
line extends along at least a second 11:31
edge of the substrate, the second edge 11:31
being opposed to the extractor 11:31

terminals and being perpendicular to 11:31
the first edge." 11:31

So if we look at the Figure 3 -- and you already have identified the extractor terminals 205 clearly shown in Figure 3 -- the edge which is opposed to the extractor terminals will be the edge that 207c will -- will -- will run along. 11:31 11:31 11:31 11:31 11:32

But the claim language is broad, and it says that extends along at least that edge, which means that the wiring or the line that is made of this material could extend along other edges as well. 11:32 11:32 11:32 11:32

Q In the embodiment described in the patent, in the specification, internal conducting lines 207a and 207b are at the source, drain metal level, and internal conducting line 207c is at the gate line level, correct? 11:32 11:32 11:32 11:32 11:33

A That is correct. 11:33

Q Would you say that there is a physical demarcation between 207a and 207c? 11:33 11:33

MR. CORDREY: Objection. Vague. 11:33

THE WITNESS: Where? In the specifications or in the claims? 11:33 11:33

BY MR. SCHLITTER:

Q Given the structure of 207a and 207c as described in the specification, do you understand 11:33 11:33

there to be a physical demarcation between 207a and 207c? 11:33 11:34
A Well, the specification describe a particular embodiment, describe a particular of structure. 11:34 11:34
Q That's the one I'm talking about. The question is focused on the one that's described there. 11:34 11:34
A The one that is described in Figure 3 and refer to the sections in the text that we refer to in the specifications, it -- it limits in that edge only. 11:34 11:34 11:34
Q I'm not sure I understood your answer. "It limits in that edge only"? 11:34 11:35
Do you mean the answer is that there is a physical demarcation done between 207a and 207c as described in the specification and figures of the '102 Patent? 11:35 11:35 11:35 11:35
A Well, 207c is shown -- is the element in Figure 3 which is along the edge which is opposing that of the extractor terminal. 11:35 11:36 11:36
And in the specifications, it -- in Column 9, Line 59, it -- it reads, 11:36 11:37
"These conducting lines 207a and 207b were connected with internal conducting lines 207c at the common contact portions 206b and 206c." 11:37 11:37 11:37 11:37
So the -- is an explicit demarcation where the 11:37

particular layer ends. I don't think there is an explicit demarcation where it ends. Where it connects to 207a and 207b, there is an explicit demarcation, which is at the common contact portions 206b and 206c. 11:37 11:37 11:37 11:37 11:38

Q Is there any disclosure in the specification of the '102 Patent, an explicit disclosure, that line 207a is anything other than a single layer formed from the source, drain metal layer? 11:38 11:38 11:38 11:38

My question is only with respect to the specification. 11:39 11:39

A I understand your question. 11:39

With regards to the specification, it states that internal conducting lines 207a and 207b are made with the same materials as source and drain electrodes. But the specifications itself do not limit that below 207a and 207b made by the material of the source and drain electrode, that there may not be another metal that will run in parallel, and the 207a and 207b refers to the element above the insulating layer 315 shown in Figure 5 and will not preclude that something may be running below it. 11:39 11:39 11:39 11:39 11:39 11:40 11:40 11:40 11:40 11:40

It doesn't say that -- explicitly that nothing runs below it. And if -- if it is, please bring that to my attention. I miss it. 11:40 11:40 11:40

Q Do you consider 207a and 207c, as described in the specification, to be one continuous line? 11:40 11:41
A 207a and 207c create a wiring structure that connects 205a to the common contact portions 206a, b and c. 11:41 11:41 11:42
I didn't understand what you mean by "one continuous line." It is one continuous wiring structure consisting of different materials at different levels. But they are electrically connected. 11:42 11:42 11:42 11:42 11:42
Q I've handed you what has previously been marked as CMI Exhibit 1003, which is Shiba, et al., United States Patent No. 5684555. 11:42 11:43 11:43
(Exhibit 1003 was previously marked for identification by the court reporter and is attached hereto.) 11:43 11:43
BY MR. SCHLITTER: 11:43
Q Is this the so-called Shiba reference that you have referred to earlier today in your deposition? 11:43 11:43
A Yes. 11:43
Q Do you understand an object of the invention described in the Shiba patent to be to reduce the width of the seal region without lowering the strength over the adhesion between the two substrates of a liquid crystal display? 11:43 11:43 11:44 11:44 11:44

A One of the objects is this one that you just mentioned. 11:44 11:44

Q Is there another object? 11:44

A Another object is to reduce the overall size of the display, and that has been accomplished by providing external connections only from two sides, versus some of the prior art that was providing external connections from all four sides. And that's the extractor terminal regions only to be formed on two sides and not on all four sides. 11:44 11:44 11:44 11:44 11:45 11:45 11:45

Q Do you -- 11:45

A Let me finish the former question. 11:45

In -- in the process of providing connections from only two sides, Shiba is describing a wiring structure in order to provide power and signal to the counter electrode, even to those regions which are far away from the extractor terminal regions. 11:45 11:45 11:45 11:45 11:46

Q Would you agree that Shiba expresses a desire to maximize the display area relative to the outside dimensions of the panel? 11:46 11:46 11:46

A All the steps that we mentioned so far, which is providing extractor terminals from two sides and reducing the -- the... 11:46 11:46 11:46

Q Width of the seal region? 11:47

A -- the width of the seal region will -- would 11:47

result in reducing the outside dimensions of the panel. 11:47 11:47

Shiba, as I said, it disclosed a -- a -- a wiring structure, and that wiring structure has some additional benefits, which are listed in Column 6, Line 40, and it reads, "The wiring defect can be prevented and the manufacturing here can be improved." 11:47 11:47 11:47 11:47 11:47

And that's an additional benefit of the disclosure of the invention of -- described in -- in Shiba, which go beyond just reducing the overall size. 11:47 11:47 11:48

Q Do you understand that the invention described in Shiba does not increase the number of manufacturing steps? 11:48 11:48 11:48

I refer to Column 6, Line 30 to 33. 11:48

A That's correct. 11:48

Q Do you understand Shiba to include three conductive layers of material on the TFT substrate? 11:49 11:49

A Correct. 11:49

Q What are those layers? 11:49

Could you just identify those, please? 11:49

A This is the layer that is used to form the gate electrodes and the scanning lines. That's the one layer. 11:49 11:49 11:50

Another layer is the layer that form the source and drain electrodes in the data lines. 11:50 11:50

And a third layer is one form the pixel electrodes. 11:50 11:50
Q Are there any insulating layers on the TFT substrate in the Shiba structure? 11:50 11:50
A Yes. 11:50
Q What -- what insulating layers are disclosed in Shiba? 11:51 11:51
A You have the gate dielectric layer. 11:51
Q Does that have a reference number on Figure 4? 11:51
A 211. 11:51
Another dielectric layer or insulating layer is the tunnel protecting layer 215 made of silicone nitrite. 11:52 11:52 11:52
Another dielectric layer or insulating layer is a protective overcoat, 241, made of silicone nitrite. 11:53 11:53
Q Any others? 11:53
A There is an orientation film of 281. That's typically an organic layer, and that's also an insulating layer. 11:53 11:53 11:53
Q Any others? 11:53
A On the TFT substrate, I do not think so. 11:54
Q Does the gate dielectric layer 211 -- or is the gate dielectric layer 211 located between two metal layers, or two conductive layers? 11:54 11:54 11:54
A Yes. 11:54

Q What layers is -- what conductive layers is the gate dielectric -- dielectric layer 211 between? 11:54 11:54
A It is between the data lines and the scanning lines. It is between the gate electrode and the amorphous silicone. And when the amorphous silicone is turned on, the channel is considered to be conductive. 11:55 11:55 11:55 11:55 11:55
It's also between the part of the element called as the storage capacitor lines, and the portion of the pixel electrodes above it were forming the storage capacitor. 11:55 11:55 11:56 11:56
Q Is the storage capacitor you're referring to indicated as CJ in Figure 4? 11:56 11:56
A Correct. 11:56
Q Is CJ one of the conductive elements of the storage capacitor? 11:56 11:56
A It forms one plate of the storage capacitor. 11:56
Q What forms the other plate? 11:56
A In this particular embodiment, the pixel electrode layer -- portions of pixel electrode layer that are overlapping, and that pixel electrode layer, which is Indium tin oxide, it's conductive in the overlap defined in the storage capacitor area. 11:57 11:57 11:57 11:57 11:57
And there are two sides, so that storage capacitor in one side is the element CJ, and the other 11:57 11:57

side is the pixel electrode material, and the overall area of that storage capacitor is defined by the overlap. That's where the storage capacitor exists. 11:57 11:57 11:57

Q Does the gate dielectric layer constitute the dielectric of that storage capacitor? 11:57 11:58

A Correct. 11:58

Q Is that the only component of the dielectric portion of that storage capacitor? 11:58 11:58

A In this particular embodiment, yes. 11:58

Q What is the reason for storage capacitor -- the storage capacitor being there in Figure 4? 11:58 11:59

A The storage capacitor from -- helps to maintain the voltage that is been held -- the voltage difference held between the pixel electrode and the counter electrode constant throughout the frame period. It run... 11:59 11:59 11:59 11:59 11:59

Q Going back to these other layers, what is the purpose of channel protective layer 215? 11:59 12:00

A The structure disclosed in Shiba is referred as to a channel edge top structure. So this 215 is referred to as channel edge top layer. Above the layer 215, the source and drain electrodes, they will be formed. 12:00 12:00 12:00 12:00 12:01

Before they will be formed, they will be deposited as one continuous film. 12:01 12:01

Q Is that -- what kind of material is that that you're referring to as the source, drain electrodes? 12:01 12:01

A I do not recall an explicit mention in Shiba of the material. 12:01 12:01

Q Does the channel protective layer 215 come into contact with the N-plus type amorphous silicon layer 217b? 12:01 12:02 12:02

I'm looking at Column 4, Lines 23 to 27. 12:02

A The N-plus amorphous silicon is interposed between the drain electrode and the channel protective layer. 12:02 12:02 12:03

Q What is on the other side of the channel protective layer? 12:03 12:03

A Look at Line 23. It says -- starting from Line 20, it reads, 12:03 12:03

"A source electrode 231 is formed above one end portion of the channel 213 with a low-resistance semi-conductive layer 217a made of an N-plus type amorphous silicon interposed there between." 12:03 12:03 12:03 12:03 12:03 12:04

Q Stop right there. 12:04

So that means the N-plus amorphous silicone is between the source electrode 231 and the channel 213, right? 12:04 12:04

A This is what I read. 12:04
Q Okay. Are you finished reading? 12:04
A Well, I think you asked me a little what is the source electrode layer material. Isn't that right? 12:04 12:04
Isn't that what you asked me a minute ago? 12:04
Q I withdraw that question for now. 12:04
I wanted to know -- let me just ask a new question. 12:04 12:04
What is the structural relationship among the channel 213, the N-plus type amorphous silicon, and the channel protective layer 215? 12:04 12:05 12:05
MR. CORDREY: Objection. Form. 12:05
THE WITNESS: What do you mean by "structure"? 12:05
BY MR. SCHLITTER: 12:05
Q Just vertical. Just vertical. 12:05
How do those stack up? 12:05
Which is on top and which is in the middle? 12:05
A Well, it depends upon which portion the device you're referring to. It's not -- 12:05 12:05
Q Okay.
A It's not the same throughout the whole device. 12:05
Q Is the channel protective layer 215 present other than around the thin-film transistor in the structure of the Shiba patent? 12:05 12:05 12:06
A In this particular embodiment, it's only there. 12:06

Q You said it's a channel etch stop layer 215. 12:06
What is the function of channel etch stop layer 215? 12:06 12:06
A Well, in this structure you have the channel layer, which is made of amorphous silicon form of the gate dielectric. 12:07 12:07 12:07
Then you -- 12:07
Q Did you say formed of the gate dielectric? 12:07
A Form the gate -- 12:07
Q Formed on. 12:07
A Then you have the channel protecting layer 215. That covers part of the channel -- part of the -- this amorphous silicone and protect it above the gate electrode. 12:07 12:07 12:08 12:08
After you do this -- these two layers, then you -- you put down the doped amorphous silicone, and then you put the metal layer that will form the source and drain electrode. And both the doped amorphous silicone, which is these N-plus type amorphous silicone, when it comes down, is a continuous film, and the metal which forms the source and drain electrode, that's also continuous film. 12:08 12:08 12:08 12:08 12:08 12:08 12:08 12:09
And then you go into a patterning step, and it -- followed by an etching step. So you etch first the metal, and then you etch the N-plus amorphous 12:09 12:09 12:09

silicon. 12:09

And the channel protection layer 215 protects the amorphous silicone that is used to form the channel from the etchant that is used to etch the N-plus amorphous silicone. 12:09

THE WITNESS: In the transcript it says "N-plus F form." It's N-plus amorphous. 12:09

THE COURT REPORTER: Thank you.

BY MR. SCHLITTER:

Q Does the channel protective layer 215 overlie the entire channel region?

A That's correct.

If it did overlie the channel region, the channel may be damaged or -- or shorted, either damaged during the etching or the N-plus amorphous silicone, or may be shorted if somehow N-plus remains. 12:10

Actually, the last one -- strike the last one. It will be damaged. 12:10

If the N-plus amorphous silicone somehow remains, it will lead to a defect anyway. So -- 12:11

Q Does the -- is -- in the finished device, is the channel protective layer 215 interposed between the N-plus layer and the channel region? 12:11

A Well, part of -- part of the N-plus amorphous silicone will overlap the channel protection layer, 12:11

and in -- in that overlap region, the -- that is true. 12:11

Q What -- 12:12

A In that -- in that overlap region, the channel protection layer 215 is in between the N-plus amorphous silicone and the channel. 12:12

Q Is there a portion of the device where the N-plus does not overlap the channel protective layer? 12:12

A Well, on the left and right of the channel protection layer 215, the N-plus amorphous silicone is touching -- physically touching the -- the channel layer. 12:12

Q You said that the channel protective layer 215 is used because, otherwise, the channel may be damaged by the etching of the N-plus. 12:13

What did you mean by "damaged"? 12:13

A Well, there are -- there are two well established amorphous silicone TFT structures. One structure is the one depicted in this Figure 4 that we're discussing. And in -- in this structure, N-plus layer is either above the amorphous silicone or above the -- the channel protecting layer. 12:13

Portions of the N-plus, which is above the channel protecting layer -- and those portions are in between the source and drain electrodes -- those portions, they have to be etched away. If they will 12:14

remain, they will short the source and drain of the device, and device will not work as a switch. That will lead to a defect. 12:14 12:14 12:14

So there is an etching step that is performed in the manufacturing that removes that material. Because material is made -- is amorphous silicone, that wet etching or dry etching, whatever one chooses to use, will also etch the undoped amorphous silicone which is used as the channel layer. 12:14 12:14 12:14 12:14 12:14 12:15

So in -- in -- in that regard, the presence of the layer 215 will protect and prevent etching of the amorphous silicone. 12:15 12:15 12:15

The other structure that -- so by doing that one, the amorphous silicone layer 213 can be made very thin. 12:15 12:15 12:15

Another structure, which is called a back channel etch, TFT structure, is such that this channel protecting layer 215 is not there. And in -- in those structures, the -- the channel layer 213 is typically made thicker than the channel layer used in these channel etched stop structures, where the channel is protected by 215. 12:15 12:15 12:15 12:15 12:16 12:16 12:16

Q And why is it made thicker without the channel protective layer 215? 12:16 12:16

A Because in those structures, the -- the etching 12:16

process will not stop on the channel protective layer 215 because it's not there. So the etching may continue, and portions of the undoped amorphous silicone may be removed from the back side. 12:16

