UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INNOLUX CORPORATION

Petitioner

v.

PATENT OF SEMICONDUCTOR ENERGY LABORATORY CO., LTD.

Patent Owner

CASE IPR 2013-00066
PATENT 7,876,413

PATENT OWNER RESPONSE TO PETITION

UNDER 37 C.F.R. § 42.120

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Exhibit 2002 – Defendants' Motion to Stay Litigation Pending Outcome of Inter Partes Review, *Semiconductor Energy Laboratory Co., Ltd. v. Chimei Innolux Corp., et al.*

Exhibit 2003 – Supplemental Declaration of Gregory S. Cordrey in Support of Defendants' Motion for Stay, *Semiconductor Energy Laboratory Co., Ltd. v. Chimei Innolux Corp., et al.*

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Exhibit 2008 – Display search Laboratory website material

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Exhibit 2014 – Watanabe US Patent No. 5,504,601

Introduction

This is the 37 CFR § 42.120 response by Semiconductor Energy Laboratory Co., Ltd. ("Patent Owner") to the petition filed November 30, 2012. In its decision (Paper No. 10, April 24, 2013; "Decision" or "Dec."), the Board instituted *inter partes* review ("IPR") of claims 1, 2, 4-7, 9-11, 13-18, 20-22, 24, 25, and 27-29 of U.S. Patent No. 7,876,413 ("the '413 patent") (Ex. 1001) based on alleged obviousness over the combination of U.S. Patent No. 5,636,329 ("Sukegawa") (Ex. 1003) and JP Publication No. H08-160446 ("Nakamoto") (Ex. 1004).

Petitioner's burden is to demonstrate unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e). The Petitioner fails to meet its burden.[1]

I. THE INVENTION OF THE '413 PATENT

The '413 patent relates to a display device such as a liquid crystal display

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[1] The Patent Owner respectfully submits that the Board lacks statutory authority to consider the Petition because Petitioner failed to identify all real parties-in-interest according to 35 U.S.C. § 312(a)(2). Notably, Chi Mei Optoelectronics USA, Inc., Acer America Corporation, ViewSonic Corporation, VIZIO Inc., and Westinghouse Digital, LLC are real parties-in-interest, which Petitioner failed to identify in its Petition. *See* Paper No. 9, Preliminary Response ("Preliminary Resp."), at 3-10. The Petition should have been denied on this ground.

("LCD") device. The '413 patent has the following advantageous effects: (1) achieving low electrical resistance; (2) achieving improved adhesion of the sealant; and (3) achieving a reliable connection with the flexible printed circuit ("FPC"). These advantageous effects are achieved simultaneously by the combination of claim elements, as discussed in more detail below.

1. Achieving Low Electrical Resistance

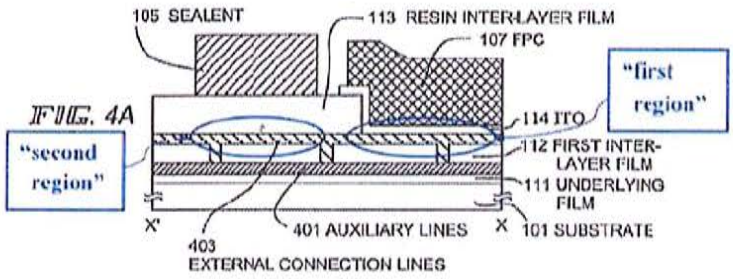
All claims in the '413 patent require a contact hole ("an opening") through the first insulating film (between the two conducting lines) to allow electrical contact between them. Ex. 2012, Escuti Decl., at ¶ 38. The advantage of reduced electrical resistance, Ex.1001, at col. 8, ll. 42-51, results from the following limitations in claim 1 (and limitations in other contested claims):

> wherein the second wiring overlaps at least part of the first wiring;
>
> wherein the first wiring and the second wiring are in electrical contact through an opening in the first insulating film.

2. Achieving Improved Adhesion Of The Sealant

Furthermore, in order to improve the reliability of an LCD by providing for the sealant 105 to have favorable adhesion, this invention provides a structure where the sealant 105 does not overlap the indium tin oxide ("ITO") film 114, which corresponds to a "transparent conductive layer" in the claims, and the

sealant is in direct contact with the second insulating film (such as the resin inter-layer film 113). *Id.*, at FIG. 4A. Generally, a sealant has poor adhesion to ITO. Ex. 2012, Escuti Decl., at ¶¶ 49, 172. As shown in FIG. 4A of the '413 patent, the transparent conductive layer is over a "first region" of the second wiring, the sealant is over both the first wiring and a "second region" of the second wiring, and the sealant is in direct contact with the second insulating film. An annotated FIG. 4A illustrates the claimed "first region" and "second region." Dec., at 13. Importantly, as shown in FIG. 4A, the second wiring (external connection line) extends under the sealant (and is shown in FIGS. 1, 4A, and 5 extending through and beyond the sealant). The claims require the sealant to overlie a "second region" of the second wiring, *e.g.*, claim element; "a sealant over the first wiring and a second region of the second wiring," as FIG. 4A shows:



The transparent conductive layer 114 is formed after the second insulating film 113, as shown by the horizontal portion of the transparent conductive layer 114 that lies on the upper surface of the second insulating film 113. It is also important that this portion of the transparent conductive layer 114 does not extend

to the second region, *i.e.*, is separated from the sealant 105. Hence, the sealant 105 makes direct contact with the second insulating film 113, and the transparent conductive layer 114 does not extend beneath the sealant 105. This configuration provides favorable adhesion of the sealant. Ex. 2012, Escuti Decl., at ¶¶ 39, 173. This advantage is achieved by the following limitations in claim 1 (and limitations in the other independent claims):

> a transparent conductive layer over a first region of the second wiring;
>
> a sealant over the first wiring and a second region of the second wiring,
>
> wherein the sealant is in direct contact with the second insulating film;

3. Achieving a Reliable Connection With The FPC

Additionally, independent claims 1, 7, 17, and 22 and dependent claims 15 and 29 of the '413 patent have the advantage of achieving a reliable connection with the flexible printed circuit 107 ("FPC"). First, a connection with high reliability can be achieved because the entire terminal portion region where the transparent conductive layer is formed can be used as the connection area for the FPC. For example, in FIG. 4A of the '413 patent, because resin inter-layer film 113 is formed before and located under the ITO layer 114, there will be no layer that blocks the ITO layer 114 from connecting with the FPC 107. That is, the entire area where the ITO layer 114 is formed corresponds to the region where the FPC

107 can be connected. Because the connection area is not obstructed by the resin-layer film 113, the connection reliability between the ITO layer 114 and the FPC 107 will increase. Ex. 2012, Escuti Decl., at ¶¶ 40, 137.

Second, because no other layer is formed over the transparent conductive layer, the transparent conductive layer will not be damaged (such as the properties of the layer changed or the layer thinned by overetching) due to the deposition or etching process of any such other layer. Therefore, a more reliable connection with the FPC is achieved. As shown in FIG. 4A of the '413 patent, the transparent conductive layer 114 is formed over the second insulating film 113, and the second wiring 403 and the transparent conductive layer are in direct contact through an opening in the second insulating film. *Id.*, at ¶¶ 41, 138. This advantage is achieved by the following limitations in claim 1 (with similar limitations in independent claims 7, 17, and 22 and dependent claims 15 and 29):

> wherein the second wiring and the flexible printed circuit are in electrical contact through the transparent conductive layer;
>
> wherein the second wiring and the transparent conductive layer are in direct contact through an opening in the second insulating film.