And having a thicker amorphous silicone will ensure that sufficient amorphous silicone remains to form the channel. 12:17

Q I think you said -- is the source, drain metal directly on top of the N-plus layer? 12:17

A That is correct. That's in Figure 4. 12:17

Q What layer is on top of the source, drain electrode metal? 12:17

A Layer 241, protective overcoat made of silicone nitrite. 12:18

Q Did you say what the gate dielectric layer was made of? 12:18

A In Column 4, Line 15, it reads,

"A gate dielectric 211 having a laminated structure of silicon oxide and silicon nitrite is formed on the gate electrode." 12:18

Q What is the function of protective overcoat layer 241? 12:19

A Protective overcoat layer is to oxidate and protect the transistor structures and the -- the metal 12:19

wiring that we have on the transistor -- on 12:19
the -- on the substrate during the subsequent 12:19
processing, and also serve as a -- as an extra 12:19
insulating layer on -- on top of the devices and the 12:19
wiring. 12:20

Q Is it the case that the protective layer 12:20
overcoat 241 is not confined to the transistor 12:20
portion, but is used elsewhere on the display also? 12:20

A The protective overcoat layer, when it first 12:20
come down, it goes everywhere, and then portions of it 12:20
are removed to form openings for contact windows. 12:20
Within those openings or contact windows, the 12:20
protective overcoat layer is removed, but remains 12:20
everywhere else. 12:20

And it is shown, for example, in Figure 6 that 12:21
the element 241 extends all the way to the edge of the 12:21
glass substrate. 12:21

Q Does 241 -- sorry. 12:21

Does Figure 6 indicate any opening or window, 12:21
contact window in protective overcoat layer 241? 12:21

Withdraw the question. 12:22

Does Figure 4 depict any opening in protective 12:22
overcoat layer 241? 12:22

A Yes, once it's opening, its label is 243 on the 12:22
left of Figure 4. 12:22

Q What is located immediately above -- 12:23
A Actually, here -- 12:23
Q Sorry. Go ahead. 12:23
A There's another opening also in Figure 4. It 12:23 is the part over the element labeled 731, and 731 is 12:25 the power supply bud. 12:25
So above the power supply bud you have the 12:26 contacting medium. That's the element in 115. It 12:26 electrically connects the pad 731 to the counter 12:26 electrode. 12:26
Q Any other openings in 7 -- I mean, in -- in 12:26 protective overcoat 241 in Figure 4? 12:26
A In this particular embodiment, it is a crowded 12:27 schematic. I cannot detect other ones. Whether may 12:27 be, I'm not sure. But... 12:27
Q What is immediately above protective overcoat 12:28 241 in Figure 4? 12:28
A In what part of Figure 4 are you referring? 12:29
Q Are there different things over 241 depending 12:29 upon where you look? 12:29
A It appears so. It also appears that the 12:29 different things are above 241 in Figure 6 that we 12:29 referred earlier to. 12:29
Q What -- various things are over 241, 12:29 immediately above 241 in Figure 4. You said there's 12:29

more than one different material or component. 12:29

What are those components or materials? 12:29

A Do you want me to go from one end of the Figure 4 and go all the way up to the other end of Figure 4 -- 12:30 12:30 12:30

Q Well, let's start --

A -- and try to distinguish the different elements? 12:30 12:30

Q Well, if you could, I'd like to know beginning on the right side of Figure 4. 12:30 12:30

A "Right" means where you have the transistor? 12:30

Q Yes. 12:30

A You have some zoom-out picture. It's difficult to see everything on this. 12:30 12:30

You prepare some sort an exhibit with -- am I going to find one with better quality? 12:31 12:31

Q I would say better. 12:31

MR. SCHLITTER: I can mark this. 12:31

What's the next number? This will be -- I'll ask the court reporter to please mark this as Exhibit 2006. 12:31 12:31 12:31

Exhibit 2006 is an enlarged version of Figure 4 from the Shiba reference. 12:31 12:31

(Exhibit 2006 was marked for identification by the court 12:31

reporter and is attached hereto.) 12:31

BY MR. SCHLITTER: 12:31

Q Does this help you in being able to identify what things are immediately above protective overcoat layer 241? 12:31 12:32 12:32

A Do we have a zoom-out of Figure 6 or just Figure 4? 12:34 12:34

Q I do not. 12:34

Well, let me -- while you're puzzling about that... 12:35 12:35

A Right above the TFT region, I think that's what you asked me to -- 12:35 12:35

Q That's where we're starting this. 12:35

A I -- I -- I cannot detect any layer between 241 and the horizontal dotted line, which is the liquid crystal material. I do not see an element labeled to the left of Figure 4. 12:35 12:35 12:35 12:35

Q Do you see element 281? 12:35

A I see element 281 in the middle of the figure. 12:35

Q To save time on this point, in Column 4, Lines 32 and 33, do you see that 281 is an orientation film? 12:35 12:35 12:36

A Yes, I see that. 12:36

Q Where do you understand the orientation film to extend in Figure 4? 12:36 12:36

A Where it starts and where it stops in Figure 4? 12:36
Q Yes.
A In this particular cross-section? 12:36
Q Yes. 12:36
A In this particular cross-section, start -- my eyes do not play tricks on me, it's -- it's an element which starts somewhere under the sealant and then -- 12:36 12:36 12:36
Q The sealant is 113, correct? 12:36
Sealant agent. 12:37
A Yes. 12:37
Somewhere below 213, so -- below 113, and then it -- it is shown in Figure 4 as being terminated about an inch, in this drawing, to the right of it -- to the left of it. Or to the right of it. Sorry. 12:37 12:37 12:37 12:37
Right -- right above what is written as No. 251, it shows that that has been terminated there, in this schematic here. 12:37 12:37 12:37
And if your eyes see differently, please tell me. That's why I asked you whether you have something in Figure 6. 12:37 12:38 12:38
Q I don't, but I have something in a spec. 12:38
A But in -- in Figure 6, the element that you refer, 281, it is -- it is shown a little more clearly, and it is shown that exists on both the storage capacitor, CJ -- but in Figure 4 it is not 12:38 12:38 12:38 12:38

shown there -- and it's shown clearly to be terminated before the sealing agent, sealing material at 115. 12:38 12:38

Q Do you -- did you identify 281? Did we? 12:38
Is it the orientation film? 12:39

A I think we did that. 12:39

Q Do you agree that's the orientation film? 12:39

A This is what the specifications state. 12:39

Q In Column 4, Line 29, there is a sentence that reads, 12:39 12:39
"A protective overcoat 241 made of silicon nitrate is arranged on the TFT 221 and around the pixel electrode 251." 12:39 12:39 12:39 12:39
Do you understand that to mean that the protective overcoat 241 does not overlie pixel electrode 251 as indicated in Figure 4, which is consistent with Figure 4; would you agree? 12:39 12:39 12:39 12:39

A You say which is consistent with Figure 4? 12:40

Q Let me restate the question. 12:40
What do you understand that sentence that I just read about the protective overcoat 241 being arranged around pixel electrode 251 to mean? 12:40 12:40 12:40

A Well, the plain English meaning of the word "around" means that it is surrounding the pixel electrode 251, but it could also mean that it is 12:41 12:41 12:41

around the region where pixel electrode 251 is. So where pixel electrode 251 is, around there you also have the protective overcoat 241. 12:41 12:41 12:41

So it is not clear whether there is an opening in the pixel electrode 251 or whether there is not an opening of pixel electrode 251. 12:41 12:41 12:41

But as I mentioned in our earlier discussion previously, it was well-known that if you have a protective layer above the pixel electrode, to leave it. It is also well known to create an opening and remove it. 12:41 12:42 12:42 12:42 12:42

What the authors and inventors here mean by the word "around" and in -- in light of the Figures 4 that I see here, where the pixel electrode is the element 2- -- 251 and the protective overcoat is 241, it is not clear. Maybe there is an opening, but the opening is not in the cross-section or the Figure 4 is -- is -- is shown here because Figure 4 is a cross-section in the area of the storage capacitor, and -- and that's -- as I said earlier, that's where you have a metal below that's formed the CJ storage electrode layer. That will block the light, and that's not where you're going to -- be transmissive in that part. 12:42 12:42 12:42 12:42 12:42 12:43 12:43 12:43 12:43 12:43 12:43 12:43 12:43

There may be an -- an -- an opening in the 12:43

pixel electrode, but we do not have -- above the pixel electrode that will -- light would be able to penetrate through will be unobstructed by the presence of another metal that will be opaque. 12:43 12:43 12:43 12:43

But the others do not provide -- let me see. 12:43

Well, the -- the planar section here of the pixel region, Figure 2, I think lists some of the elements, but not all the elements. I'm not sure. 12:44 12:44 12:44

Q Looking at Figure 6, would you agree that orientation film 281 is shown as directly overlying pixel electrode 251? 12:44 12:44 12:44

A In Figure 6, yes. 12:44

But again, this is a portion of -- of the storage capacitor, but I -- I would agree that probably they overlie the entire pixel electrodes. It's a sensor to overlie a pixel electrode. 12:44 12:44 12:44 12:45

Q It is -- what did you say? 12:45

A "Essential." 12:45

Q It is "essential" that it overlie the pixel electrode? 12:45

A Because it's at the -- or -- or -- or alignment of the liquid crystal. 12:45 12:45

MR. SCHLITTER: Okay. I'd like to break for lunch. 12:45 12:45

THE VIDEO OPERATOR: We are off the record. 12:45

The time is 12:45 p.m. on July 12, 2013. 12:45

This is the end of Video No. 2 of the continuing deposition of Dr. Milt Hatalis. 12:45 12:45

(Lunch recess taken.)

FRIDAY, JULY 12, 2013; 2:06 p.m.

THE VIDEO OPERATOR: We are on the record. 02:06
Time is 2:06 p.m. on July 12, 2013. 02:07
This is the beginning of video three of the 02:07
deposition of Dr. Milt Hatalis. 02:07
BY MR. SCHLITTER: 02:07
Q Do you understand that Figure 6 shows a portion 02:07
of the capacitor, the storage capacitor, Exhibit 6 of 02:07
Shiba? 02:07
A Among other things. 02:07
Q Among other things. 02:07
So CY refers to an electrode of the capacitor; 02:07
is that correct, or CJ? 02:08
A Yes, the lower electrode of the storage 02:08
capacitor. 02:08
Q What are the layers above that electrode CJ? 02:08
A I have layer 211. 02:08
Q And what layer is that? 02:08
A It's the gate dielectric. 02:08
Q What is immediately above the gate dielectric 02:08
211? 02:09
A 251, which is the pixel electrode layer. 02:09
Q What is immediately above the pixel electrode 02:09
layer? 02:09
A In Figure 6 it is labeled 281. 02:09

Q Is that the orientation film 281? 02:09
A Yes. 02:09
Q What is above orientation film 281? 02:09
A Liquid crystal. 02:10
Q Do you see the label 241 on the right side of Figure 6 -- 02:10 02:10
A Yes. 02:10
Q -- as a protective overcoat, right? 02:10
A Correct. 02:10
Q Does protective overcoat 241 extend over in the area where the capacitor is in Figure 6? 02:10 02:10
A I cannot distinguish it in Figure 6. I assume it is not shown in Figure 6. 02:10 02:10
Q It's shown on the right but not shown on the left, correct? 02:10 02:10
A It is not shown on the left which is the storage capacitor. It is shown on the right under -- above the wiring 127 and below the 113 -- on the left of figure -- sorry, the right of Figure 6. That orientation film 281 stops below the -- well before it reaches the sealant. 02:11 02:11 02:11 02:11 02:11 02:11
Layer 241 continues past and completely covers the wiring 127, and it's the one in direct contact with the sealant 113, and extends also outside the sealant to the right edge of the substrate 200. 02:11 02:11 02:11 02:12

Q Do you see the crosshatching on the layer that 02:12
is labeled 281 on the left? 02:12
A Yes. 02:12
Q So it's a wide crosshatch and a line crosshatch 02:12
alternating? 02:12
A I believe so. 02:12
Q Do you see the same crosshatching to the right 02:13
of the transistor? 02:13
A It terminates roughly in the area at the bottom 02:13
of the number 291. Somewhere above that numbering 291 02:13
the 281 terminates. 02:13
Q Okay. 02:13
A Is that what layer you're referring to? 02:13
Q Yes.
A Okay. 02:13
Q Referring to Figure 3 of Shiba, what do you 02:13
understand is designated by 127? 02:13
A 127 is the -- 127 is the wiring line that 02:14
consists of six narrow lines in this embodiment, and 02:14
the six narrow lines are drawn or start from the 02:14
element labeled 125a. 02:14
And then if we look at Figure 1, that wiring 02:14
structure continues along that edge and continues past 02:15
the side of the display to other edges. 02:15
Q Does 123 extend with reference to Figure 1 on 02:15

the left side of Figure 1, that is the left side of the substrate that is illustrated in Figure 1? 02:15 02:16

A It's more clearly shown in Figure 3. 02:16

Do you want to look at Figure 1 or Figure 3? You mentioned 123, correct? 02:16 02:16

Q I meant 127. 02:16

A Okay. Can you repeat the question? 02:16

Q Line 127, the wiring line marked 127 which you said comprises six lines, does that extend up along the left edge of the substrate in Figure 1? 02:17 02:17 02:17

A Yes, and the left edge is labeled 201d. 02:17

Q And does it also extend across the top edge of the substrate? 02:17 02:17

A Yes, extends along the top along the side labeled 201b. 02:17 02:17

Q Do you understand in Figure 3, 4 of the six narrow lines that you referred to of the wire line 127 are located in a seal region that is marked 111? 02:17 02:17 02:18

A That is correct, in this particular embodiment. 02:18

Q The other two narrow lines are located in a boundary region between the seal region 111 and the display area 103, correct? 02:18 02:18 02:18

A Correct, in this particular embodiment. There is another embodiment where the wiring 127 is depicted having a different structure, and that structure is 02:18 02:18 02:18

shown in Figure 8. 02:18

Q We'll come back to that. 02:18

What is the structure of figure 127 -- I mean of wiring line 127, as described in the Shiba patent? 02:19 02:19

MR. CORDREY: Objection. Form. 02:19

MR. SCHLITTER: Let me withdraw that question. 02:20

BY MR. SCHLITTER: 02:20

Q What is designated by 125a in Figure 3? 02:20

A In 125a refers to the interconnecting part. 02:20

Q What is referenced by the numbers 123/1 to 123/4? 02:20 02:21

MR. CORDREY: Just to be clear, which figure are you referring to now? 02:21 02:21

MR. SCHLITTER: Figure 1 and Figure 3. 02:21

THE WITNESS: The 123/1 is shown in both Figure 1 and Figure 3, and that is on the left lower side -- left lower corner of the Figure 1. 02:21 02:21 02:21

And if we look in the zooming portion of Figure 1, which is surrounded by the dotted line A, and that portion is shown in magnification and more detail in Figure 3, we will see that 123/1 is a second wiring line which is guided across the seal region 111. And that second wiring line is also being divided into a plurality of narrow lines as it travels under the sealant. It is divided into narrow lines as 02:21 02:22 02:22 02:22 02:22 02:22 02:22 02:22

it exits the interconnecting part 125a and continues 02:23
as a plurality of narrow lines past the other edge of 02:23
the sealant. 02:23
By analogy, the 123/4, which is on the 02:23
right-hand side of the display, it will be a single 02:23
line that will go to another external pad, and they 02:23
will connect with part of the wiring that ultimately 02:23
terminates into another external connection pad. 02:23
Q Is there a 123/2? 02:24
A I do not recall if there is a 123/2 and 123/3. 02:24
If you have a portion to guide me it will save us 02:26
time. 02:26
Q We'll call them line 127 and 28 refers to third 02:26
wire lines. That is not right. 02:26
Line 29, second wiring lines 123/1 to 123/4, 02:26
does that suggest to you there are four of those lines 02:26
123 since it doesn't say 123/1 and 123/4? 02:26
A At face value it suggests that -- one, that 02:27
that may be a carryover from the other set of wiring 02:27
lines, 121/1 to 121/4 that constitute the third wiring 02:27
lines, and those -- there are four of those. The 02:27
second one -- 02:27
Q How do you know there are four? 02:27
A 121/1? 02:27
Q Yes, of the -- 02:27

A They are shown in Figure 1. There is 121/1, 121/2, 121/3, 121/4 on the lower along the side of the display. 02:27 02:27 02:28

Q I see it, yes. 02:28

A I believe this must have been a typo because there are two interconnecting parts, 122/5. There is a 125a and 125b, and 123/1 are originated from 125a on the left lower corner, and the 123/4 they originated from the 125b on the right lower corner. 02:28 02:28 02:28 02:28 02:28

I think the artist may have labeled four in order to coincide with the 121/4 on that side. So there is 123/1, 121/1 on the left lower corner and then the 123/4 and 121/4 to correspond to the right lower corner. That will be my understanding. 02:28 02:28 02:29 02:29 02:29

Probably wanted to avoid the confusion by having 123/2 which may have been confused with 121/2, but then they replaced this 123 lines. So it's like having the last one in both 123 and 121. They probably mean they go to the same pad or same region. 02:29 02:29 02:29 02:29 02:29

Q What is 121/1? 02:29

A You could see what it is in Figure 3. The 121/1 is -- it reads in Column 5, line 50, 57, it reads, 02:30 02:30 02:31

"The common pad 751 is connected to 02:31

the power supply pad 731 through a 02:31

third wiring line 121/1."   02:31
Another wiring line that connects a common pad, in this case the 751, to the power supply pad, 731.   02:31
Q Does the plurality of lines comprising 123/1 merge into the wiring line 121/1?   02:31
A The plurality of lines 131/1 which originated at the edge of the interconnecting pad 125a, as shown in Figure 3, they terminate in another -- for lack of a better word -- another interconnecting pad. Out of that interconnecting pad there is a narrow line that originates and connects the power supply pad 731.   02:32
I guess the other interconnection pad it refers to the bottom of Column 5 as part of the common pad. So bottom of Column 5, line 67 it reads,   02:33
"A second wiring line 123/1 is drawn from the common pad 751 and divided into five narrow lines outside the seal of origin."   02:33
I guess the interconnecting pad I referred to according to the specification is part of --   02:33
Q It's common pad 751?   02:33
A -- it's drawn from the common pad 751.   02:33
Q So the plurality of wirings, I think it says five connected to common pad 751, correct?   02:34
A What is your question?   02:34

Q What is called in the specification as the second wiring line 123 is divided into five narrow lines outside the seal region? 02:35 02:35 02:35

A Well, yes. It's not clear here that these -- if I have to guess 751 is the common pad, and outside of the pad region where the width of it is wider, I think that becomes 123. That is why it says it's drawn from the common pad, so that would be 123 and is divided into five narrow lines. 02:35 02:35 02:35 02:35 02:36 02:36

I don't know if that is a square, a rectangle which is undivided, if it's labeled 123 or if it's labeled 751. 02:36 02:36 02:36

Q 123/1 has a lead line that goes around something that loops the five narrow lines, correct, in Figure 3? 02:36 02:36 02:36

A Where 123 terminates to 125, those five narrow lines are looped and labeled 123/1. 02:36 02:36

On the other end they go into this rectangle piece of metal which is not on -- which is not labeled, and that is part of 751 and part of 123. 02:36 02:37 02:37

Q There is a portion of the specification Column 6 of Shiba beginning on line 25, that says, "In the case of TFT of bottom gate type are used as the switching devices as in the above embodiment." 02:37 02:37 02:38 02:38

That is referring to a bottom gate structure 02:38

like is shown in Figure 4? 02:38
A Correct. 02:38
Q The power supply pads 731 to 738 and 731 as shown in Figure 3, right? 02:38
A Correct. 02:38
Q And all four of them are shown in Figure 1? 02:38
A I believe, or eight are shown in Figure 1 -- four of the -- along the side, along the lower end of Figure 1 and 4 along the long side on the top edge of Figure 1. 02:38
Q Correct. And the common pad 751, the third wiring lines 121/1 to 121/4, the interconnecting pad 125a and 125b, so 125a is shown in Figure 3 and 125b is shown in Figure 1, correct? 02:39
A Yes. 02:39
Q "Second wiring lines 123/1 to 123/4, and the first wiring line 127 can be formed in the same step by forming the data lines X." 02:40
Do you understand that sentence to mean that all of those components are formed from the same metal layer as the data lines? 02:40
A Well, all these different elements are made of the same material. 02:40
Q They're formed from the same step as from the data lines so they would have the same material? 02:40

A Material. It will be made from the same material. 02:40 02:40
Q In that case -- 02:40
A They will be made from the same material, the main elements, yeah. 02:40 02:40
Q Therefore, it says in that case they are all made of the same material as the data lines, so all these elements would have a single layer of material? That is all that is described there, correct? 02:40 02:41 02:41 02:41
A Well, they will be made the same way the data lines are made. The data lines are made with a single-layer material, and they will be single-layer material. If they're made as a multi-layer structure they will be made as a multi-layer structure. 02:41 02:41 02:41 02:41 02:41
I couldn't find evidence -- and I asked your help to point out to me how the data lines are made, and I couldn't -- I didn't receive any guidance from you how the data lines are made. So if it's a single layer or multi-layer, it's not clear. 02:41 02:41 02:41 02:41 02:41
Q What do you mean by multi-layer? 02:41
A Like a layer of titanium and layer of aluminum and maybe another layer of titanium. 02:42 02:42
Q Those layers in multi-layer film you just described would overlay each other directly; is that right? 02:42 02:42 02:42

A After patterning and performing the 18 steps they overlie. How the edges would look like depends upon the etching process. Sometimes you have a tapered edge. Sometimes you have a vertical edge. Sometimes you have like a stepwise edge. 02:42 02:42 02:43 02:43 02:43

So they will overlap in the middle of a line. But how they overlap on the edges of the line, that depends upon how the etching was performed. For example, you may have the lower layer to be wider than the upper layer. 02:43 02:43 02:43 02:43 02:43

Q But there is no intervening insulating layer within that multi-layer structure, is there? 02:43 02:43

A In forming the data lines? 02:43

Q Yes.

A No. But one of those elements, another portion below it could be made in another way. 02:44 02:44

Q I haven't gotten there yet though. 02:44

A Okay. 02:45

Q What is the purpose of dividing wiring line 127 into a plurality of narrow lines? 02:45 02:45

A It serves to increase the surface area, because now we have the top as well as the edges that will make contact with the sealant. 02:45 02:45 02:45

And also they serve as some sort of barrier for the sealant to prevent the flow of the sealant, as the 02:45 02:46

sealant is like a viscous material before it is cured. This prevents that from expanding into the display area. 02:46 02:46 02:46

It is a discussion in the text on the specifications by that one. We can refer to it for a more accurate description. 02:46 02:46 02:46

Q Where would you reference? 02:46

A So if we look at the Column 6 -- not in Column 6. Hold on a second. 02:46 02:47

Q How about Column 7? 02:47

A Yes. 02:48

Q Line 39, is that what you're referring to? 02:48

A Yes. 02:48

Q What is this? "The advantage of increasing the effect of adhesion area can be obtained," and that is as a result of the narrow lines, 127, being divided into several narrow lines? 02:48 02:48 02:48 02:48

A Correct. It's part of the adhesion between the -- between the adhesive and the ending protective overcoat in the gate dielectric so that the -- in this case we want to have a good adhesion to the -- to the substrate. So 127 is a variety of a narrow lines. 02:48 02:48 02:49 02:49 02:49

Q Does that increase the surface area available to interface with the sealant? 02:49 02:49

A One second please. 02:50

As you have the 127 divided into a set of lines, the protective overcoat 241 in the gaps between the metal wiring lines is touching and makes a better bond with the gate dielectric to a level. There are 22 layers, maybe both oxides or maybe both nitrite, so the sealant material -- so the adhesion of the 241 to the gate dielectric is the one that becomes more effective as we are dividing the narrow 127 into plurality of lines. 02:50 02:50 02:50 02:50 02:50 02:51 02:51 02:51 02:51

So the one you have to remove, the sealing agent we do the protective overcoat, and along that are the wiring lines 127. 02:51 02:51 02:51

Q When do you have to remove the sealing agent? 02:51

A In the process of forming the display is an alignment that is between the two counter substrates, and one has the colored filters, the red, blue, and one has the pixel electrodes. So the colored filters have to be aligned with respect to the right subpixel below. 02:51 02:52 02:52 02:52 02:52 02:52

I'm just reading whatever it says here. 02:52

Q Where are you reading? 02:52

A On Column 7, on line 49 or 50, it says, 02:52

"As a result the risk of removal of the first wiring line 127, together with the sealing agent 113, is 02:52 02:52 02:52

reduced. Correspondingly, the degree 02:52
of freedom of selecting material of 02:52
the sealant agent 113 depends on the 02:52
adhesion device that can be 02:53
increased." 02:53
Q But that doesn't say anything about having to 02:53
remove it, does it? Isn't that just referring to the 02:53
integrity of the seal? 02:53
A The first says, "As a result the risk of 02:53
removing of the first wiring line 127 together with 02:53
the sealing agent, 113 is reduced." 02:53
Here it implies the sealing agent may have to 02:53
be removed. 02:53
Q How does it imply that? The word "risk" 02:53
implies something that you would intentionally do? 02:53
Is that your opinion? 02:54
A The risk of removing first one in line in the 02:54
event of a sealing agent that has to be removed. 02:54
Q Where does it say that? 02:54
A I'm reading the same sentence as you. 02:54
Q I don't see "in the event." 02:54
A How you interpret the sentence? Maybe you can 02:54
provide me an alternative. 02:54
Q Let me ask a different question. 02:54
How does -- well, does the use of the plurality 02:54

of narrow lines for 127 allow the width of the sealant region to be reduced? 02:55 02:55
A Well, if we look further down the same column, we are on Column 7, and we look at the line 55, that is the element labeled D, and it reads, 02:55 02:55 02:55
"Since part of the first wiring line 127 is arranged in the battery region between the seal region 111 and the display area 103, Figure 3, the sealing agent 113 is prevented from flowing toward the display area 103. As a result the width of the bundled portion between the seal region 111 and the display area 103 can be small, thereby reducing the outside dimension of the LCD panel 100." 02:55 02:55 02:55 02:55 02:56 02:56 02:56 02:56 02:56 02:56 02:56
Q Looking at Line 42, beginning line 42 in Column 7, there is a sentence that states, 02:56 02:56
"However, if at least three narrow lines of the first wiring line are arranged in the seal region 111, the advantage of increasing the effective adhesion area can be obtained." 02:56 02:56 02:56 02:56 02:56
What does that sentence mean to you? 02:56
A If you divide 127 with the plurality of small 02:56

lines and three of those lines are in the seal region 02:57
in between the metal lines, the adhesive that is used 02:57
to provide the bonding material through substrate will 02:57
bond to 241. 02:57
And then 241 is the portion that we read a 02:57
moment ago indicated will be right on top of the gate 02:57
dielectric 211. So the area where the adhesive will 02:58
be bonded to the protective overcoat and the 02:58
protective overcoat will be bonded to the gate 02:58
dielectric. It will increase the surface area. Where 02:58
the protective overcoat is touching the gate 205 to 02:58
211, will increase. 02:58
Q You think this patent is about increasing 02:58
adhesion between the protective overcoat 241 and the 02:58
gate 205, 211? Is that your opinion? 02:58
A This has a relevance to my answer. The 02:58
strength of the adhesion is very relevant. 02:59
There is a very strong adhesive. You can 02:59
narrow down its effective width. You don't need to 02:59
use as much of it. If you use a weaker adhesive, then 02:59
you have to have a wider region to put the adhesive 02:59
down. 02:59
Is that clear? 02:59
Q Sure. 02:59
A Now, if you have a strong adhesive, and that is 02:59

bonded on to 241, and 241 is bonded to 127, if you have to remove it, 241 is not as strongly bonded on 127 as it is if it is bonded in contact with the gate dielectric 211. 02:59 03:00 03:00 03:00

Q When you have to remove the wiring 127 from the protective overcoat, when does that happen? 03:00 03:00

A You don't have to remove the wiring 127. You may have to rework the sealing process. 03:00 03:00

Q Where does it say that in this patent? 03:00

A This is the sentence that we've -- we were discussing a moment ago. 03:00 03:00

Q How about risk of removal? Do you think that is about rework? 03:00 03:00

A As a result the risk of removal of the first wiring line 127, together with the sealing agent 113 is reduced according to the degree of freedom of selecting the material -- capacity can be increased. It means you can have a stronger sealing agent 113. One has a better adhesion, and so you can make it a narrow width. If you have to pull it out you don't have to -- 03:00 03:00 03:01 03:01 03:01 03:01 03:01 03:01

Q What are you talking about? When do you have to pull it out? 03:01 03:01

A This is what I was trying to explain earlier.

You have the two substrates, and the two 03:01 03:01

substrates are in close contact, and you have to align 03:01
the one substrate with respect to the other substrate 03:01
so the colored filters are in the right position. You 03:01
don't want the colored filter to be overlapping two 03:01
pixel electrodes. 03:02
So there is some fine motion that you have to 03:02
do to bring the two substrates, and at some point the 03:02
two substrates will become so close that you'll be 03:02
pressing against the adhesive. And if the alignment 03:02
is not correct then you have to pull one substrate in 03:02
order to reposition it, then you run into this 03:02
problem. 03:02
Q Have you seen that problem in manufacturing 03:02
processes firsthand? 03:02
A I have seen the finished products, and I have 03:02
took apart finished displays and I became aware of the 03:02
intricacies of all the important elements there, the 03:03
adhesive, the sealing, and I get an appreciation of 03:03
the complexity involved in creating these displays. 03:03
Did I work in manufacturing? You've seen my 03:03
resume'. 03:03
Q I didn't ask that. I asked if you'd ever 03:03
become aware of a situation during a manufacturing 03:03
setting where substrates were brought together and 03:03
then peeled apart and then restuck together again? 03:03

A In the context of another patent that we were discussing, for example the Sukigawa that referred to the process of attaching the external connection, it's a similar situation. 03:04 03:04 03:04 03:04

Q That was talking about attaching a flexible circuit, not the substrates. 03:04 03:04

A It's a similar issue. 03:04

Q There is nothing in Shiba about the substrates being put together and then pulled apart again, is there? 03:04 03:05 03:05

A You asked your questions about substrates. In that case the flexible connectors would be substrate. The glass substrate is another substrate. There are a set of -- 03:05 03:05 03:05 03:05

Q I'll rephrase. 03:05

There is nothing in Shiba about the color filter substrate and the thin-film transistor substrate being brought together and then pulled apart and repositioned together again, is there? 03:05 03:05 03:05 03:05

A That is not addressing the -- how the colored filter and the glass substrates are bonded together. It's addressing the substrate that has the flexible connector that is attaching the glass substrate, and the turns out that you may have to rework that connection. 03:05 03:05 03:05 03:05 03:06 03:06

In pulling one substrate, a flexible substrate that has the external wiring, you may pull the metallization and you may damage the pads. So it's a very similar issue here. 03:06 03:06 03:06 03:06

Q Except that what is described in Shiba has nothing to do with the color filter substrate and a thin-film transistor substrate, does it? It's about the FPC. 03:06 03:06 03:06 03:06