II. INDEPENDENT CLAIMS OF THE '413 PATENT

The Petition challenges all of the '413 independent claims. The following claim chart correlates the features of claim 1 to similar recitals in other independent claims:

#	Claim language	Corresponding element nos.
1.1	A ... display device comprising:	7.1, 10.1, 17.1, 22.1, 24.1
1.2	a first wiring over ... substrate	7.2, 10.2, 17.3, 22.3, 24.3
1.3	a first insulating film over the first wiring	7.3, 10.3, 17.4, 22.4, 24.4
1.4	a second wiring over the substrate and the first insulating film	7.4, 10.4, 17.5, 22.5, 24.5
1.5	a second insulating film over the second wiring	7.5, 10.5, 17.6, 22.6, 24.6
1.6	a transparent conductive layer over a first region of the second wiring;	7.6, 10.6, 17.7, 22.7, 24.7
1.7	a flexible printed circuit over the first wiring and the first region of the second wiring;	7.7, 10.7, 17.8, 22.8, 24.8
1.8	a sealant over the first wiring and a second region of the second wiring,	7.8, 10.8, 17.9, 22.9, 24.9
1.9	wherein the sealant is in direct contact with the second insulating film;	7.9, 10.9, 17.11, 22.11, 24.11
1.10	wherein the second wiring overlaps ... the first wiring;	7.10, 10.10, 17.12, 22.12, 24.12
1.11	wherein the first wiring and the second wiring are in electrical contact through an opening in the first insulating film;	7.11, 10.11, 17.13, 22.13, 24.13
1.12	wherein the second wiring and the flexible printed circuit are in electrical contact through the transparent conductive layer;	7.12, 10.12, 17.14, 22.15, 24.15
1.13	wherein the second wiring and the transparent conductive layer are in direct contact through an opening in the second insulating film.	7.13, 17.16, 22.16

III. NEW EVIDENCE ON HOW ORDINARILY SKILLED ARTISANS UNDERSTAND THE CLAIM LANGUAGE

Claim elements 1.11 and 1.13 (and other claims) use the phrase "contact through an opening in the ... insulating film." The Board construed the phrase to have two meanings: "contact which occurs because of, or by virtue of, the opening, or which occurs between the vertical limits of the opening." Dec., at 11-12, *see also* Rehearing Dec., at 3-4.

The claims use the word "through" in several contexts, *i.e.*, through an opening, a layer, or a wiring. Claims 1, 7, 10, 15, 17, 22, 24, and 29 each recite "contact *through* an opening in the ... insulating film." Claim element 1.12 recites "electrical contact *through* the transparent conductive layer." *See also* claims 7, 17, and 22. Lastly, "connected ... *through* (wiring)" is recited in claims 17, 22, and 24. In *every* instance, the inventor is claiming that the contact or connection is made *by virtue of* the opening, layer, or wiring. The contact or connection occurs *because of* the opening, layer, or wiring and uses the full thickness of the opening or layer.

The '413 specification likewise includes an explanatory sentence using two types of "through" connections, "Referring to FIG. 4A, the external connection lines 403 are electrically connected to an FPC (flexible printed circuit) 107 ***through*** contact holes provided in the resin inter-layer film 113 ***through*** an ITO (indium tin oxide) film 114." Ex. 1001, '413 Patent, at col. 8, ll. 52-55 (emphasis added). The word "through" as used in this sentence means "because of," and "by

virtue of" to persons skilled in the art in both instances. Ex. 2012, Escuti Decl., at ¶¶ 52-59, 74-81.

A. To Persons Skilled in the Art, "contact through an opening" Has But One Meaning.

The Patent Owner respectfully submits the accompanying declaration of Dr. Escuti (Ex. 2012) as evidence that the second part of the Board's interpretation extends beyond the broadest, *reasonable* interpretation in light of the specification *as it would be interpreted by one of ordinary skill in the art. In re American Academy Of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). "Although the PTO must give claims their broadest reasonable interpretation, this interpretation must be consistent with the one that those skilled in the art would reach." *Id.*, citing *In re Cortright,* 165 F.3d 1353, 1358 (Fed. Cir. 1999). The Board's analysis focused on the word "through" apart from the context of the claim elements in which the term is used and resorted to dictionary definitions of that single word in the abstract, rather than the understanding of the meaning of the entire phrase containing the word to a person of ordinary skill in the art. Ex. 2012, Escuti Decl., at ¶¶ 54, 58, 59.

The Federal Circuit *routinely* instructs that context of claim language is important. For example, the Court stated, "...claim language must be construed in the context of the claim in which it appears. Extracting a single word from a claim divorced from the surrounding limitations can lead construction astray..." *IGT v.*

Bally Gaming Intl, Inc., 659 F.3d 1109, 1117 (Fed. Cir. 2011). The importance of context to claim construction is well established. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed.Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir. 1996)). "[T]he person of ordinary skill in the art is deemed to read the claim term not only in the *context of the particular claim* in which [it] appears, but in the *context of the entire patent, including the specification.*" *Id.*, at 1313 [emphasis added].

The claim term "contact through an opening" should be construed considering the phrase as a whole. In integrated circuit fabrication and LCD fabrication, "contact through an opening in an insulator" is a phrase which has a single meaning, Ex. 2012, Escuti Decl., at ¶¶ 52-59, 67. This meaning corresponds to the first meaning which the Board adopted, namely, "contact which occurs because of, or by virtue of, the opening."

B. The Board's Construction of "Contact Through an Opening" as Meaning "Contact ...Which Occurs Between the Vertical Limits of the Opening" Is Improper

The Patent Owner respectfully submits that the specification of the '413 patent and the context in which "contact through an opening" is used in the claims do not suggest the construction, "contact which occurs between the vertical limits." While acknowledging that the specification "is the single best guide to the meaning of a disputed term," the Decision resorts instead to abstract definitions from a

dictionary. Dec., at 10-11. In FIG. 4A, the contact through the opening in resin inter-layer film 113 is completely through film 113, from top to bottom. Similarly, the connection between external connection lines 403 (second wiring) and the FPC 107 is completely through ITO 114 (transparent conductive layer), from top to bottom. Finally, the electrical contacts between the auxiliary lines 401 (first wiring) and external connection lines 403 (second wiring) are completely through first interlayer film 112. Even in the example the Board cites in its Decision on Rehearing (Paper 23) ("Rehearing Dec."), at 3 – "a spacer . . . penetrates through the resin" – the spacers must penetrate completely through the resin from top to bottom, not merely within the vertical limits of the resin, or they could not function as spacers. *See* Ex. 1001, '413 Patent, at col. 13, ll. 43-44. In each of the foregoing instances, the contact or penetration is through the entirety of the vertical limits of the respective opening or thickness of the ITO layer or resin. In these instances, the contact is not merely in the vicinity of or within some portion of the vertical limits of the opening or layer, and the penetration of the spacers is not merely part way into the resin. None of the foregoing connections would exist without the respective opening.

C. The Second Meaning Adopted by the Board Lacks Evidentiary Support

The second meaning of "contact through an opening" adopted by the Board, however, "contact which occurs between the vertical limits of the opening," Dec.,

at 12, does not require the contact to be because of or by virtue of the opening. Nothing in the specification or claims of the '413 patent suggests that "contact through an opening" should be given this second meaning. Dr. Escuti attests that the Board's second meaning is contrary to any reasonable interpretation that a person of ordinary skill in the art would ascribe to the phrase "contact through an opening" in the context of the specification and claims of the '413 patent. Ex. 2012, Escuti Decl., at ¶¶ 52-81.

The Board did not expressly rely on Dr. Hatalis' declaration testimony on this point, and in any event it is inconsistent and not credible. In his declaration at ¶ 113, he construes claim element 1.11 ("...contact through an opening in the first insulating film") to mean that the opening allows one layer or film on one side of the opening to extend into the opening to thereby make contact with another layer or film on the opposite side of the opening, *i.e.,* the contact is because of the opening. Then, in ¶ 122 of his declaration, Dr. Hatalis asserts that there is "contact through an opening" where an opening is located above two layers that already were in contact with each other before the opening was created, so that the opening has no causal relationship to the contact, and the contact is not because of the opening. Dr. Hatalis cites no evidence to support this latter construction. His testimony thus lacks credibility.[2] Consequently, Dr. Hatalis' testimony relating to

[2] The Office Patent Trial Practice Guide states (at page 48763): Affidavits

the construction or application of the claim element "contact through an opening" should be accorded little weight. *Id.*, at ¶¶ 60-64.

D. Persons of Ordinary Skill in the Art Would Not Understand "Contact Through an Opening" to Mean "Contact Within the Vertical Limits of the Opening."

Here the meaning of "contact through an opening" is not ambiguous in the context of the specification and claims of the '413 patent. Because the meaning is not ambiguous from the intrinsic evidence, it cannot be rendered ambiguous by reference to abstract definitions of "through" in a dictionary, which is extrinsic evidence. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) ("When the intrinsic evidence is unambiguous, it is improper for the court to rely on extrinsic evidence such as expert testimony for purposes of claim construction."); *see also, Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys.*, 132 F.3d 701, 706 (Fed. Cir. 1997) (providing rationale for refraining from using expert testimony when the intrinsic evidence is unambiguous and refraining from

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expressing an opinion of an expert must disclose the underlying facts or data upon which the opinion is based. *See* Fed. R. Evid. 705; and § 42.65. Opinions expressed without disclosing the underlying facts or data may be given little or no weight. *Rohm & Haas Co. v. Brotech Corp.*, 127 F.3d 1089, 1092 (Fed. Cir. 1997) (nothing in the Federal Rules of Evidence or Federal Circuit jurisprudence requires the fact finder to credit unsupported assertions of an expert witness).

using extrinsic evidence to cast light upon ambiguous claim language because "expert testimony should not "inject a new meaning into terms that is inconsistent with what the inventor set forth in his or her patent," and should be used only if it is not inconsistent with the unambiguous intrinsic evidence.)

However, if extrinsic evidence is to be considered, then the testimony of Patent Owner's expert, Dr. Escuti, must be considered. He flatly disagrees with Dr. Hatalis and explains that in the context of the specification and claims, "contact through an opening" must be construed consistent with the relative orientation of structures shown in FIG. 4A of the '413 patent. Ex. 2012, Escuti Decl., at ¶¶ 52-81. Dr. Escuti explains that persons of ordinary skill in the art would not adopt the Board's alternate interpretation that does not require contact to exist because of, or by virtue of, the opening. *Id., at* ¶¶ 60-64.

Dr. Hatalis addressed the question of the relative locations of layers during his deposition and conceded that, except for three layers, the order of the layers is completely specified by the claims. Ex. 2011, Hatalis Dep., at p. 47, l. 4 – p. 60, l. 11. The three layers for which Dr. Hatalis contends the claims do not specify the order are the second wiring, the transparent conductive layer and the second insulating film. *Id.*, at p. 59, l. 12 – p. 60, l. 11. However, the claims specify the order of these three layers also. Ex. 2012, Escuti Decl., at ¶ 69.

The elements of claim 1 specify the order of the layers recited therein. Both Petitioner and Patent Owner agree that the substrate is the lowermost layer, followed by the first wiring, the first insulating film and the second wiring in that order. Claim element 1.12 requires: "wherein the second wiring and the flexible printed circuit are in electrical contact through the transparent conductive layer." Therefore, if, as Patent Owner contends, and consistent with the Board's first meaning (*see* Dec., at 12), "contact through an opening" means contact which occurs because of, or by virtue of, the opening, then the transparent conductive layer must be disposed between the second wiring and the FPC so that the transparent conductive layer provides an electrical path between the second wiring and the FPC. That is, the electrical connection occurs because of the transparent conductive layer. Similarly, claim element 1.13 requires: "wherein the second wiring and the transparent conductive layer are in direct contact through an opening in the second insulating film." Therefore, if "contact through an opening" means contact that occurs because of, or by virtue of, the opening, the second insulating film must be between the second wiring and the transparent conductive layer. That is, the direct contact between the transparent conductive layer and the second wiring occurs because of an opening in the second insulating film. This analysis applies to claims 1, 7, 15, 17, 22, and 29. *Id.*, at ¶¶ 70-77.

Importantly, the structure resulting from the foregoing construction of "contact through an opening" corresponds to the structure shown at the middle of

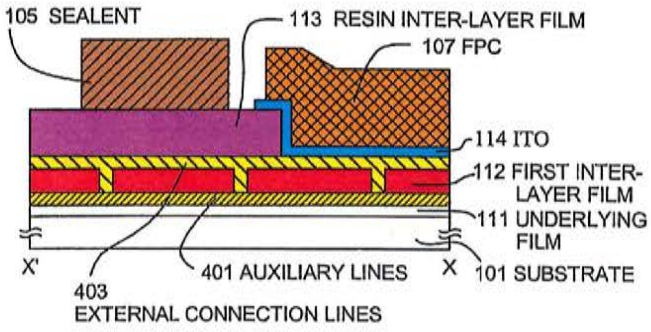


FIG. 4A of the '413 patent. It shows a horizontal portion of the transparent conductive layer 114 (blue) located on top of the second insulating film 113 (purple) (indicating that it was formed after film 113), and on top of the second wiring 403 (yellow) located immediately beneath the second insulating film 113 (purple). *Id., at* ¶ 75. As noted, claim element 1.13 calls for "direct contact" of the transparent conductive layer with the second wiring "through an opening in the second insulating film." In the context of the specification and claims of the '413 patent, the ordinarily skilled artisan would understand this language only one way -- that the opening in the second insulating film allows the transparent conductive layer to make direct contact with the second wiring. *Id.,* at ¶¶ 74-77.

In fact, this corresponds to the structure shown in the right-hand portion of FIG. 4A of the '413 patent, which shows an opening in second insulating film 113 (purple) over which the transparent conductive layer 114 (blue) has been formed so that a horizontal portion of the transparent conductive layer is located on the underlying second insulating film 113, a vertical portion of the transparent

conductive layer is shown along the edge of the opening in second insulating film 113, and another horizontal portion of the transparent conductive layer is located at the bottom of the opening in the second insulating film 113. At the bottom of that opening, the transparent conductive layer 114 makes direct contact with the upper surface of the second wiring 403 (yellow). *Id.*, at ¶¶ 76-77. This permits the second wiring to be in electrical contact with the FPC "through the transparent conductive layer." *See* claim element 1.12.

For these reasons, the Patent Owner submits that the Board should modify its construction of "contact through an opening" to remove "between the vertical limits" as an alternative meaning.