A Your question earlier, it reads, "I asked if you'd ever become aware of the situation during the manufacturing setting where substrates were brought together then peeled apart and then re-stuck together again." This is what you asked me. 03:06 03:06 03:07 03:07 03:07

I told you I did not work in manufacturing or -- and you asked me -- then I said that I became familiar with this issue of bringing two substrates together in the case of Shiba where you have a similar issue. You have two substrates. You have to align one with respect to the other, and then you have an adhesive in between. 03:07 03:07 03:07 03:07 03:07 03:07 03:07

Only difference in Shiba is the adhesive is conductive, and in this case the adhesive is not conductive. 03:07 03:07 03:07

Q I take that as a "no". 03:07

Looking at Column 7, beginning at Line 21 it 03:08

reads, 03:08

"Since the first wiring line 127 is arranged in the seal region 111, while the other are arranged in the boundary portion between the seal region 111 is constituted by a plurality of neural lines, the effective adhesion area between the sealing agent 113 and the array substrate 200 is relatively large. For this reason the width of the seal region 111 can be reduced without a risk of removal of the sealing agent 113 from the array substrate 200." 03:08

Do you understand that to be talking about the adhesion between the sealing agent and the substrate 200? 03:08

A Excuse me. Where are you reading? 03:09

Q Column 7 beginning at Line -- I misspoke, 31, beginning at Line 31. 03:09

A I see that. That refers to another problem. I think the substrates have to be broken and diced, separated. 03:11

So if you make a narrow seal which is strongly adhered with the array substrate 200, when you're 03:11

breaking the substrate. You're not removing the seal when you're separating the substrate. I think that is what I'm understanding from this part. If you understand something different, please tell me. 03:11 03:11 03:11 03:12

It's all those things. If you have a narrow -- the plurality of narrow lines, the area where the sealing agent 113 is touching the protective overcoat 241 and the protective overcoat is attached with the gate dielectric 211 is increased. That is where you have a strong bond. 03:12 03:12 03:12 03:12 03:12 03:12

Q Do you think that the surface area between gate dielectric 211 and protective overcoat 241 is increased when there are the plurality of narrow lines separating protective overcoat 241 from gate dielectric 211 compared to those narrow lines being absent? 03:12 03:12 03:13 03:13 03:13 03:13

A Well, instead of -- if you're having six narrow lines, some of them are inside the sealing region and some outside, we have one continuous wide line -- and that is all inside the sealing area, sealing region -- then the protective overcoat 241 above the wiring 127 is separated from the 211. They're not directly connected. 03:13 03:13 03:14 03:14 03:14 03:14 03:14

In lines 45 to 50 this is what it states. It states, 03:14 03:14

"Since the first wiring line 127 is constituted by a plurality of narrow lines as shown in Figure 6, the protective overcoat 241 and the gate dielectric 211 are directly connected to each other through the gap between the narrow lines." 03:14 03:15

Continuing, it reads, "As a result, the risk of removal of the first wiring line 127, together with the sealing agent 113 is reduced. Accordingly, the degree of freedom of selecting material of the sealing agent 113 to bonding adhesion capacity can be increased." 03:15

Q Look at Column 2. 03:15

"If the width of a seal region is reduced the strength of adhesion between the array substrate and the counter substrate is lowered." 03:16

Do you see that? 03:16

A Yes. 03:16

Q So it says, 03:16

"This causes various problems. For example, removal of the sealing agent 03:16

itself or the sealing agent 03:16
accompanied with a thin film deposited 03:16
on the raised substrate." 03:16

Do you understand that to say it's a problem if the sealing agent is removed? 03:16 03:16

A Yeah. If your sealing agent is not strong, and you have a narrow width where the seal or the sealing agent is applied, the adhesion between the two substrates, bonding, may not be effective. And in that situation the two substrates may come apart, and in that process the thin-film may also come apart. 03:16 03:19 03:19 03:19 03:20 03:20

Q A short time ago we referred to Column 6, beginning line 25. We talked about in the case where TFT bottom gate type are used, and we went through the power supply pads 731 to 738, the common pad 751, the third wiring lines 121/1 to 1221/4, the 125a and b, second wiring lines 123/1 to 123/4, and the first wiring line 127 can be formed in the same step of forming the data lines. 03:20 03:20 03:20 03:20 03:20 03:20 03:20 03:20

Do you recall that? 03:21

A Yes. 03:21

Q There is another sentence, one sentence removed from that that says, 03:21 03:21

"Further, depending on the kind of 03:21
TFTs, the aforementioned wiring lines 03:21

be formed in the same step of forming 03:21
the scanning lines Y sub J." 03:21
Do you understand that to mean that if instead of a bottom gate type TFT, top gate type TFTs were used, then in that case those various lines and components could be formed in the same step of forming the scanning lines Y sub J? 03:21
A It is -- someone skilled in the art will see that these wiring lines may not bend by the type of the TFTs, because I don't see how even if you have a bottom gate TFTs, that you cannot use that one using the scanning lines, and that the wiring lines can be made using the material from the scanning lines only in the case of as you put it of top gate TFTs. 03:22 03:23
Q That's what I'm saying is just what is in the patent, what it teaches, and it says, "Depending on the kind of TFTs." 03:23 03:24
So in the first part of the paragraph it talks about bottom gate type TFTs, and then describes if you use those you can make all the components out of the data line material. 03:24
Then it says, 03:24
"Further, depending on the kind of the 03:24
TFTs, the aforementioned wiring lines 03:24
can be formed in the same step of 03:24

forming the scanning lines." 03:24

Doesn't that mean another alternative is to form all those components from the same layer as the scanning lines are formed from? That is what this says, would you agree? 03:24

A Well, what someone skilled in the art will understand by this term -- depending on the kind of the TFTs -- is what material is used to form the scanning lines? 03:25

To form all those elements that we're discussing above, all those wiring line elements, and the supply pads, the power supply pads, common pad, third wiring lines, second wiring lines and first wiring lines, you need to have a high conductivity material. You need to have a layer of -- made out of a material that is very conductive, that will not be resistive. 03:25

In the bottom gate TFT structure, which is used here the data line material is taken as a fact that it is a high conductivity material. 03:26

If you use a bottom gate device and the material that is used to make the scanning lines also is made of a high conductivity metal, that bottom gate -- that -- sorry. 03:26

If it's a bottom gate TFT, it is implied that 03:26

the material used to form the data lines it will be high conductivity, correct? There is no disagreement with that part. 03:26 03:26 03:26

So this structure applies to that question if you have the data line material in the bottom gate TFT, that is given it is a high conductivity material. 03:26 03:27 03:27

The question is when one can use the scanning line material to form that wiring line? You said in your question that the structure bottom gate versus top gate is determining factor, and I responded. 03:27 03:27 03:27 03:27

And I'm stating again that it's not the structure top versus bottom, but it is the material that is used to form the scanning line itself. If that material is a high conductivity material, that material can be used to make the wiring -- all these wiring elements. If that material is low conductivity or high resistivity, using the scanning line -- the material of the scanning lines for the wiring elements, it will not be effective because you will add serious resistance. 03:27 03:27 03:27 03:27 03:27 03:28 03:28 03:28 03:28 03:28

For example, you mentioned the top gate device, and one material in the top gate device is like polycrystalline silicone, highly-doped silicone. That will be the resistive material that will not be useful. 03:28 03:28 03:28 03:28 03:28

If you have an aluminum gate device it doesn't matter if it's a top or bottom gate, you can use it to form that wiring structure. You will have a refractory metal that is about enough -- about activity, that will be good. 03:28 03:28 03:28 03:28 03:29

Q A what metal? 03:29

A "Retractory" metal. 03:29

Q "Retractory" did you say? 03:29

A Yes. Some of the gates used to be made with aluminum, so aluminum has much higher conductivity than the doped polycrystalline silicone used as the gate of the top gate TFTs. 03:29 03:29 03:29 03:29

Q Would the polycrystalline silicone also be used for the scanning lines in that situation? 03:29 03:29

A If it's a small-sized display. 03:29

Q Regardless of the kinds of transistors, this sentence says, "Depending on the kind of TFT, there is some kind of TFTs where the aforementioned wire lines can be formed in the same step performing the scanning lines," right? 03:29 03:30 03:30 03:30 03:30

A Okay. 03:30

Q Do you agree? 03:30

A Well, this is what the sentence says. You're implying that it is the structure of the TFT that dictates where you can use or cannot use the scanning 03:30 03:30 03:30

line, and you tried to imply that -- 03:30

Q I'm not implying that. 03:30

I said in my question, regardless of the kind 03:30 of transistor the sentence says there is some kind of 03:30 transistors depending upon the kind, it says, for you 03:30 to form the aforementioned wire lines all from the 03:30 same step of performing the scanning lines. 03:30

If you do that, all of the aforementioned 03:30 wiring lines would be formed over one layer and would 03:31 have the same makeup as the scanning lines, right, 03:31 just looking at this sentence? 03:31

A Okay. This sentence says it is possible to 03:31 form those lines out of a scanning line element. 03:31

Q In which case they all have the same material, 03:31 and they're all one layer, or if it's a multi-layer 03:32 scanning line they'd have the same composition as the 03:32 scanning line, correct? 03:32

A All but one segment. 03:32

Q What do you mean? I don't see that. 03:32

A Yeah. Someone skilled in the art would see. 03:32

With all respect, you're an attorney, not 03:32 skilled in the art in these matters. I'm sure, again, 03:32 in these proceedings you'll be very skilled. 03:32

But if you read the section in Column 6 03:32 starting from line 7, it says, 03:32

"As shown in Figure 1, the first wiring line 127 is guided along a second circuit side 201d to the second longer side 201b and connected to the power supply pad 735 to 738 through a branch wiring line. Then the first wiring line 127 is guided along the first side 201c to the first longer side 201a, and the narrow lines meet together at the inner connecting pad 125b." 03:32 03:32 03:32 03:32 03:33 03:33 03:33 03:33 03:33 03:33 03:33

In the same column, line -- 03:33

Q Let's stop. Let's stop. 03:33

A Let me conclude this part here, because what I'm going to read is the conclusion of that part. 03:33 03:33

In the above amount the first wiring line 127 is arranged the seal region. 03:33 03:33

Q Where are you looking? 03:34

A Same Column 6, line 48. 03:34

"The first wiring line 127 is arranged along the seal region 111 on the three sides, 201b, 201c and 201d of the array substrate." 03:34 03:34 03:34 03:34

Q Do you understand that to mean the wiring line 127 goes along three sides of the substrate? 03:34 03:34

A This is what it says here. 03:34
Q Not four sides? 03:34
A But it's source with specific sides. 03:34
Q Right. Which sides are those that are shown? 03:34
A The 201b which is the top along the side, the 201c and 201d, those are the two short sides. 03:34
Q That is where the wiring 127 goes along those three sides? 03:35
A Correct. And if you make 127 with the scanning line material, the line that goes -- the second of the line that goes along the side 201c, it cannot be made with the scanning line material because that segment will shorten all the scanning lines that will come from those external connections 721, 722, 723 and 224. 03:35
Q 201c is the short side, on the right? 03:35
A Correct. 03:35
Q But if you had a bottom gate transistor the scan lines are going to be in the gate line layer. They're going to be on the bottom layer of the transistor, correct? 03:36
A It doesn't matter if it's a bottom gate or a top gate transistor. If you make a wiring that is made in the same material as the scanning lines, you cannot have that wiring be in the same place where there is scanning lines that will be crossing. 03:36

You see that wiring 127 goes around, and it stops at 125b. That side 201c may have like a thousand scanning lines going across that segment, as I said, there is -- will have to be a different material. And the other material of choice, it is the data line material. 03:36 03:36 03:36 03:36 03:36 03:36

So this embodiment says it is possible to make it with the scanning line material, but in that case it will be on two sides. The third side will still have to be the data line material to avoid the shorting with the scanning lines. That is what someone skilled in the art will see. 03:37 03:37 03:37 03:37 03:37 03:37

MR. SCHLITTER: Okay. Let's take a break. 03:37

THE VIDEO OPERATOR: We are off the record. The time is 3:37 p.m. on July 12, 2013. This is the end of video No. 1 of the continuing deposition of Dr. Milt Hatalis. 03:37 03:37 03:37 03:38

(Recess taken.) 03:38

THE VIDEO OPERATOR: We are on the record. The time is 3:53 p.m. on July 12, 2013, in this is the beginning of video four of the deposition of Dr. Milt Hatalis. 03:53 03:53 03:53 03:54

BY MR. SCHLITTER: 03:54

Q Before the break we were talking about the two cases that are described in Column 6, one where 03:54 03:54

various wire lines described in lines 25 through 31 are formed from the same step as formed from the data lines, and the other case where the wiring lines are formed in the same step as formed in the scanning lines. 03:54

In the case of those wiring lines being formed from the same step as the data lines, I take it all three sides of wiring line 127, that is 201d, 201b, or the sides along 201b, d and c, all could be at the data line level, right? 03:54 03:55

It wouldn't interfere with the data lines driven by the circuits on the bottom side of the substrate shown on Figure 1, correct? 03:55

A Correct. 03:55

Q And then you were suggesting on the other hand if instead of forming all the wire lines from the data lines they were formed from the scanning lines, then in that case you would need to make a different line segment for wiring line 127 along the side 201c in order to not short out the scan lines? Am I recalling your testimony correctly? 03:55

A Correct. 03:56

Q Alternatively, if you just interchange the driving circuits in Figure 1 so you put the data line circuits alongside 201c, and the scan line circuits 03:56

along line or side 201a -- if I have that right -- which is the bottom side, in that case you would also be able to have all three sides of line 127 be on the scanning line level without interfering or shorting out the scan lines, correct? 03:56

A You could do that if one interchanges the circuit. But now you are going to have the long -- when you do that you will increase the length of your data lines. The data lines now will run along the long side of the display, not along the short side of the display. 03:58

So you cannot just simply say it's a simple change from one case to take into consideration what effect will that have on the display performance. 03:58

But, hypothetically speaking, if one was able to do that, and where are the scan lines and where are the data lines, that would be correct. 03:58

Q Your opinion is the structure that corresponds to a first internal conducting line referenced in the claims of the '102 Patent, for example Claim 15? 03:59

A I don't understand your question. 04:00

Q Referencing Claim 15 of the '102 Patent, there is an element that calls for, 04:00

"First internal conducting line 04:00

electrically connected to the common 04:00

terminal in the contact hole, wherein 04:00
the first internal conducting line and 04:00
a gate electrode of the thin-film 04:00
transistor are created by first 04:00
processing step." 04:00

In your -- is there a structure in the Shiba reference that corresponds to this Claim element? 04:00
A Yes. 04:00
Q Where is that structure? What structure are you referring to? 04:01
A Indicating to the first wiring line 127. And I want to point out another way to get Shiba teaching. 04:01
Q Let me break down the question a bit more. 04:01
A Sure. 04:02
Q Where is wiring line 127, in your opinion, if it is connected to a common terminal in Shiba? 04:02
A Well, the common terminal, according to the specifications, according to the Claim, is the conductive element which is located in the extractor terminal. And there is a contact hole in the extractor terminal, and according to the limitation Claim 15 that reads, 04:03

"An extractor terminal including a 04:03
common terminal and a contact hole 04:03
formed over the substrate wherein the 04:03

common terminal is formed from the 04:03
same layers that pixel dielectric." 04:03
So in this section the description of the 04:04
common terminal is provided. It is a conductive 04:04
layer. It is located in the extractor terminal 04:04
region, and there is a hole in that region, and the 04:04
whole is space violator. 04:04
And in this section here it also provides 04:04
limitation on what is the material that the conductive 04:04
layer is made of, and specifically he says this is 04:04
formed from the same layer as the pixel electrode. 04:04
Now, Shiba discloses a conductive layer in the 04:04
extractor terminal. 04:05
Q Where is the extractor terminal in Shiba? 04:05
A The extractor terminal in Shiba is located 04:05
along the sides 201a and sides 201c. 04:05
Q Mark that as the next exhibit, 2007. 04:05
(Exhibit 2007 was marked for 04:05
identification by the court
reporter and is attached hereto.) 04:05
BY MR. SCHLITTER: 04:05
Q Is an extractor terminal shown in Figure 3 -- 04:06
I've handed you what is marked as Exhibit 2007, which 04:06
is an enlargement of Figure 3 from Shiba. 04:06
Do you recognize that? 04:06

A Yes. 04:06
Q Is an extractor terminal shown in Figure 3? 04:06
A Yes. There are many extractor terminals in the 04:07
region that is enclosed by the opening in the 04:08
passivation layer, protective overcoating layer 04:08
241, and that opening is -- the hole is called 243. 04:08
And different terminal pads are indicated labelled 04:08
751, 762, 763, and go on many such pads in the full 04:09
Figure 1. Only a handful are shown in Figure 3, which 04:09
is the magnified portion of the lower left corner. 04:09
Q Could you take a pen, please, and draw a line 04:09
around what you consider to be the extractor terminal 04:09
in Figure 3 that is Exhibit 2007. 04:09
A There are many extractor terminals. Do you 04:10
want my to draw one? 04:10
Q I want you to draw a line around what, in your 04:11
opinion, constitutes extractor terminal in Figure 3. 04:11
A Okay. Figure 3 is from Shiba, and Shiba is 04:11
using slightly different terminology of the different 04:11
elements. 04:11
Extractor terminal comes from 1 or 2. So if we 04:11
look in Column 1 in line 53 it reads, 04:11
"Furthermore there are extractor 04:11
terminals 15 to supply electric power 04:11
and control signals from the outside." 04:12

And in Figure 12 in the prior art I -- 04:12
Q Are you looking at Column 1 from -- 04:12
A 102. 04:12
Q You said line 53? I see it. Okay. 04:12
A So the extractor terminal 15, and in Figure 12 in the prior art it shows like a dotted line labeled 15, and within that dotted line there are many extractor terminals. 04:12 04:12 04:12 04:12
Q Are extractor terminals also shown in Figure 3 which is not prior art in the '102 Patent? We talked about those this morning labeled 205. I think I'm in the column I referred to. 04:13 04:13 04:13 04:13
A So the bottom of Column 7, line 61 reads, 04:13
"Extractor terminals 205 are also provided to supply electric power and control signals from the outside. A plurality of extractor terminals are shown in the dotted line that surrounds them in Figure 3." 04:13 04:14 04:14 04:14 04:14 04:14
So by analogy I can draw a circle in one of them or in many of them. You asked me to draw -- you asked me as a singular, if I understand. 04:14 04:14 04:14
Q I will clarify the question. 04:14
Circle in front of you everything that you think in your opinion you believe to be an extractor 04:14 04:14

terminal or part of the extractor terminal, or terminals. 04:14 04:15

A Let me go one -- 04:15

Q Everything in Figure 3 that is an extractor terminal I would like you to circle. 04:15 04:15

A Well, an analogy of Figure 3 and the Figure 12 which defines what are the extractor terminals. I will draw a circle in Figure 12 -- sorry in Figure 3. 04:15 04:15 04:15

Is that what you asked me? 04:15

Q Yeah. Could you label that "extractor terminals" what you just circled, please? 04:15 04:16

A Do you want me to write the words "extractor terminals"? 04:16 04:16

Q Yes, please. 04:17

A So I draw a rectangle around the area where the extractor terminals are included within. 04:17 04:17

Q Is that the only part of Figure 3 that you deem to be an extractor terminal? 04:17 04:17

A In Figure 3. 04:17

Q Okay. Claim element we read a moment ago refers to, "First internal conducting line electrically connected to the common terminal." 04:17 04:18 04:18

Is there a common terminal shown in Figure 3 or is there structure in Figure 3 that you believe corresponds to the common terminal recited in the 04:18 04:18 04:18

element of Claim 15? 04:18
A Well, the extractor terminal in the 04:18
specifications indicated is the region where 04:18
connections with the external wiring takes place, and 04:18
in these connections you have a conductive element in 04:18
the substrate. 04:19
And in the specifications they list different 04:19
materials that is used to make the pixel electrode, 04:19
and that material is also present in the extractor 04:19
terminal region, and -- 04:19
Q You're talking about the '102 Patent 04:19
specification now? 04:19
A Right. The Claim has a limitation in the 04:19
extractor terminal in which the material that can be 04:19
used to make the common terminal is restricted to the 04:19
material that is used to make the pixel electrode. 04:20
In Shiba what we referred to here as a common 04:20
terminal in the particular embodiment depicted in 04:20
Figure 3 and discussed in the specifications, the 04:20
particular embodiment is not made from the same layer 04:20
as the pixel electrode. There is another material 04:20
used in the extractor terminal to form the connection 04:20
with the external circuit. 04:20
Q So are you saying that Shiba does not disclose 04:20
structure that corresponds to the common terminal 04:20

recited in Claim 15? 04:21

MR. CORDREY: Objection. Form. 04:21

THE WITNESS: The particular embodiment disclosed by Shiba meets many of the limitations imposed by the Claim 15, such as the presence of an extractor terminal, such as the presence of a contact hole. 04:21 04:21 04:21 04:21 04:21

But the particular embodiment -- in this particular embodiment of Shiba the common area is made from a different material. There is teaching within Shiba that could lead someone skilled in the art to modify the -- this particular embodiment, and make 751 -- make the common terminal in an alternative way, and in that case it will meet all the limitations of Claim 15. 04:21 04:21 04:21 04:21 04:22 04:22 04:22 04:22

BY MR. SCHLITTER: 04:22

Q Are you saying that there is structure in Figure 3 of Shiba that you believe corresponds to the common terminal, except it's made from a different material than is required by Claim 15? Is that what you're saying? 04:22 04:22 04:22 04:22 04:23

A As we discussed earlier in the context of 1 or 2, the extractor terminal is a multi-layer structure, has a lower level metal and an upper layer metal. The upper layer metal is made of the pixel electrode 04:23 04:23 04:23 04:23

material, and that -- and it is the upper layer metal that 102 refers as the common terminal. 04:23 04:23

Shiba in this particular embodiment which is described in Figure 3, you have the lower level metal. You have the contact hole, but this particular embodiment does not show the upper layer material. 04:23 04:23 04:24 04:24

Q You said in your answer that the extractor terminal is a multi-layer structure. 04:24 04:24

What exactly in the '102 Patent about the extractor terminal is multi-layer? 04:24 04:24

A May I refer you to the discussion we had in the morning? 04:24 04:24

Q With respect to the contact hole? Is that what you were -- 04:24 04:24

A Well, it refers to the one we said one way to implement the extractor terminal regions is to indicate what you have in the -- to duplicate, replicate, what is shown in the cross-section of Figure 13 in the common contact portion where you have -- as I said -- a lower level of metal and an upper layer of metal and a contact hole, and that is shown in the common contact portion. 04:24 04:24 04:24 04:25 04:25 04:25 04:25 04:25

And one way to make the extractor terminal in 102 would be to use exactly the same layers, use the data line metal for the lower metal and use the pixel 04:25 04:25 04:25

electrode layer for the upper metal. 04:25

If you have -- and in this particular embodiment of it it indicated where it is a specific sequence of how the layers are laid down, there will be a contact hole as we discussed that the pixel electrode layer will go down and cover the edges of the hole, and cover the bottom of the hole, and in the bottom of the hole make connections to the lower level metal. That is one embodiment that one can build. 04:25 04:25 04:25 04:26 04:26 04:26 04:26 04:26

Q Could you please take this red pen and circle what you in your opinion you believe corresponds to a contact hole recited in Claim 15. In other words, indicate on that Exhibit 2007 which is the enlargement of Figure 3 the contact hole. 04:26 04:26 04:26 04:26 04:26

A (Witness complies.) Well, the contact hole in Claim 15 has certain limitations. There is a contact hole shown in Figure 3 and is referred to -- 04:27 04:31 04:31

Q Figure 3 of -- 04:31

A -- in Shiba. And then that specification in Shiba, Column 4, line 66, it reads, 04:31 04:31

"As shown in Figure 3 the data line part 761 through 764 are exposed through a slit 243 formed in the protective overcoat 241." 04:32 04:32 04:32 04:32

It is -- slit in the protective overcoat is an 04:32

opening in the protective overcoat, and an opening in an insulating layer is what someone skilled in the art would refer to as a contact hole. You remove the insulating layer, so then you allow the surface of the underlying metal layer, which is below the insulating layer, to be exposed. 04:32 04:32 04:32 04:32 04:32 04:32

So in Shiba that element 243, which is shown already in Figure 3, it is labeled and it is depicted with a dotted line as an opening in the protective overcoat. 04:32 04:33 04:33 04:33

And the -- but in Claim 15 the contact hole has other limitations as well. And the other limitations, because Shiba does not include a common terminal made from the same layer as the pixel electrode, the contact hole that is shown in Shiba does not meet some of the limitations such as providing a connection between the common terminal and the first internal contacting line, because the common terminal made from the same layer as the pixel electrode is not disclosed in Shiba. 04:33 04:33 04:33 04:33 04:33 04:34 04:34 04:34 04:34 04:34

So I can -- in your question you asked me to draw a contact hole which would correspond to everything recited in Claim 15, and that may not be possible because Shiba is -- is not having -- is lacking one element of -- and so the contact hole 04:34 04:34 04:34 04:35 04:35

which is disclosed in Shiba and which is an opening in the passivation layer, though it is disclosed it is not meeting all the limitations of the Claim 15. 04:35 04:35 04:35

But should one modify based on the teaching of Shiba, and based on the teaching of other priority, then modify the extractor terminal, they could meet all the limitations of Claim 15. It would be obvious how to make structure in light of the teaching of Shiba, and in view of other priority make a structure that will meet all the limitations of Claim 15. 04:35 04:36 04:36 04:36 04:36 04:36 04:36

Q Is it true also then that you cannot indicate in Figure 3 of the Shiba structure that that meets the limitations for the common terminal recited in Claim 15? 04:36 04:36 04:36 04:36

A There is something wrong with the transcript. 04:36

Q It should be "recite." This is a rough transcript. 04:37 04:37

It says is it true also that you cannot recite -- let me restate the question. 04:37 04:37

Is it true that you cannot point to structure in Figure 3 of Shiba that meets the limitations for the common terminal recited in Claim 15? 04:37 04:37 04:37

A The extractor terminals in Shiba have some of the elements or limitations described in Claim 15, but not all. 04:37 04:39 04:40

Q Which ones does Shiba not show, which limitations? 04:40 04:40

A For example, the common terminal in Shiba is formed from the same layer as the pixel electrode. That is an explicit limitation imposed in the Claim, correct? That is what is written here. 04:40 04:40 04:40 04:40

Q Yes, that is in the Claim. 04:40

A Shiba disclosed what is the pixel electrode, yet does not disclose what is the material used to make all that wiring. So we cannot say if that material is the same or not. 04:40 04:40 04:41 04:41

Q Shiba nowhere discloses where, in 127, or any of those wirings that are referenced in Column 5, lines 20 to -- 25 to 31, there is no discussion of Shiba using a pixel electrode material for those wirings, is there? 04:41 04:41 04:41 04:41 04:41

A Well, there is no disclosing of any material that I looked for, and I trust you looked for, and I could not find any reference for the data lines. 04:41 04:41 04:41

I know that wiring elements listed in that portion, what is the material that Shiba is using to make those elements. 04:41 04:42 04:42

Q But Shiba, I think you would agree, discloses that you can make those elements all from the data line material? 04:42 04:42 04:42

A Right. 04:42
Q Or you could make them all from the scanning line material? 04:42
A Correct. 04:42
Q But never make it from a pixel electrode material, does it disclose that? 04:42
A Correct. That part he's disclosing. But he's not disclosing what is the material of the data line, or what is the material of the scanning line, and he's only disclosing what is the material of the pixel electrode. 04:42
Q When you say that part he is disclosing, you mean he's disclosing it's made from data line material or scanning line material? 04:42
A Wasn't specifically like a number. 04:42
Q Doesn't disclose that, just discloses the concept of data line material or scanning line material? He never discloses the concept of pixel electrode material? 04:42 04:43
A Correct, it doesn't disclose that part. It only discloses the pixel electrode material but does not disclose the material of the other ones. 04:43
And for the particular pixel electrode material that he is disclosing, which is Indium tin oxide, it is unlikely he can -- these elements will be made, or 04:43

these wiring elements will be made by that material 04:43
because that material is not suitable for making a 04:43
14-inch diagonal display. 04:43
Q For what reason is it unsuitable? 04:43
A Because you need a high conductivity material. 04:43
Q And the pixel electrode material disclosed in 04:43
Shiba is not a high conductivity material? 04:44
A It is a conductive material, but it's 04:44
conductivity is much lower than aluminum or chromium 04:44
or other materials. 04:44
Q The element we've been talking with about 04:44
Claim 15 talks about electrically connected, that the 04:44
first internal conducting line which you identified as 04:44
wiring 127 in Shiba corresponds to 127 in Shiba, I 04:44
think you said, am I right? Is that your opinion? 04:44
Does the first internal conducting line 04:44
corrrespond to wiring 127, in your opinion? 04:44
A Well, I tried earlier to point to another 04:45
construction within Shiba 127, and you have 04:45
interrupted me. So if I may describe the other means 04:45
of creating the wiring 127 in the other means, you 04:45
will see the first internal conducting lines are 04:45
disclosed. 04:45
Q What are you referring to in Shiba? 04:45
A I'm referring in Shiba in Column 6, line 37 04:45

that it reads, 04:46

"Moreover, the first wiring lines 127 04:46
may be formed in the step of forming 04:46
the scanning lines CJ and the data 04:46
lines XI, respectively, thereby 04:46
constituting a two-layer structure. 04:46
In this case if the layers are 04:46
partially connected to each other, the 04:46
wiring defect can be prevented in the 04:46
manufacturing yield can be improved." 04:46

In this section Shiba discloses the first 04:46
wiring line in 127 can be made as a two-layer 04:46
structure, made of two metal layers, one metal being 04:46
the same as that used in the scanning lines and the 04:46
other metal would be the same as used in the data 04:47
lines. 04:47

As we were discussing earlier, the two lines, 04:47
data lines and scanning lines, have an insulating 04:47
layer interposed between those two and -- 04:47

Q Is it shown is Figure 4, the insulating layer 04:47
you're talking about? 04:47

A The insulating layer is shown. If we look at 04:47
Figure 6 you see that the wiring layer which is made 04:47
as the same as that used for the source and drain 04:47
electrodes, it is located above the insulating layer 04:48

211, in which you have identified as the gate electrode, and in the scanning line CJ, which also forms the gate electrode, CJ shown in Figure 6, is located below that layer. 04:48 04:48 04:48 04:48

So someone skilled in the art, by looking at that figure, reading the specifications, and looking at the sequence that the layers are laid down, and which comes first and which comes afterwards, it will be evident that the two-layer structure formed by using the scanning lines and the data line materials, those two layers will have an insulating layer in between. 04:48 04:48 04:48 04:48 04:48 04:49 04:49 04:49

And that's why Shiba says if the layers are partially connected, implying that there will be a contact hole that provide the partial connections, even with this contact hole there will be a plurality of those runs. So if there are wiring in other -- 04:49 04:49 04:49 04:49 04:49

Q It doesn't disclose what you're thinking would be -- it doesn't exclusively talk about a plurality of contact holes, does it? 04:49 04:49 04:49