IV. The Background Of The Prior Art

The Board found, at the preliminary stage of granting the Petition, a reasonable likelihood of unpatentability over Sukegawa (Ex. 1003) in light of Nakamoto (Ex. 1004). Dec., at 22. In regard to Sukegawa, the Petition relies principally on FIG. 2C. The only other figures from Sukegawa relied on in the Petition are FIG. 3C (Petition at 29, 48, and 49) and FIG. 3D (*Id.* at 38 and 47). Similarly, Dr. Hatalis relies on only these same figures from Sukegawa. *See* Ex. 1005, Hatalis Dec., at ¶¶ 60, 84, 116, 125 and 140 (referring to FIG. 3C), ¶¶ 99, 103 (referring to FIG. 3D); *see also* Ex. 2011, Hatalis Dep, at p. 105, ll. 14-24.

A. Sukegawa

Sukegawa, the primary reference, discloses a corrosion problem in the terminal portion of an LCD where a tape carrier package connects to one of the two opposing substrates. Colorized copies of FIGS. 1B and 2C are shown below.

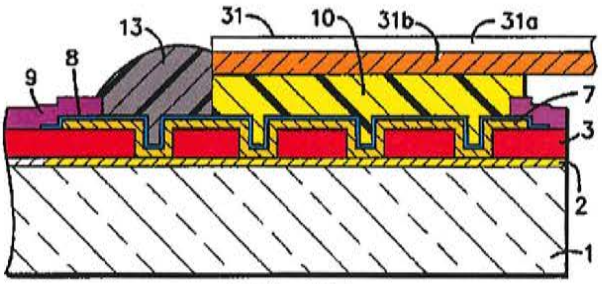


FIG. 2C
PRIOR ART

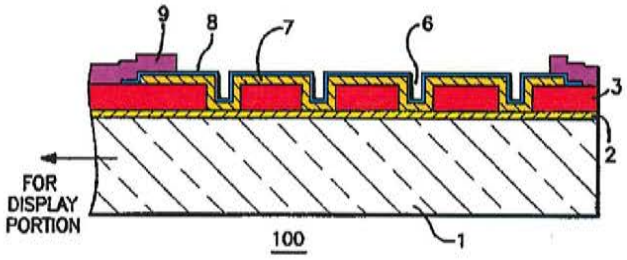


FIG. 1B
PRIOR ART

In that terminal portion, the prior art had included an upper layer metal wiring 7 (burnt yellow) that overlies a lower layer metal wiring 2 (yellow) with an interlayer insulating film 3 (red) between them.

The lower layer metal wiring 2 and the upper layer metal wiring 7 contact one another because of "contact holes 6" (Ex. 1003, Sukegawa, at col. 3, ln.13) in interlayer insulating film 3. That is, contact holes 6 overlie upper surface portions of lower layer metal wiring 2 and extend completely through interlayer insulating film 3. When the metal to form upper layer metal wiring 7 is added after interlayer insulating film 3 has been etched to open contact holes 6 exposing the upper surface of the underlying lower layer metal wiring 2 below contact holes 6, portions of that upper layer metal wiring 7 extend through the contact holes 6 to establish direct contact between upper layer metal wiring 7 and lower layer metal

wiring 2. This is the normal usage of "contact through an opening in an insulation layer." Sukegawa uses the equivalent phrase, "connected ... by way of ... contact holes." *Id.*, at col. 4, ll. 60-61. This meaning of "contact through an opening in an insulation layer" is the same as the first meaning adopted by the Board in its Decision. *See.* Dec., at 12.

Sukegawa also shows a film 8 of transparent conductive film (blue; indium tin oxide – ITO) that covers the top and end surfaces of an upper layer metal wiring 7 in the terminal portion 100. Ex. 1003, Sukegawa, at col. 3, ll. 37-38, col. 6, ll. 12-20.

In addition, Sukegawa provides a protective insulating film 9 (purple). *Id.*, at col. 3, ll. 19-20. It is apparent from the figures in Sukegawa that protective insulating film 9 is added after transparent conductive film 8 because parts of transparent conductive film 8 lie underneath protective insulating film 9. After forming protective insulating film 9, an opening is created in protective insulating film 9; this is shown in the plan view in FIG. 1A of the structure shown in FIG. 2C of Sukegawa. The opening in protective insulating film 9 is also shown in sectional view in FIGS. 1B, 2A, 2B, and 2C of Sukegawa.

An anisotropic conductive film 10 (yellow) connects a tape carrier package 31 (orange) to the terminal portion of substrate 100 in such a way as to cover much of the opening in protective insulation film 9 but to leave a space for probe testing.

That is, the opening (unnumbered) in protective insulation film 9 (purple) by design is not completely covered by the tape carrier package 31, as FIGS. 2A, 2B, 2C and several other figures of Sukegawa depict.

Sukegawa discloses the problem that a pin-hole defect in transparent conductive film 8 of ITO could develop because ITO is generally not applied in thick films because it must be transparent. *Id.,* at col. 3, ll. 36-42. Also, although ITO is chemically stable, it is not very moisture-resistant. *Id.* These pinholes would allow corrosion 12 to occur on the upper layer metal wiring 7, which is formed under the transparent conductive film 8, and also on the underlying lower metal wiring 2. *Id.*, at col. 1, ll. 39-49; col. 3, ll. 36-53. FIG. 2B of Sukegawa depicts such corrosion 12. *Id.,* at col. 3, ll. 42-53.

Sukegawa teaches protecting against these defects by forming the protective insulation film 9 or the anisotropic conductive film 10 over the transparent conductive film 8. *Id.*, at col. 3, ll. 37-53 and col. 6, ll. 9-20; Ex. 2023, Sukegawa, at p. 104, l. 14 – p. 105, l. 2. With this double coverage structure, the metal layer 7 will not be exposed to the external air and will be protected against corrosion, even when the pinholes are formed in the transparent conductive film 8. Ex. 1003, at col. 6, ll. 22-26. Similarly, silicone resin 13 (*see* gray element 13 in colored version of FIG. 2C above) protects transparent conductive film 8 after the probe test. *Id.*, at col. 3, ll. 54-57. If a pin-hole develops in transparent conductive film 8

or moisture penetrates it before the silicone resin 13 is applied, however, corrosion could occur to upper layer metal wiring 7 and lower metal wiring 2 in FIG. 2C.

Sukegawa's solution was to remove the upper layer metal wiring 7 at the probe test region (labeled 14 in FIG. 3E) so that even if a pin-hole develops in the transparent conductive film 8 (blue) or moisture permeates transparent conductive film 8 where it traverses region 14, no corrosion of upper layer metal wiring 7 or lower layer metal wiring 2 would result because only interlayer insulating film 3 (red) would be exposed by the pin-hole or the moisture permeating transparent conductive film 8. *See, e.g., id.,* at col. 2, ll. 13-22; FIG. 3E. Further, Sukegawa protected the upper layer metal wiring 7 by double coverage with the transparent conductive film 8 and either the protective insulation film 9 or the anisotropic conductive film 10, because the protective function of the transparent conductive film 8 to the upper layer metal wiring 7 is not very effective. *Id.,* at col. 3, ll. 36-42.

The transparent conductive film 8 is formed after upper layer metal wiring 7 is formed and protects the wiring 7 during assembly of the FPC and for testing before installing silicone resin 13 to plug the gap left open for probe testing. *See id.,* at col. 2, ll. 13-28; FIG. 3E. That is, in Sukegawa, transparent conductive film 8 needs to be formed over the upper layer metal wiring 7 and under the protective insulating film 9, thereby ensuring sufficient protection against corrosion (oxidation) on the upper layer metal wiring 7. Ex. 2012, Escuti Decl., at ¶¶ 83-87.