A It talks about it partially connected to each other. And in the last deposition we had a long discussion about the meaning of that terminal connection. If you wish, we can repeat the discussion. 04:49 04:50 04:50 04:50 04:50

Someone skilled in the art will see that partial connections can be made by having these holes, and Shiba is teaching a way to any other means of forming it because, as we are discussing before the break in Column 7, it requires that the protective overcoat in the gate electrode are directly connected through each other through the gap between the narrow lines that form 127. 04:50 04:50 04:50 04:50 04:50 04:50 04:51 04:51

So Shiba is teaching a way to completely remove the protective overcoat 241. So if you have a contact hole, you simply have an opening on the wiring line 127, and you do not affect the integrity of the overcoat and how that overcoat adheres to the underlying gate electrode. 04:51 04:51 04:51 04:51 04:51 04:51

Q Are you talking about an opening in the wiring line, 127? 04:51 04:51

A I'll sorry. Are you asking me a question? 04:52

Q That is the question. 04:52

MR. CORDREY: That is the pending question. 04:52

MR. SCHLITTER: That is the pending question. 04:52

MR. CORDREY: He's asking the question. 04:52

THE WITNESS: In my previous answer I said so if you have a contact hole you simply have an opening on the wiring line 127. 04:53 04:53 04:53

BY MR. SCHLITTER: 04:53

Q What does that mean, an opening on the wire 04:53
line? 04:53

A That means that you remove a portion of the 04:53
protective overcoat in the region which is only 04:53
located above the wiring line 127, and you do not 04:53
remove the overcoat in the gap between adjacent lines. 04:53

Q Protective overcoating region above the wiring 04:53
line 127? 04:53

A I'm sorry. You have an opening in the -- in 04:53
the layer 211 -- I'm sorry -- in the layer 211, in the 04:54
gate dielectric layer, the one that will be on top of 04:54
the first layer. 04:54

We are talking about a double layer line, the 04:54
lower level being made to aid the scanning lines, the 04:54
upper level to be made in the data lines, and there 04:54
will be the layer 211 interposed in between the two 04:54
lines, the two metal lines as shown in the two 04:54
Figure 6 where you show the data line material above 04:54
211, and you see the scanning line material below 211. 04:54

So in this particular embodiment in Figure 6 it 04:54
shows the embodiment will figure -- the wire lines 127 04:54
is a single layer. 04:55

Q The source drain layer? 04:55

A The source drain layer. 04:55

Q 231 and 233 in Figure 6, right? 04:55

A I believe so. But it's on -- explicitly on the sealing region where you have the wiring that is labeled below as 127. So that multi-wiring structure, wiring running parallel, they're all indicated above 211. So that will be made of the material of the source and drain electrode. 04:55 04:55 04:55 04:55 04:55 04:55

Q When you say they're all indicated above 211, but if you had the two structures you just described, one of the layers would be below 211, right? 04:55 04:55 04:56

A Correct. So the particular embodiment is a single-layer structure. The would be -- that is made with the data line material one. But Shiba disclosed in the embodiment a means for someone to make wiring lines that have two-layer structure, and in that one it disclosed specifically what are the layers, the materials they use to make the two-layer structure. 04:56 04:56 04:56 04:56 04:56 04:56 04:56

Q And those layers are -- 04:56

A Made of the scanning line material, the first layer, and the other one would be with the data line material. 04:56 04:56 04:56

Because those two layers have the 211 gate electrode which is formed in between them. That gate electrode will be between those two layers. Those two layers will not touch each other because there is an insulating layer in between them. 04:56 04:56 04:57 04:57 04:57

So before you put down the layer 211 there will be opening of contact holes. 04:57 04:57
Q But before you put down 211 -- 04:57
A Before you put down the upper layer metal, before you put down the metal layer made from the drain line material, contact holes will be made to layer 211. 04:57 04:57 04:57 04:57
Those contact holes are already performed in the process. These are not new contact holes. These are not a new, extra step. 04:57 04:57 04:57
Q Extra contact holes but not extra steps? 04:57
A Right. They're extra contact holes, not extra holes, because this is -- etching is performed to form other structures. So you just simply open more holes in the region where you are forming the wire in 127. 04:57 04:58 04:58 04:58
Q If you do that, and use the embodiment that you describe so that you have a two layer wiring line 127, does that wiring line meet the limitations recited in Claim 15 for the first internal conducting line? 04:58 04:58 04:58 04:58
A Well, it meets the limitations if you modify the common terminal. 04:58 04:58
Q Putting aside the common terminal, just the wiring line? 04:59 04:59
A Yes. The limitation for the first internal conducting line is they're created by the first 04:59 04:59

processing step. That limitation is the first 04:59
internal conducting line and the gate electrode to the 04:59
thin-film transistor created by the first processing 04:59
step. That limitation is met, and you can see that 04:59
clearly in Figure 6. 04:59

So we have the gate electrode that forms 04:59
element CJ, and below the existing lines shown in 04:59
Figure 6, 127. We have another set of lines made of 04:59
CJ of the material used for making CJ they will be 04:59
meeting that limitation made by the first processing 05:00
step. 05:00

Q If you do that, as you pointed out there is no 05:00
structure that corresponds to the contact hole recited 05:00
or shown in Figure 3 in Shiba. And there is the 05:00
common terminal, according to Claim 15, that needs to 05:00
be electrically or needs to be formed from the pixel 05:00
electrode, same layer as the pixel electrode, and 05:00
Shiba does not disclose that, correct? 05:01

A Yes. Shiba does not disclose a common terminal 05:01
made of a pixel electrode. But there is teaching 05:01
within Shiba that could lead someone skilled in the 05:01
art to form such a structure. 05:01

Q First of all, Shiba never discloses using the 05:01
same layer as the pixel electrode for either the 05:01
extractor terminals, the wiring, 127, or the common 05:01

terminal, correct? 05:01

A Shiba is disclosing the conductive structure 05:01
can be made as a two-layer structure. 05:02

Q Scanning line layer and data line layer, 05:02
correct?

A That is the specific combination of metals to 05:02
form the first wiring 127. 05:02

And the reason that is disclosed in that for 05:02
the wiring 127 is because those two metals are the 05:02
highest conductivity metals of the three that would be 05:02
needed to make the display. They are a metal used for 05:02
the scanning lines, a metal used for the data lines, 05:02
and a metal used to make the pixel electrode. 05:02

In making a long wiring structure where the 05:02
goal is to reduce the conductivity, to reduce the 05:03
resistance, you will pick the highest conductivity 05:03
materials. Those highest conductivity materials are 05:03
those used in making the scan lines and the data 05:03
lines. It's not the ones used to make the pixel 05:03
electrode. 05:03

So Shiba is teaching a two-layer structure in 05:03
general, and is providing guidance how to construct 05:03
this two-layer structure for making this particular 05:03
wiring. 05:03

If one takes that teaching of Shiba and looks 05:03

at the construction of the extractor terminals, 05:03
someone skilled in the art will be motivated -- 05:03
particularly in view of other prior art that teaches 05:03
the advantages of the pixel electrode layer being 05:04
present as the outer metal layers, upper conductive 05:04
layer that is exposed in the extractor terminal 05:04
region. 05:04

So though it is not directly mentioned, the 05:04
teaching that someone can follow to create such 05:04
structure is there, and the particular combination is 05:04
explicitly mentioned in other prior art that I use in 05:04
my declaration. 05:04

Q If you look at Shiba there is a pixel electrode 05:04
disclosed; is there not? 05:04

A Correct. 05:04

Q And that is 251 in Figure 4? 05:04

A That is correct. 05:05

Q Same in Figure 6? 05:05

A Yes. 05:05

Q I believe you said earlier the pixel electrode 05:05
serves as one of the electrodes of the storage 05:05
capacitor opposite the electrode CJ, correct? 05:05

A Correct. 05:05

Q There is no insulation between the pixel 05:05
electrode layer in Shiba and the source drain metal 05:05

layer, is there? 05:05
A In this particular embodiment? 05:05
Q In the only embodiment disclosed in Shiba there is no insulation between a source drain metal and the pixel electrode metal, right? 05:05 05:06 05:06
Let me start more easily, because you're searching through the whole thing. 05:06 05:06
Look at Figure 4. 05:06
A I'm just formulating my answer. 05:06
In the particular embodiment there is no insulating layer between the source drain metal and the pixel electrode as far as we can see from the schematics. 05:06 05:07 05:07 05:07
Q Or from the specification. 05:07
Do you agree the specification doesn't disclose any specification between those layers either, does it? 05:07 05:07 05:07
A Do you have a section to refer me for that one? 05:07
Q I haven't seen that section, if it's there, so I'm asking you. 05:08 05:08
A Something being there cannot be taken as proof it is not there. 05:08 05:08
Is there a section that says there is no -- 05:08
Q The question I asked is, is there a section that says it is there? Would you agree it's not shown 05:08 05:08

in Figure 4, right? 05:08
A Well, Figure 4 shows 251, and shows the protective overcoat 241. And figure -- 05:08 05:09
Q 241 -- 05:09
A -- Figure 6 does not show the protective overcoat 241. 05:09 05:09
Q Neither shows protective overcoat 241 separating source draining metal from pixel electrode layer, does it? 05:09 05:09 05:09
A Well, the question is if we look at Figure 6, and we -- if you only had Figure 6 to guide us, 241 is not there. 05:09 05:09 05:09
And then the question is is it not there because it was removed before pixel electrode came down or never existed? So that is why I asked you if you have a guidance to show -- 05:09 05:10 05:10 05:10
Q Well, the guidance is this specification never says there is any insulation present separating the source drain metal from the pixel electrode. 05:10 05:10 05:10
A Is there a section that lists a specific -- I'm just trying to save time. That is what I'm trying to do here, what shows that explicitly. If you know it, we can save time. 05:10 05:10 05:10 05:10
Today we are mostly addressing these terminal regions and the wiring and how to provide means to 05:11 05:11

reduce the size of the display and improve 05:11
reliability, and not going into detail about how to 05:11
construct the pixel electrodes. 05:11
Let's hypothetically agree it should be -- that 05:12
there should be -- I guess I won't take the time for 05:12
this. 05:12
Q I don't want to hypothetically agree. 05:12
Would you agree that Figures 4 and 6 do not 05:12
show such an insulation layer? 05:12
A Well, I think I point out some inconsistency 05:12
between 4 and 6. 05:12
Q Where do you see insulation in either figure 05:12
between the pixel electrode and the source drain 05:12
metal? 05:12
A Well, in Figure 6 it shows nowhere where you 05:12
have the pixel electrode 251. But it does show 241 05:12
above the source and drain electrode. 05:12
Q It also shows protective overcoat 241 above the 05:13
pixel electrode 251 in Figure 4; does it not? 05:13
A That is what I point to the -- 05:13
Q Take that back. 05:13
It shows it at least to the left of pixel 05:13
electrode 251. 05:13
A We -- as far as what is above, and how the 05:13
pixel electrode in the source and drain electrode are 05:14

laid down, we may have to refer to the specifications for further guidance. 05:14 05:14

Q Okay. But Figure 6, would you agree, shows that source electrode 231 is directly in contact with pixel electrode 251? 05:14 05:14 05:14

A Well, 251 and 231 are touching the side or the edge. It's not a very clear schematic of which comes first and which comes second. 05:14 05:14 05:14

Q They touch each other, at least? 05:15

A Yes, they touch each other. 05:15

Q The same is true in Figure 4, is it not, 231 and 251 are in direct contact 231 being the source electrode and 251 being the pixel electrode? 05:15 05:15 05:15

A Right, they are in direct contact. 05:15

And the question is are they in direct contact because there was a preservation removed or in direct contact because the passivation layer would come later? 05:15 05:15 05:15 05:15

Q How would they come into direct contact by removing a passivation layer? 05:15 05:15

A If there was a passivation layer above the 231 and then it was removed, it can create an opening for the other metal to come down and attach to the 231. 05:15 05:15 05:16

Q Do you mean if you had a protective overcoat before the pixel electrode was put down? Is that what 05:16 05:16

you're saying? 05:16
A Right. 05:16
Q If you did that, what would the protective overcoat overlay? Would it overlay the gate dielectric 211, that layer? 05:16 05:16 05:16
A Yes. 05:16
Q Those layers would be in contact with each other in that case, in your hypothetical? 05:17 05:17
A Correct. 05:17
Q Then in order to put the pixel metal down you would have to etch openings in the overcoat layer? 05:17 05:17
A Correct. 05:17
Q You would etch openings to allow access to the source drain metal? 05:17 05:17
A Correct. 05:17
Q You would etch an opening over the capacitance, the capacitor electrode CJ? 05:17 05:17
A Someone skilled in the art will not open something on top of the capacitor in CJ. 05:17 05:17
Q Why not? 05:18
A It may risk of creating a pinhole or weakening the dielectric. 05:18 05:18
Q Would it effect the thickness of the dielectric, gate dielectric 211? 05:18 05:18
A Well, make it thinner. It would be beneficial 05:18

for the capacitance, storage capacitors. Thinning it down it would -- it is an advantage. It would increase the storage capacitors. 05:18 05:18 05:18

But thinning it down, it creates other risks that you have a weak spot, and you may completely remove it. You may etch the weak spot and the second layer may go down and create a short. Someone skilled in the art probably will find an alternative way to do that. But these are -- 05:18 05:18 05:18 05:18 05:19 05:19

Q What would you suggest? So how -- if you wanted to do your hypothetical and put the pixel electrode layer down after protective overcoat layer, as 241 was put down, how would you do that? 05:19 05:19 05:19 05:19

A It's not a mention how I would do it. It would be -- 05:19 05:19

Q How would a person skilled in the art do that? 05:19

A I think the answer is in the 102 in the prior art in Figure 13, that you form a contact hole on top of the drain region only. You will not do a blank etching over an extended region and risk weakening the integrity of the underlying layers. 05:19 05:19 05:20 05:20 05:20

That is why one has to look at the specifications, and in the prior art, and try to figure out how someone skilled in the art would be motivated to do something. I do not take a figure 05:20 05:20 05:20 05:20

that describes some portion of the overall structure, but that portion is not the main invention. So we seem to focus in Figure 4 on the pixel structure, but that's not the main focus of the Shiba invention. 05:20 05:20 05:20 05:21

We should not read too much into the pixel structure disclosed in Shiba, because the only thing that guides us are these two figures, and these are crowded figures. We should look at the figures, and I believe -- I do not find any consistencies. There are no inconsistencies in the way that some of the critical elements that were discussed related to the wiring, where the wiring exists, how the wirings are connected, and what purpose they serve, and so on. 05:21 05:21 05:21 05:21 05:21 05:21 05:21 05:21 05:21

Q Looking at Figure 4, if you were to use your hypothetical and put the pixel electrode layer down after the protective overcoat 241, then if I understand your hypothetical you would have two layers for the dielectric of the capacitor, correct, one being the gate 205 and the other being the protective overcoat 241? 05:21 05:21 05:21 05:22 05:22 05:22 05:22

A That is correct. That by itself is not a bad idea. Again, it provides a double layer protection so then there are no shorts created between the lower metal and the upper metal. 05:22 05:22 05:22 05:22

Q The upper metal being the pixel electrode 05:22

layer? 05:22

A Correct. 05:22

Q Does that increase the capacitance or decrease the capacitance to add another dielectric layer between the two electrodes? 05:22 05:22 05:22

A If you increase the thickness that will decrease capacitance. 05:22 05:23

Q Is that desirable? It's not desirable generally, is it? 05:23 05:23

MR. CORDREY: Objection. Form. 05:23

THE WITNESS: Well, the amount of first capacitance that you need is a function of how good the transistor is, what is the leakage current of the transistor, what is your frame rate, and how much your voltage is going to decrease because of the leakage current with the transistor, or voltage will change in your pixel because the transistor may have -- may be a little transistor. 05:23 05:23 05:23 05:23 05:23 05:23 05:23 05:23