Sukegawa fails to show the exact location of a sealant between the active matrix substrate 100 and the counter (or color filter) substrate 200. *Id.*, at ¶¶ 89-93

B. Nakamoto

The Board relies on Nakamoto (Ex. 1004) as a secondary reference only. "CMI primarily employs Nakamoto to show that skilled artisans knew how to extend different sets of wiring groups under a sealant for the purpose of making circuit connections." Dec., at 21; *see also* pp. 13 and 15. Dr. Hatalis noted in his deposition that he relies on Nakamoto only for placement of the sealant. He does not rely on Nakamoto to show the first and second regions of the second wiring, as set forth in the claims. Ex. 2011, Hatalis Dep. at 158, ll. 13-19.

Nakamoto discloses an LCD device and shows a sealant marked as "SL" in FIGS. 5 and 9. FIG. 9 shows a conductive film g1 of metal and an overlying transparent conductive layer d1 extending beneath the sealant SL. Other conductive films DL, d2, and d3 all extend from the right-hand side of FIG. 9 (from the active matrix area) and terminate beneath the sealant SL as FIG. 9 shows. Dr. Hatalis agreed. Ex. 2011, Hatalis Dep., at 153, l. 18 – p. 154, l. 1. Nakamoto does <u>not</u> show two overlapped conductive lines separated by an insulator passing beneath the sealant. Dr. Hatalis agreed. Ex. 2011, Hatalis Dep. at 165, ll. 2-10; Ex. 2012, Escuti Decl., at ¶¶ 94, 95.

V. The '413 Patent Is Patentable Over The Prior Art

Neither Sukegawa nor Nakamoto teaches or suggests extending to beneath the sealant Sukegawa's composite arrangement of an upper layer metal wiring 7, which overlies interlayer insulating film 3, which in turn overlies lower layer metal wiring 2. Also, neither of these references teaches or suggests that the transparent conductive layer (ITO layer) 8 should be applied after the upper insulating film (such as Sukegawa's protective insulating film 9). As to the claim limitation restricting the relative locations of the sealant and transparent conductive layer, Sukegawa is silent about the sealant, and, therefore, does not disclose its location relative to transparent conductive layer 8. In Sukegawa, it is plain that, in the terminal portion, an ITO layer 8 is added on top of upper layer metal wiring 7 before protective insulating film 9 is deposited since parts of the protective insulating film 9 overlie and rest upon the upper surface of ITO layer 8. *See* FIG. 2C; Ex. 2012, Escuti Decl., at ¶¶ 96-98. The ITO layer 8 and upper layer metal wiring 7 in Sukegawa end at the terminal 100. Nor is the claimed relative locations of the transparent conductive layer and the sealant disclosed in Nakamoto, as discussed below.

A. Sukegawa and Nakamoto Do Not Render Obvious the Claimed Location of the Sealant Relative to the Second Wiring, the Second Insulating Film and the Transparent Conductive Layer

Sukegawa fails to disclose the following limitations of claim 1: "a sealant over the first wiring and a second region of second wiring, wherein the sealant is in direct contact with the second insulating film."

As to the limitation, "a sealant over the first wiring and a second region of second wiring," the Board recognizes that, while Sukegawa FIG. 2C discloses a second wiring 7 overlying a first wiring 2 in a terminal region of an LCD, only first wiring 2 extends under the sealant. Dec., at 14. The Board, however, found that "as Dr. Hatalis reasons, skilled artisans would have recognized that extending first and second wirings such as 2 and 7 under the sealant would have created a more reliable connection and a reduced resistance as compared to extending just one wiring layer 2 to make the display circuit connection." Dec., at 16. As discussed below, Dr. Hatalis' reasoning on which the Board relied for its foregoing conclusion is flawed.

It would not have been obvious to one of ordinary skill in the art to modify Sukegawa to achieve the claimed structure. Ex. 2012, Escucti Decl., at ¶¶ 99-10. One reason is that the terminal region of an LCD is where unusual stresses occur due to connection via an FPC. It is in that particular region that a fortified structure is advantageous. However, the ordinary skilled artisan would not have

thought to extend the overlapping wiring from there to beneath the sealant because the mechanical stresses do not call for it and because putting a double wiring arrangement (actually having three layers when counting the first insulating film) under the sealant introduces or exacerbates the problem of thickness variations in the sealant forming region. *Id.*, at ¶¶ 101, 129.

As for the advantage of lowering resistance, the evidence points to the conclusion opposite to what the Board suggests may be the case. While it is true that resistance would be lowered, it is undeniable that Sukegawa chose not to make such an extension. Instead Sukegawa chose to terminate the double wiring in the terminal region and not extend it to the sealant, keeping the double wiring in the terminal portion in the area outside the sealant. As noted above, Sukegawa extends only lower layer metal wiring 2 to beneath the sealant. Significantly, Sukegawa's teaching is to remove the upper layer metal wiring 7 at the probe test region (labeled 14 in Sukegawa FIG. 3E). *Id.*, at ¶¶ 87, 102, 131. Moreover, if the double wiring structure were to be extended, that structure would need to be modified to eliminate the overlying ITO in the second region, but not the first region. Specifically, it would need to be modified so that the overlying ITO is not in direct contact with the sealant in the second region. This is a pure hindsight reconstruction and improper. *Id.*, at ¶¶ 1015-108.

The Decision cited Sukegawa FIG. 3B as showing ITO layer 8 making contact with wiring 7 "between the vertical limits of the opening in the second insulating film 9..." Dec., at 18-19. The Petition does not rely on FIG. 3B as a basis for alleged obviousness. Dr. Hatalis emphasized in his deposition that his declaration does not rely on Sukegawa FIGS. 3A or 3B. Ex. 2011, Hatalis Dep., at p. 136, l. 9 – p. 137, l. 9. Nowhere does the Petition rely on Sukegawa FIG. 3B as showing contact through an opening in the insulating film 9. Moreover, for the reasons discussed above in Sections III and IV.A., Sukegawa FIG. 3B does not show contact between upper layer metal wiring 7 and transparent conductive film 8 through the opening in protective insulating film 9 as "contact through an opening" would be understood by a person of ordinary skill in the art in the context of the specification and claims of the '413 patent. *See* Ex. 2012, Escuti Decl., at ¶ 133.

As to the limitation "wherein the sealant is in direct contact with the second insulating film," while including a sealant is implicit and necessarily located outside the display matrix region, the claims call for a specific structure, Specifically, the claims require that the sealant directly contact the second insulating film and not overlap the second wiring in the region where the transparent conductive layer is present. *See id.*, at ¶ 103.

B. A Transparent Conductive Layer Over a First Region of the Second Wiring and Sealant Over a Second Region of the Second Wiring and In Direct Contact With the Second Insulating Film Is Not Obvious

All of the independent claims recite that the sealant is located "over the first wiring and a second region of the second wiring" (claim elements 1.8, 7.8, 10.8, 17.9, 22.9, and 24.9); that "the sealant is in direct contact with the second insulating film" (claim elements 1.9, 7.9, 10.9, 17.11, 22.11, and 24.11); and that transparent conductive layer is located "over a first region of the second wiring" (claim elements 1.6, 7.6, 10.6, 17.7, 22.7, and 24.7). The Patent Owner respectfully submits that this combination structure greatly impacts the performance of the LCD and is not obvious over Sukegawa and Nakamoto. These foregoing claim limitations are illustrated by the structure in FIG. 4A of the '413 patent. The sealant 105 lies on top of the resin inter-layer film 113 (which is a second insulating film), and sealant 105 does not overlap ITO 114 (which is a transparent conductive layer). This is because the transparent conductive layer is over a first region of the second wiring and the sealant is over a second region of the second wiring.

In addition, independent claims 1, 7, 17, and 22 and dependent claims 15 and 29 recite that the "second wiring and the transparent conductive layer are in direct contact through an opening in the second insulating film" (claim elements 1.13, 7.13, 15, 17.16, 22.16, and 29). As discussed above in Section III, the claim

limitation "contact through an opening" of claim element 1.13 required the transparent conductive layer to be formed after the second insulating film. That is, for the second wiring and the transparent conductive layer to be "in direct contact through an opening in the second insulating film," the second insulating film must be between the second wiring and the transparent conductive layer. The second wiring must be the lowermost layer of these three because the claims require (A) (*e.g.*, claim element 1.5) a second insulating film to be over the second wiring and (B) (*e.g.*, claim element 1.6) a transparent conductive layer to be over the second wiring. Because the second insulating film is middle layer and the second wiring is the lowermost layer, the transparent conductive layer is uppermost layer. Thus, the claim limitations specify the order of the layers. *See also* Ex. 2012, Escuti Decl., at ¶¶ 70-77.

In Sukegawa, on the other hand, upper metal wiring 7 and transparent conductive layer 8 are not "in direct contact through an opening" in the protective insulating film 9. In FIG. 2C of Sukegawa, the transparent conductive layer 8 overlies and is in direct contact with upper metal wiring 7. They are in direct contact before protective insulating film 9 is even formed. In FIG. 2C, which is the only figure from Sukegawa relied on in the Petition or by Dr. Hatalis to show an opening in protective insulating film 9, both the transparent conductive layer 8 and upper metal wiring 7 are completely below the opening in protective insulating

film 9. Thus, FIG. 2C of Sukegawa does not show "contact through an opening" even under the Board's second meaning of contact "which occurs between the vertical limits of the opening." (The Petition also references FIGS. 3C and 3D of Sukegawa, but neither of those figures shows the opening in protective insulating film 9.)

The Board's reliance on FIG. 3B of Sukegawa is misplaced because the Board's alternative meaning of "contact through an opening" is improper for the reasons discussed in Section III above.[3]

The claims also recite (*e.g.*, claim element 1.9) "wherein the sealant is in direct contact with the second insulating film." As noted above, Sukegawa does not disclose the location of sealant. The Petition and declaration of Dr. Hatalis argue this claim element disclosed in FIG. 2C of Sukegawa combined with FIGS. 5 and 9 of Nakamoto. *See* Petition, at 39-40; Hatalis Decl., at ¶¶ 105-108, and 144.

FIGS. 5 and 9 of Nakamoto merely show a sealant SL in direct contact with an insulating film PSV1. However, without applying hindsight, it would have been

[3] The Board's reliance on FIG. 3B of Sukegawa also is improper under 35 U.S.C. § 314, which allows the Board to institute IPR on the basis of "information presented in the petition filed under section 311 and any response filed under section 313." FIG. 3B is not information presented in the Petition or any response.

far from obvious how to modify the combination of Sukegawa and Nakamoto to provide a transparent conductive layer over a first region of a second wiring, a sealant over a second region of the second wiring with the sealant not overlapping the transparent conductive layer, and the sealant in direct contact with a second insulating film, with the second insulating film being between the second wiring and the transparent conductive layer.

Even if it were accepted that in an LCD, a sealant may rest upon an insulator that overlies and protects wiring under the sealant, this fails to address of the present invention where the transparent conductive layer is formed *after* the claimed second insulating film. That is, in Sukegawa, the formation order is reversed from the claimed invention. In Sukegawa, the transparent conductive layer 8 is deposited and defined before the insulating film 9 is deposited, as is evident from examining FIGS. 1B, 2B, or 2C. In the challenged claims, the second insulating film is established and an opening is made so that a subsequently-added transparent conductive layer will extend into the opening and make direct contact with the second (upper) wiring. Ex. 2012, Escuti Decl., at ¶ 171.

Also, even if Sukegawa's transparent conductive layer is deposited as the top layer to obtain the advantages of (1) the high reliability advantage and (2) the protected transparent conductive layer advantage as stated in the below Sections V.D.4. and V.D.5, Sukegawa still needs to resolve another problem. Even if the

transparent conductive film 8 could hypothetically be formed over the protective insulation film 9, in that case the sealant would directly contact transparent conductive film 8. It is known that generally the transparent conductive layer and sealant have poor adhesiveness with each other. *Id.*, at ¶¶ 49, 172. In the '413 invention, the transparent conductive layer does not extend to the sealant so as not to overlap with each other, and as a result of this, good adhesion of the sealant can be achieved despite the fact that the transparent conductive layer is added after the second insulating film. For example, in FIG. 4A of the '413 patent, the ITO 114 and sealant 105 are spatially separated so that the adhesiveness of the sealant 105 with respect to the underlying resin inter-layer film 113 is preserved. This is reflected in the claim element "a sealant over the first wiring and a second region of the second wiring" (claim elements 1.8, 7.8, 10.8, 17.9, 22.9, and 24.9) and "wherein the sealant is in direct contact with the second insulating film" (claim elements 1.9, 7.9, 10.9, 17.11, 22.11, and 24.11) in combination with the recitals of "a transparent conductive layer over a first region of the second wiring" (claim elements 1.6, 7.6, 10.6, 17.7, 22.7, and 24.7).

For these reasons, the combination structure recited in each of the challenged claims solves multiple problems with unique and unexpected advantages in a manner that is clearly not contemplated by the prior art. The modifications that would have to be made to the prior art to arrive at the claimed

structures are substantial and certainly not matters of applying routine skill of the art as of 1997. Ex. 2012, Escuti Decl., at. ¶¶ 173-175.

Therefore, Sukegawa does not render obvious the claim limitations "wherein the second wiring and the transparent conductive layer are in direct contact through an opening in the second insulating film," and "wherein the sealant is in direct contact with the second insulating film."

Furthermore, neither FIG. 5 nor FIG. 9 of Nakamoto disclose a second wiring over a first wiring. Therefore, Nakamoto also does not disclose a sealant over the first wiring and a second region of the second wiring. Although the Petition alleges that GTM and DTM in FIG. 9 correspond to first and second wirings, respectively (*e.g.*, Petition, at 37-39), wiring GTM and DTM do not overlap and are not in electrical contact through an opening in a first insulating film. Ex. 2012, Escuti Decl., at ¶¶ 124, 125.

C. Sukegawa and Nakamoto Fail to Disclose a "First Wiring" and Overlying "Second Wiring" That Extend to the Claimed "Second Region"

1. Sukegawa Does Not Teach the Claimed Structure

The "second region" is an essential feature of the claimed "second wiring" because this limitation provides structure in which the sealant does not overlie the transparent conductive layer. Claim elements 1.8, 7.8, 10.8, 17.9, 22.9, and 24.9 contain recitals about the second region ("a sealant over…a second region of the

second wiring"). Also, because the first wiring and the second wiring are in electrical contact *and the sealant is above both of them*, the electrical resistance of wiring for transmitting signals between the flexible printed circuit and other circuits, *e.g.*, the display portion, can be reduced. For the claimed "second region," the Petition cites Sukegawa FIGS. 2C and 3D, claiming that the color filter substrate 200 is "fitted just outside the flexible wiring circuit 31," along with Nakamoto. Petition, at pp. 37-39.