Ideally, if you have -- in an ideal situation you will not need a storage capacitance, but some charge may also leak through the liquid crystal. So a certain amount of charge is required. But the exact size depends upon a lot of factors. In general, the higher the better. 05:23 05:23 05:24 05:24 05:24 05:24

But you do not want to fill the pixel area with 05:24

the storage electrode CJ because that will take area from your light, if you're thinking about a transmissive display. 05:24 05:24 05:24

But there are other means to form the storage capacitor that will not increase the thickness. For example, if the protective overcoat comes after the source and drain electrode, you then form the storage capacitor with the extension of the drain electrode itself, and there would only be the gate dielectric in between. It will be the same structure as shown in Figure 4, just the metal that will extend above CJ will be the source electrode. In that case you maintain the advantages of the thinner dielectric and, thus, the higher storage capacitors. So having the pixel electrode on the top may require that you change some of your design, but you still have the same steps. 05:24 05:25 05:25 05:25 05:25 05:25 05:25 05:25 05:25 05:25 05:25 05:25 05:26 05:26

BY MR. SCHLITTER: 05:26

Q I'm sure it absolutely would require a change from what is disclosed in Shiba to put the pixel electrode layer above the protective overcoat 241? 05:26 05:26 05:26

A I'm sorry. You said you are sure? 05:26

Q No. Isn't it absolutely sure -- I'll restate the question. 05:26 05:26

Putting the pixel-like layer above the 05:26

protective overcoat layer 241 would require a redesign of what is disclosed in Shiba; would it not? 05:26 05:26

A It would require a change in the order with certain steps that are performed, and may require a change in the mask design. But once you have the mask -- and you need to have a certain number of masks. You do not add anything to the masks. You do not add numbers to the masks. You are simply changing the design of the mask. 05:26 05:26 05:27 05:27 05:27 05:27 05:27

So you're going to design a set of masks. You still are going to use five masks, but the design on this mask in -- some of the masks will be different. Once you have the mask design, the manufacturing steps, the number of manufacturing steps will be the same. The order with which you perform those manufacturing steps will change. 05:27 05:27 05:27 05:27 05:27 05:27 05:27

Q If you don't change the steps, and if you use what is disclosed in Shiba, isn't it true that the way 227 and what is called in the Shiba the common pad 751 would not have -- would not be made from the pixel electrode layer? 05:27 05:27 05:28 05:28 05:28

A If you don't change the ordering of the steps then you will end up with the particular embodiment depicted in the figures that we're discussing, 3, 4, 1 and 6. 05:28 05:28 05:28 05:28

Q And you -- 05:29
A The pixel electrode layer is not present in the common pad 751. 05:29 05:29
Q If you redesigned -- if you modified what is disclosed in Shiba to put an insulating layer such as protective overcoat 241 between the source drain metal and the pixel electrode, you would need some modification to make some connection, would you not, between the pixel electrode and the source electrode 231? 05:29 05:29 05:29 05:29 05:29 05:29 05:29
A What do you mean by you need modification? 05:29
Q Well, the way it's disclosed in Figures 4 and 6 is that the source electrode 231 is directly in contact with the pixel like 251. 05:29 05:29 05:29
If you separate them by an insulating film such as protective overcoat 241, you would have to figure out some way to etch them; would you not? 05:29 05:30 05:30
A Well, let me say that what is shown in Figure 4 and 6 it is not very clear. 05:30 05:30
What is clear is that the step that you need to do to provide that X has already been performed and already been disclosed in Shiba, that is the step to open the -- to create the element 243. 243 is an opening, is a contact hole, a large contact hole which is created in the layer 241. 05:30 05:30 05:30 05:30 05:30 05:30

So 241 is removed, and that is the step you need to do to provide the connection between the pixel electrode and the drain electrode or the source electrode, whatever it may be in the pixel region. 05:31 05:31 05:31 05:31

Is that clear? 05:31

Q How would you modify the structure in Shiba to arrive at a structure that would meet all the limitations recited in Claim 15 of the '102 Patent? 05:32 05:32 05:32

Let me narrow that question down -- well, referring to the common terminal? 05:32 05:32

MR. CORDREY: Objection. Form. 05:32

MR. SCHLITTER: I'll restate the question. 05:32

BY MR. SCHLITTER: 05:32

Q How how would you modify the structure in Shiba to arrive at a structure that would meet the limitations relating to the common term recited in Claim 15 of the '102 Patent? 05:32 05:32 05:32 05:32

A Well, I would -- someone skilled in the art -- 05:32

Q Would that be you? 05:33

A I think I'm a little bit over qualified since I have more than working experience than someone skilled in the art. So I am skilled in the art, but -- 05:33 05:33 05:33

Q More than skilled in the art? 05:33

A -- but I think I'm a little bit more than skilled in the art because you're -- there are just 05:33 05:33

too many years. I think you do not need 25 years and a Ph.D. to be skilled in the art. 05:33 05:33

Q Okay. 05:33

A So to someone skilled in the art, it will modify the order with which the pixel electrode layer will be put down. 05:33 05:33 05:34

We had a lengthy discussion that is a little bit unclear how the pixel electrode -- and if we want to have the pixel electrode to serve as a protective layer in the extractor terminal, so gain the advantages of the corrosion protection provided by the pixel electrode layer, and in particular not the pixel electrode layer disclosed in 1 or 2 which is the aluminum -- because aluminum does not provide any protection -- but the protection that is provided by the Indium tin oxide which is a chemically stable material and which does not react with oxygen and moisture, it does not corrode. 05:34 05:34 05:34 05:34 05:34 05:34 05:34 05:34 05:34 05:34 05:34 05:34

So if one wants to gain that protection in the extractor terminal region, then it will also put the pixel electrode on top of the source and drain -- on top of the source electrode, and the structure will be as follows; you will form the scan lines. You will form the transistor, or you will form the data lines. You will form the source and drain electrodes. You 05:35 05:35 05:35 05:35 05:35 05:35 05:35

will form the wiring, the double A wiring that Shiba is disclosing. Then you put the protective overcoat 241, and then you perform that step that opens the slit 243. 05:35 05:35 05:35 05:36

But someone skilled in the art will not make just one big opening. He will make many small holes, openings such as those disclosed in Moriyama, and it will have many small openings on top of each of the pads labeled in the extractor terminal, which is like the 751. 05:36 05:36 05:36 05:36 05:36 05:36

And they will place a contact hole also in each eye on top of every source, as disclosed in the prior art of Figure 13 of '102 Patent. And it will form, as the final layer, the pixel electrode layer made out of Iridium tin oxide. And that layer will be patterned to form the pixel electrodes in the display area and to form the second layer in the extractor terminal regions, again similar to what is shown in Figure 13 in the prior art. 05:36 05:36 05:36 05:36 05:36 05:37 05:37 05:37 05:37

Q If you were to make your modification, did you say there would be an opening in the protective overcoat 241 down to what is called in Shiba a common pad 751? 05:37 05:37 05:37 05:37

A And say that that person will open many small holes, as disclosed in Moriyama, on top of 751. And 05:37 05:38

then will put down the pixel electrode material, and pattern that pixel electrode material as the -- as a second layer in the extractor terminals, and at the same time it will form the pixel electrodes in the display area. 05:38 05:38 05:38 05:38 05:38

Q So under your hypothetical modification there would be insulation on top of common pad 751 in Shiba, there would be -- which would be the protective overcoat 241 -- 05:38 05:38 05:38 05:38

A That is already there. 05:39

Q But it's not over 241 as it it is right now? 05:39

A Sorry? 05:39

Q Common pad 751 -- 05:39

A Well, 751 during fabrication it had the protective overcoat 241 above it. But then the slit was formed, and that protective overcoat was removed from that area. 05:39 05:39 05:39 05:39

In the modified structure the protective overcoat will remain everywhere except the regions that were formed a plurality of smaller contact holes as shown in, for example, in Moriyama on top of each one of the electrodes, like 751. 05:39 05:39 05:39 05:39 05:39

Then you will put the pixel electrode layer, and you will pattern that pixel electrode layer. What you will end up with is something like the common 05:40 05:40 05:40

contact portions on Figure 13 of prior art, but option is to make one big opening as shown in this one. But someone skilled in the art will be motivated to create many smaller openings such as disclosed in Moriyama. 05:40 05:40 05:40 05:40

Q The pixel electrode layer would be separated from the common pad 751 layer by the protective overcoat 241, excepting in the plurality of small openings you talked about? 05:40 05:40 05:40 05:41

A Correct. 05:41

Q So it would be a double layer structure? 05:41

A Such as the one shown in Figure 13. 05:41

Q And the wiring -- 05:41

A Of 102. 05:41

Q Are you proposing the wiring 127 would have another ITO layer on top? 05:41 05:41

A Well, 127 is in a different region than 751. There is no reason to modify the wiring 127 to change the metals. That already is disclosed by Shiba, which would be the best metals, namely, the scan line metal and data line metal. 05:41 05:41 05:41 05:41 05:41

Someone skilled in the art would be modified to only change the extractor terminal regions. 05:41 05:42

Q May I see this exhibit then? 05:42

If you made the modification you are proposing, would there be a structure corresponding to the 05:42 05:42

contact hole recited in Claim 15 of the '102 Patent? 05:42
A Well, a contact hole already exists in the present embodiment of Shiba that meets some but not all the limitations of Claim 15. 05:43 05:43 05:43
The thing that the present embodiment is lacking is the pixel electrode layer. By modifying the structure and adding the pixel electrode layer on top of 751, then the contact hole which will be formed by the step which is already formed, performed in Shiba, that is the step that creates slit 243. That is the same step that will be used to create the contact holes. That same step will result in the contact holes that will meet all the limitations, because we will have the ITO layer or the pixel electrode layer in the extractor terminal region. 05:43 05:43 05:43 05:43 05:44 05:44 05:44 05:44 05:44 05:44 05:44
Q Would the first internal conducting line in that case be electrically connected to the common terminal in the contact hole? 05:44 05:44 05:45
A Yes. 05:45
Q I'd like to take a break. Off the record. 05:45
THE VIDEO OPERATOR: We are off the record. The time is 5:45 p.m. on July 12, 2013. This is the end of video No. 4 of the continuing deposition of Dr. Milt Hatalis. 05:45 05:45 05:45 05:45
(Recess taken.) 05:59

THE VIDEO OPERATOR: We are back on the record. 06:00
Time is 6:00 o'clock p.m. on July 12, 2013. This is the beginning of video five of the deposition of Dr. Milt Hatalis. 06:00
BY MR. SCHLITTER: 06:00
Q Referring to the Exhibit 2007, which is a version of Figure 3 from Shiba, if you made the modification you proposed so that you would add a pixel layer, a pixel electrode metal layer over common pad 751 and the extractor terminal, that is what you're proposing; is it not? 06:00
A That is the modification of the terminal, and there is an associate modification that would go along in the pixel region. 06:01
Q If you made that modification then in Figure 3 where will the connection be made between -- well, let me back up. 06:01
If you made the modification what would correspond to the common terminal that is called for in Claim 15? What in your modified version of Figure 3 in Shiba in your opinion would correspond to the common terminal recited in Claim 15? 06:01
A It would be the pixel electrode metal layer that will be added. 06:02
Q Where would that actually be in that Figure 3? 06:02

A There will be a series of such metal layers on top of each one of those pads 751, 761, 762 and so on. 06:02 06:02

Q Could you draw with the red pen where you would place the common terminal, the structure in Figure 3, the modified structure in Figure 3 that would, in your opinion, correspond to the common terminal in Claim 15? Can you do that? 06:02 06:02 06:02 06:02 06:02

A Well, that would -- 06:04

Q Use the red pen this time. 06:04

A That figure is a little bit rounded figure here. 06:04 06:04

Do you mind if I draw a structure on the side, and if you wish I can do the structure as well as the cross-section of it? 06:04 06:04 06:04

Q Well, can you not indicate on Figure 3 where that would go? 06:04 06:04

A Well, Figure 3 has this slit 243. That opening is created and surrounded by 243 would be replaced by -- as we discussed earlier, someone skilled in the art would change that design from one big contact hole to many small contact holes, and those will be placed within 751. But I can -- 06:04 06:04 06:04 06:04 06:05 06:05

Q Are you saying to me you would not count slit 243 as the contact hole under your proposed modification? 06:05 06:05 06:05

A Well, 243 is something that is formed. It is something which is formed by an etching step. 06:05 06:05

So the present embodiment in Shiba is performing an etching step that creates the contact hole 243, and that contact hole serves to connect the wiring that comes externally, which is this flexible connector 711 to the pad 751 to 764 on the glass substrate. That is what that contact hole presently is serving in this particular embodiment. 06:05 06:05 06:05 06:05 06:05 06:06 06:06

If we are going to modify the embodiment and add the pixel electrode layer in the common terminal region, we will still perform an etching step such as the one created -- such as the one used to create the opening 243. But instead of opening one big contact hole, someone skilled in the art would be motivated to open many smaller contact holes, and the level of the figure is such that it is not easy to show these contact holes at this level of detail. 06:06 06:06 06:06 06:06 06:06 06:06 06:06 06:06 06:07

Q So are you saying under your proposed modification -- first of all, the slit 243 does not correspond to the contact hole recited in Claim 15, I think you already established earlier today? 06:07 06:07 06:07 06:07

A Well, we established that 243 is a contact hole in the protective layer 241. 06:07 06:07

Q But it doesn't electrically connect to a common 06:07

terminal made by the pixel electrode layer, does it? 06:07
A Right. It does not meet all the limitations of the contact hole because one layer is not present in this particular embodiment of Shiba, namely, the pixel electrode layer. 06:07
Someone, in view of the teaching in Shiba and in view of other prior art, could modify and add that pixel electrode layer and then all the limitations of the contact hole will be met. So there is a contact hole and a common hole as an opening. That opening serves a purpose in the particular embodiment, but because it's lacking one layer it will not make a connection with that layer because that layer is not present in this particular embodiment, but it will modify. And without that layer the same contact hole will meet all the limitations. 06:08
Q In Figure 4, under your modification you would have a pixel electrode layer where? 06:09
A Well, in Figure 4, since we're modifying the structure, I will first extend the source electrode element 231 to overlap to the capacitor CJ, and that will be the upper electrode of the storage capacitor. 06:09
So imagine the 231 extends past CJ, and then somewhere between -- somewhere above the new 231 there will be a contact hole in the protective overcoating 06:09

layer 241. In that contact hole will be the same contact hole which is presently being used to form the slit 243, and we will simply put the ITO -- we open that contact hole on top of the element 231. I can draw it, if you wish. 06:10 06:10 06:10 06:10 06:10

But it would be better if I draw it with my own next to it, because this is already kind of crowded and a complicated figure. 06:10 06:10 06:10

Q Go ahead and draw it. You have to draw fast. 06:10

A Okay. Stop the clock while I'm drawing. 06:10

You want me to draw the pixel electrode structure? I will skip some of the TFT details. 06:10 06:11

241 or 251? 251. 06:11

Q You've just drawn the transistor part? 06:13

A The part on the source side. 06:13

Q Where does the wiring, 127, connect to the new common pad, 751? 06:13 06:14

A Do you want me to draw the pixel structure? 06:14

Q I would like to know how to do -- how the common pad 751 connects to the wiring 127. 06:14 06:14