Even if Sukegawa discloses lower metal wiring 2 as a "first wiring" that extends under a sealant, Sukegawa's upper metal wiring 7 (corresponding allegedly to the "second wiring" in the '413 claims, as noted above) is confined to the terminal region and does not extend to beneath the sealant. These references simply do not show, teach, suggest, or motivate the skilled artisan to modify Sukegawa to extend the double wiring structure of wiring 2, insulator 3, and overlying wiring 7 in that relationship from the terminal region to the region beneath the sealant. Ex. 2012, Escuti Decl., at ¶¶ 107, 108.

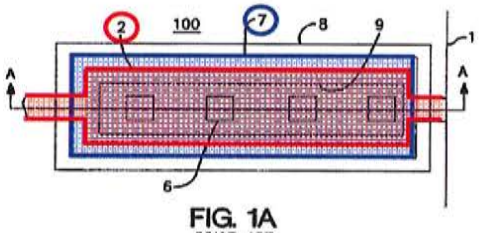


FIG. 1A
PRIOR ART

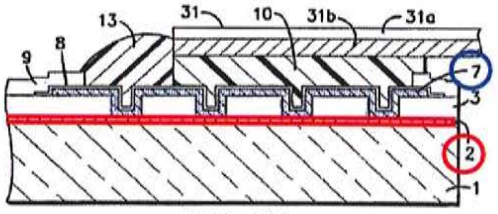


FIG. 2C
PRIOR ART

As shown in FIG. 2C and FIG. 1A, which is a top view representation of FIG. 2C (reproduced with annotations) of Sukegawa, the upper layer metal wiring 7 (blue region) is formed only at the terminal portion in an island-shape as opposed to the lower layer metal wiring 2 (red region) which extends to the left, off the page, to the display portion. This structure is configured so that the upper layer metal wiring 7 transmits signals from the FPC (flexible wiring substrate 31) to the lower layer metal wiring 2 via anisotropic conductive film 10, transparent conductive film 8, and then upper layer metal wiring 7. On the other hand, the lower layer metal wiring 2 extends leftward from the terminal portion to the display portion, so that the lower layer metal wiring 2 transmits signals to the display portion.

It would not have been obvious to extend the upper metal wiring 7 from the terminal region to under the sealant. Doing so would increase the thickness of the wiring structure crossing the sealant, thereby causing the gap in that region to be higher and making it more difficult to maintain a uniform cell gap. *See* Ex. 2012, Escuti Decl., at ¶¶ 91, 92, 129. It follows that claim elements 1.8, 7.8, 10.8, 17.9, 22.9, and 24.9 were not obvious.

2. Nakamoto Does Not Teach the Claimed Structure

In Ex. 1005, at ¶ 100 (first sentence), Dr. Hatalis notes that Nakamoto shows an LCD with wirings extending to an external tape carrier package and wirings

extending under sealant SL. However, the GTM and DTM wiring in Nakamoto do not correspond to the first wiring and the second wiring recited in the claims of the '413 patent. As shown in FIG. 5 of Nakamoto, GTM and DTM are *orthogonal* wirings that pass under different quadrants or portions of the sealant SL. They do not overlap one another under the sealant region. Indeed, the mark up of Nakamoto FIG. 5 in ¶ 100 (Ex. 1005, at p. 36) shows explicitly that the GTM lines (lower arrow) extend horizontally across a vertical section of the sealant SL, while the DTM lines (upper arrow) extend vertically across a horizontal section of the sealant SL in a completely different location. Accordingly, GTM and DTM do not satisfy several claim limitations. They are not overlapped wirings (*e.g.*, claim elements 1.4 and 1.10); they are not electrically connected through an opening in the first insulating film (*e.g.*, claim element 1.11); they are not separated by a first insulating film (*e.g.*, claim elements 1.3 and 1.4), and they do not both extend beneath the sealant in the same location (*e.g.*, claim element 1.8). *See* Ex. 2012, Escuti Decl., at ¶122. Indeed, the Board already found that these two lines should not be connected directly together. Dec., at 16, line 23 *et seq*. (noting that the TFT would not operate).

Furthermore, FIG. 9 of Nakamoto also fails to show that sealant SL lies over a double wiring arrangement as the claims require. Nakamoto only discloses that a terminal portion consists of silicon oxide SIO formed on the substrate SUB 1,

conductive film g1 formed on the SIO, ITO d1 formed on the conductive film g1, and protective film PSV1 formed over the ITO d1. *See e.g.,* Ex. 1004, FIG. 9 in Nakamoto. *See also* Ex. 2012, Escuti Decl., at ¶ 123.

Nakamoto stands for the unremarkable proposition that LCDs have sealant between the substrates. By no means does this teach or motivate the one skilled in the art to extend Sukegawa's wiring lines 2 and 7, together, away from the terminal portion all the way to the sealant.

3. The Claimed Structure Is Not Obvious In View Of Sukegawa in Combination With Nakamoto

Although Sukegawa makes reference to lowering the electrical resistance by connecting lower metal wiring 2 and upper metal wirings 7-1 and 7-2 (*see* FIGS. 3A, 3B, and 3E), this is merely suggesting a reduction in electrical resistance with a structure in which upper layer metal wirings 7-1 and 7-2 are connected by lower metal wiring 2 in addition to the transparent conductive film 8 at the terminal portion. *See* Ex.1003, col. 7, ll. 16-21. Sukegawa alone or in combination does not suggest any extension of upper layer metal wiring 7 from the terminal region to under the sealant. The function of Sukegawa's upper layer metal wiring 7 is merely to transmit signals from flexible wiring substrate 31 to the lower layer metal wiring 2 that is located vertically below upper layer metal wiring 7. Ex. 2012, Escuti Decl., at ¶¶ 109-113.

Moreover, to reduce wiring resistance of lower metal wiring 2, a person of ordinary skill in the art would consider widening the width of the lower layer metal wiring 2 rather than extending the upper layer metal wiring 7 to the display portion because the upper layer metal wiring 7 is disclosed as a wiring that could easily corrode. Sukegawa recites the problem of the corrosion of the upper layer metal wiring 7. As the upper layer metal wiring 7 has the risk of corrosion, extending the upper layer metal wiring 7 increases the corrosion risk. Simply widening the lower layer metal wiring 2 would lessen its resistance without increasing the corrosion risk. *Id., at* ¶ 114

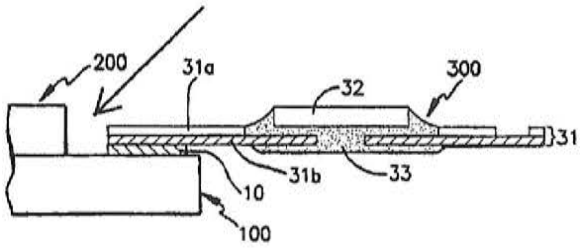
Dr. Hatalis asserts (Ex. 1005, Hatalis Decl., at ¶ 99) that Sukegawa describes a multilayer wiring structure that "provides lower resistance as well as a more secure connection," referring to Sukegawa col. 6, ll. 9-20. However, this Sukegawa passage cited in ¶ 99 is discussing lowering resistance and protecting against corrosion at a terminal portion. As noted above, the resistance being lowered in Sukegawa is from an FPC at a terminal to the lower layer metal wiring 2. Sukegawa indicates that better corrosion protection can be realized when upper layer metal wiring 7 is covered by both transparent conductive film 8 and either protective insulating film 9 or anisotropic conductive film 10. This structure seeks to prevent corrosion of upper layer metal wiring 7 and lower metal wiring 2.