MR. SCHLITTER: Should we go off the record while he draws? 06:14 06:14

MR. CORDREY: That's fine. 06:14

THE VIDEO OPERATOR: We are off the record. The time is 6:14 p.m. 06:14 06:14

(Recess taken.) 06:14

THE VIDEO OPERATOR: We are back on the record. 06:17
The time is 6:17 p.m. 06:17

BY MR. SCHLITTER: 06:17

Q Okay. So what have you drawn? 06:17

A Well, there is a discontinuity here to the -- 06:18
to the right. I draw a section that includes the 06:18
storage capacitor, which now is formed between the 06:18
underlying layer CJ which was the same as before, and 06:18
in an extension of the source metal over that region 06:18
so that the gate dielectric thickness still serves as 06:18
the thickness of the storage capacitor dielectric. 06:18

Then somewhere in that core metal, the wires on 06:18
the pixel side or the storage capacitor side or on the 06:19
source side or in between, there is an opening in the 06:19
passivation layer 241. So the layer 241 is below the 06:19
red line that I have indicated and I marked here. 06:19

There is an opening, and on top of it the ITO 06:19
the pixel electrode is formed. 06:19

Q Just for the record, to make this clear, you're 06:19
drawing on Exhibit 2006 which is the enlarged few of 06:19
Figure 4? 06:19

A And is that letter -- what is on your right, on 06:20
the right? 06:20

Q It is what it is. I mean, are you satisfied 06:20

with my description of it? Do you need any more clarification? 06:20 06:20

I have no further questions about what you just said. 06:20 06:20

A On the right? 06:20

Q Yes. 06:20

A The one on the left, it is in the extractor terminal. So we see the layers made from the -- that forms the element 751 which is made up of the data line layer. We see 241, the protective overcoat, to be above it. We see the openings formed in 241, so two contact holes that are formed. As I said, it would be motivated to create many small openings instead of one big opening. 06:20 06:20 06:20 06:20 06:20 06:21 06:21 06:21

And also the ITO, that ITO is patterned at the same time the pixel electrode ITO, and both ITOs -- 06:21 06:21

Q On the figure which is exhibit -- your copy is Exhibit 2007? 06:21 06:21

A About -- 06:21

Q Yes, under your modified version of the Shiba structure, where would the common terminal be? 06:21 06:21

A Well, as my drawing showed it will be roughly where 751 is present, and it will extend -- 06:22 06:22

Q Just draw with a red pen indicating on Figure 3 where the modified common terminal would be. 06:22 06:22

A Can I draw a planar section view of this one? 06:22
Q I'd rather just see in Figure 3. 06:22
A Can I draw it here in Figure 3? 06:22
Q Can you not indicate on the drawing that is Figure 3 where the common terminal would be? 06:22
A Well, you see, the common terminal has to be positioned with respect to the metal layer and with respect to the contact holes. So I need to draw contact holes, and the level of magnification is -- 06:22
Q Just draw the extent of it and we'll understand there are contact holes there. 06:23
A I'd rather -- if I do it here, would you mind? 06:23
Q I'd rather you do it on Figure 3. I won't understand the modification. 06:23
A I'll draw my -- 06:23
Q Then you're not modifying Figure 3. I want to see modified Figure 3. 06:23
A Well, Figure 3 -- 06:23
MR. CORDREY: Objection. Form. 06:23
THE WITNESS: Figure 3 is such level magnification the detail I want to indicate the ITO on top of the metal. 06:23
BY MR. SCHLITTER: 06:23
Q Just draw on Figure 3 the extent of the common terminal, and then you can draw off to the side more 06:23

detail, if you would like. But I want to see where the common terminal goes in Figure 3. 06:23 06:24

A And you want me to do it with the red pen? 06:24

Q Yes.

A And then if I go all the way up to the edge I will run to the edge of the substrate and -- 06:24 06:24

Q Use a green pen. It is a fine point. 06:24

A See, I cannot draw, with my artistic skill, one and then do another one, because they will just be touching. 06:25 06:25 06:25

Q You mean because there is more than one of the -- 06:25 06:25

A Well, if you're going to put in the ITO on top of each one of them, you're not going to protect one pad. 06:25 06:25 06:25

Q Do they all constitute the common terminal? 06:25

A No. The common terminal is one. But while you form the common terminal you'll also be putting ITO. 06:25 06:25

Q I don't care about those. I just want you to draw where the common terminal goes in your modified version. 06:25 06:25 06:26

A Okay. As long as you are agreeing you're not going to say ITO between the other things is going to be short to my drawing. 06:26 06:26 06:26

Q I'll not agree to anything. 06:26

A You're saying I can draw a magnified version? 06:26
Q Yes, but may I just see what you've done. Okay. 06:26 06:26
So the green indicates what you believe corresponds to -- with the modification you've proposed, the common terminal as you said in Claim 15? 06:26 06:26 06:26
A Well, the green will be something that overlaps the present metal that constitutes 751. So green is the ITO layer that will overlap the drain metal 751, and I place it roughly because I couldn't draw the contact holes. I asked you earlier in such a small magnification, so I'm going to draw on the bottom here a magnified portion of that part. 06:26 06:26 06:27 06:27 06:27 06:27 06:27
Q Of the green rectangle you drew? 06:27
A Well, the planar section view of my cross-section. 06:27 06:27
Q Would that correspond to an enlarged view of what you indicated with the green rectangle? 06:27 06:27
A Well, I place the green rectangle in reference to existing openings in 243. And over here I'm going to draw a planar section view of that one because I cannot place many small holes here, but just indicate that the ITO will overlap the opening. 06:27 06:27 06:27 06:27 06:28
I will draw you the 751 with many small openings, and I will draw it in green, and I will use 06:28 06:28

different colors to indicate each layer. 06:28
Q You are going to do a cross-section? 06:28
A Cross-section is already here, and I'm going to do a planar section. 06:28 06:28
Q A planar section will correspond to the green rectangle? 06:28 06:28
A The only difference between my planar section and the green rectangle is that the green rectangle in the existing figure -- though you insisted I modify -- I placed the green relative to the existing opening because I cannot draw openings in the 751. So I placed the green so it overlaps the opening, goes beyond the edge of the opening. 06:28 06:28 06:28 06:28 06:28 06:29 06:29
And if I'm going to draw here, how should it actually be done? I will modify the size of the opening, and it will show it in more clarity how one will modify. 06:29 06:29 06:29 06:29
The fabrication step will be the same. The mask design is the one that is going to change. 06:29 06:29
Q The fabrication order changes? 06:29
A Right, but it does not add steps. It just exchanged the order with which the steps are performed. 06:29 06:29 06:29
Without the steps -- 06:29
Q I don't think we need to -- 06:29

A I think he's already going to be flexible enough. 06:29 06:30

MR. CORDREY: Where are we at, just for the record? 06:30 06:30

THE VIDEO OPERATOR: We're past the time. 06:30

MR. CORDREY: How far? 06:30

THE VIDEO OPERATOR: Six minutes. 06:30

MR. CORDREY: Let's finish up what you're doing, and you can finish up your line of questions. 06:30 06:30

THE WITNESS: We can stop the clock. It's very quick. 06:30 06:30

MR. CORDREY: Draw your drawing. Let's finish this part up. I'm not going to stop it right in the middle of what you're doing. I'm just saying -- 06:30 06:30 06:30

BY MR. SCHLITTER: 06:31

Q What did you just write? 06:31

A "ITO green." 06:31

Q Is the green rectangle in the lower left corresponding to the green rectangle in Figure 3 you drew? 06:31 06:32 06:32

A Well, the size may be different because, as I said, the green Figure 3 was placed to overlap the existing opening, and it modified the overlaps, the contact holes I had placed within the blue. 06:32 06:32 06:32 06:32

The blue is the data line material. The green 06:32

is the ITO, and red are openings. 06:32

Q Would you no use the slit 243 then in your modified version? 06:32

A You could use the slit, but a more effective protection is provided if you have many small openings instead of one large opening. 06:32

Q So you would -- 06:32

A I would change the design. 06:33

Q If you used your multiple small openings you would not use the slit 243 to make the connection to the common terminal? 06:33

A Well, if I'm going to modify things I would adjust the design. It's the design I'm modifying, not a step of forming that structure. 06:33

Q Would you use slit 243 if you used the multiple openings that you've sketched on that Exhibit 2007? 06:33

A It is one approach to use existing design and put ITO. In that case you put the ITO the way I have drawing, if there is no Figure 3 that you insisted that I modify. But you asked me how would I modify it, and I would modify with a smaller opening in view of Moriyama. 06:34

Q Instead of using one slit you would use that plurality of openings? Is that what you're saying? 06:34

A That is what was taught by Moriyama where it 06:34

addresses the creation of an extractor terminal with an ITO as a protective layer. 06:34 06:34

You could use the existing slit. You would still have the same protection that if -- the slit is an etching step. It forms one big opening, and you can form many smaller openings. The step is the same. 06:34 06:34 06:34 06:34

Here the blue is a drain layer and the red is the contact, or is that clear? 06:35 06:35

Q The red is the openings, you said? 06:35

A Right, so the transcript is clear. 06:35

Q I have what I think is a short question. It's a different issue. 06:35 06:35

But looking at the element of Claim 39 in Column 19 it begins, on line 4, it says -- I'll read this, 06:35 06:35 06:35

"A third internal conducting line formed from the same layer as the source electrode and the drain electrode are the thin-film transistor." 06:35 06:36 06:36 06:36 06:36

Does Shiba disclose structure that corresponds to that third internal conducting line? 06:36 06:36

A Yes. 06:36

Q Where is that disclosed in Shiba? 06:36

A It is not disclosed with the exact name. Its 06:36

inventor assigns its own terminology. That part is 06:36
disclosed in Shiba and corresponds to a third internal 06:37
conducting line formed from the same layer as the 06:37
source electrode and the drain electrode. 06:37
It is disclosed in Column 6, line 10, and it 06:37
reads, 06:37
"Then the first wiring line 127 is 06:37
guided along the first shorter side 06:37
201c to the first longer side 201a, 06:37
and the narrow lines meet together at 06:38
the interconnecting part 125." 06:38
So the part of the first wiring line 127 which 06:38
is guided along the first shorter side 201c and which, 06:38
as we discussed earlier, is made with the data line 06:38
material which is the same material that is used to 06:38
form the source and drain electrodes in the 06:38
corresponding third internal -- 06:38
Q That would be the one on the right side in 06:38
Figure 1 on Shiba? 06:38
A The right side is the 201c. 06:38
Q That would be what corresponds, in your 06:38
opinion, to the third internal conducting line 06:38
referenced in that portion of Claim 39 we just read? 06:38
A Correct. 06:39
Q Moriyama discloses in the internal portion 06:39

three metal layers, correct? 06:39
A Can you give me the Moriyama exhibit? I cannot form my own objections. 06:39
Q I hand you what was previously marked as CMI Exhibit 1004. 06:39
(Exhibit 1004 was previously marked for identification and is attached hereto.)
BY MR. SCHLITTER:
Q Do you see the question? Is it correct that Moriyama discloses three metal layers in terminal portion, layers 1, 3 and 4; is that correct? 06:40
A Well, depending upon what embodiment in Moriyama you're referring to. 06:40
Q There are only three conductive layers in any of the embodiments in Moriyama, are there not, 13 and 4? 06:40
A Not in the prior art of Moriyama depicted in Figure 9. 06:41
Q Let me take a look. 06:41
What layers are depicted in Figure 9? 06:41
A There are two layers depicted in Figure 9. 06:41
Q Okay. 06:41
A A lower level element one and an insulating layer, openings in the insulating layer that is the 06:41

element two, and an upper layer, element four, which 06:41
is made of ITO. 06:41
What I have drawn in my schematic that I have 06:41
annotated, and in both these exhibits in Figure 3 and 06:42
4 are duplicating the structure that is shown in 06:42
Figure 9 and -- 06:42
Q Figure 7 of Moriyama discloses three metal 06:42
layers instead of two, correct? 06:42
A That's Moriyama's changes to the prior art. 06:42
Q Seven is prior art? 06:42
A No, nine is prior art. Seven is the embodiment 06:42
that I invented. 06:42
Q The question is in seven, does Figure 7 in 06:42
Moriyama disclose three conductive layers? 06:42
A Figure 7 disclosed three conductive layers. 06:42
Q And those layers are 1, 3 and 4? 06:43
A That is correct. 06:43
Q And layers 3 and 4 directly contact each other; 06:43
is that correct?
A In that embodiment, that is correct. 06:43
Q There is not an insulating film separating 06:43
layers 3 and 4 disclosed in Moriyama, is there? 06:43
A In that embodiment, no. 06:43
Q In any embodiment is there anything in Moriyama 06:43
where layers 3 and 4 are separated by an insulating 06:43

film? 06:43

A You focus in the embodiment that uses three metal layers, and I point out that someone skilled in the art may motivate you to change the Shiba structures and implement something as a figure shown for Figure 9a. 06:43 06:43 06:43 06:43 06:43

Q But that is not the question. 06:43

The question is, isn't it true that metal does not disclose an insulating film separating layers 3 and 4? 06:43 06:44 06:44

A In the embodiment that employ 3 and 4 is not. But as I see there is one embodiment that -- in which is using two layers such as the one that someone skilled in the art would be motivated to modify Shiba terminal region. 06:44 06:44 06:44 06:44 06:44

Q In Figure 7 there is an insulating film five that separates one from layers 3 and 4. Do you see that? 06:44 06:44 06:44

A The insulating layers is the same insulating layers used in embodiment 9. 06:44 06:45

Q That is the same as 9a, and seven are the same insulating layer five, correct? 06:45 06:45

A That is correct. But someone skilled in the art will take the teaching, which is -- maybe is expressed in the embodiment 9a, and what is the 06:45 06:45 06:45

teaching? How to provide a protection to a metal layer that will be exposed in the external -- in the extractor terminal. 06:45 06:45 06:45

So in Figure 9a I have the metal layer one, I have a passivation layer on top of it. I create openings in the passivation layer and I cover the one -- and the openings with the ITO layer. That teaching is directly as you see in all my drawings of Moriyama. 06:45 06:45 06:45 06:45 06:45 06:46

So the element one, shown in Moriyama, is made of certain materials that the cross-section -- if you put it side-by-side in 9a and the cross-section I drew, they're identical. In Moriyama the sequence of the layers is different. 06:46 06:46 06:46 06:46 06:46

But what is the essence here to someone skilled in the art is the means to create an extractor terminal that will be resistant to corrosion, and that is something that someone skilled in the art will be able to construct. 06:46 06:46 06:46 06:46 06:46

Q Does Shiba talk about as an objective preventing corrosion? 06:46 06:46

A Shiba is not addressing the issue and corrosion the extractor terminals region. 06:46 06:47

MR. SCHLITTER: We have to go off the record. 06:47

THE VIDEO OPERATOR: We are off the record. 06:47

The time is 6:47 p.m. 06:47

(Recess taken.) 06:47

THE VIDEO OPERATOR: We are back on the record. 06:52

The time is 6:53 p.m. 06:53

MR. SCHLITTER: In view of the hour I don't have any further questions. 06:53 06:53

MR. CORDREY: I don't have any questions. 06:53

THE VIDEO OPERATOR: We are off the record. 06:53

The time is 6:53 p.m. on July 12, 2013. 06:53

This concludes today's testimony given by Dr. Milt Hatalis. Total number of media used was five and will be retained by Veritext Legal Solutions. 06:53 06:54 06:54

06:54

I, MILTIADIS HATALIS, Ph.D., do hereby declare under penalty of perjury that I have read the foregoing transcript; that I have made such corrections as appear noted herein, in ink, initialed by me, or attached hereto; that my testimony as contained herein, as corrected, is true and correct.

EXECUTED this _____ day of ____________, 2013, at ____________________, ____________________.
(City) (State)

____

MILTIADIS HATALIS, Ph.D.

STATE OF CALIFORNIA)
) ss
COUNTY OF ORANGE)

I, the undersigned, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated: 16 July, 2013

Sherry A. Case

SHERRY A. CASE
RPR, CLR, CLR, CSR No. 2989

06:54

2

3

f