Ex.2012, Escuti Decl., at ¶¶ 115, 116. (Patent Owner notes that the word "secure" does not appear in Sukegawa.)

Even if a more secure connection were provided by the double wirings as Dr. Hatalis contends, it still would not be the basis of the upper layer metal wiring 7 being extended under the sealant to the display portion. More specifically, Dr. Hatalis testified that a more secure connection can be achieved in Sukegawa because the peeling defect can be reduced when the upper layer metal wiring 7 is connected by way of plural through holes 6 to the lower layer metal wiring 2, by referring to Sukegawa at col. 6, l. 61 – col.7, l. 8. Ex. 2011, Hatalis Dep., at 167, ll. 4-13. From this testimony, it is apparent that Dr. Hatalis is focusing only on the structure of the terminal portion since the peeling could only occur with the FPC at the terminal portion. That is, Dr. Hatalis' argument on the "more secure connection" is not relevant to whether or not a person of ordinarly skill in the art would be motivated to modify Sukegawa by extending the upper layer metal wiring 7 to the sealant.

For at least these reasons, Dr. Hatalis' "lower resistance" and "more secure connection" arguments in Ex. 1005, at ¶ 99 do not provide a basis to find that a person of ordinary skill in the art in 1997 would have extended the upper wiring 7 of Sukegawa to reach beneath a sealant region.

Next, in Ex. 1005, at ¶ 99, Dr. Hatalis states that the color filter is sealed with the active matrix substrate and points to the gap between the tape carrier package 300 and the color filter substrate 200 in Sukegawa FIG. 3D with an arrow. While the color filter must be sealed somewhere between those two substrates 100 and 200, the assertion that the color filter is "just outside of the connection to the flexible wiring circuit" invites a serious misunderstanding. Ex. 2012, Escuti Decl., at ¶ 117. In fact, the gap which Dr. Hatalis' arrow (above) points to is orders of magnitude larger than the dimensions being discussed. It is on the order of one millimeter, while the thicknesses of the film 10 and the insulating film 31a are typically tens of microns at most.. *Id.*, at ¶ 118.



Moreover, Dr. Hatalis' supposition that the ordinarily skilled artisan would place a sealant exactly touching the left side of silicone rein 13 in Sukegawa FIG. 2C (Ex. 2010) conflicts with the disclosure in Sukegawa. *See* Ex. 2010.

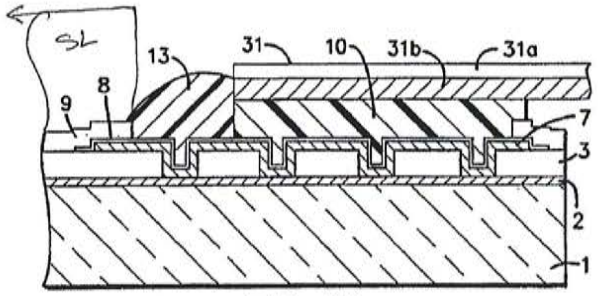


FIG. 2C
PRIOR ART

In addition, Dr. Hatalis relied on the disclosure in Nakamoto when he drew the sealant (SL) in Ex. 2010 on FIG. 2C of Sukegawa during his deposition. (Ex. 2011, Hatalis Dep., at p. 139, l. 1 – p. 143,

l. 2). In determining the position of the sealant, he assumed that the epoxy resin (EPX) in Nakamoto is used for sealant. However, the EPX disclosed in Nakamoto is a material which protects the space between the upper and lower glass substrates outside the seal pattern SL. There is no description in Nakamoto that the EPX is a sealant. Ex. 1004, at ¶127.

If the sealant were to be placed immediately next to the silicone resin 13 in FIG. 2C as Dr. Hatalis drew it on Ex. 2010, there would be (a) a risk of not being able to perform a checking test with a probe since the counter substrate would extend toward the checking terminal area where it would restrict access by the probe, and (b) a risk that the exposed terminal portion where the test probe contacts the transparent conductive film 8 would not be properly covered with silicone resin 13. Ex. 2012, Escuti Decl., at ¶119.

Because it is commonly known that a sealant is formed *inward* of the counter substrate edges, if a counter substrate is formed in the structure drawn in Ex. 2010 by Dr. Hatalis, the edge of the counter substrate will necessarily invade the area where the check probe is applied, i.e., the region below silicone resin 13 (before it is added). That is, the edge of the counter substrate will cover the checking terminal. Sukegawa's checking terminal in the gap permits a measuring probe to check whether the tape-carrier package and the terminal portion are connected electrically as desired. Ex. 1003, at col. 3, ll. 27- 36 and col. 6, ll. 26-38.

Thus, if the sealant were formed immediately next to the silicone resin 13, the counter substrate formed over the sealant will prevent the probe from reaching the checking terminal. Therefore, Dr. Hatalis' hypothetical structure in FIG. 2C as drawn in Ex. 2010 is unworkable, and a person of ordinary skill would reject it. Ex. 2012, Escuti Decl., at ¶ 120.

Moreover, spacers affect the uniformity of the gap between the substrates, and the spacers were commonly included in the sealant at the time of the invention of the '413 patent. The presence of such spacers would prevent the sealant from fully compensating for the unevenness caused by the presence of upper layer metal wiring 7 and transparent conductive film 8 under the sealant. Any uneven height difference in the sealant region where the sealant is provided causes distortion of the counter substrate such as flexing and twisting to make the substrate interval uneven. Ex. 1001, at col. 2, ll. 56-59. Accordingly, one skilled in the art would not form the sealant over the upper layer metal wiring 7 and transparent conductive film 8 are present, but rather form it farther away from the terminal so that the sealant would overlie only the uniform surface of protective insulating film 9. Ex. 2012, Escuti Decl., at ¶ 121.

For the foregoing reasons, the position of the sealant in Ex. 2010 to which Dr. Hatalis testified during the deposition is not correct.

Neither Dr. Hatalis' statements in ¶¶ 98-99 of the declaration nor his

testimony at the deposition provide a basis for extending the upper layer metal wiring 7 of Sukegawa under the sealant. Therefore, the intial decision made by the Board stating that it was obvious to extend the upper layer metal wiring 7 of Sukegawa under the sealant (Dec., at pp. 13-16) is not correct because it is unsupported by the teachings of Sukegawa and it is based on Dr. Hatalis' incorrect statement in the declaration at ¶ 99.

In Ex. 1005, at ¶ 101, Dr. Hatalis asserts that Nakamoto shows placement of an LCD sealant "near close" to the connection to the tape carrier package, that placement of the sealant over first and second wirings that extend outside the sealant, and that only ordinary skill would have been required to configure sealant over first and second wirings. These assertions are incorrect.

Again, while Nakamoto does indeed show that it was known for different, unconnected wirings DTM and GTM to cross under <u>different sections</u> of the sealant, as discussed above at Section V.C.2, Nakomoto nowhere suggests that a double wiring arrangement as recited in the claims of the '413 patent should extend under the sealant at the same place. The claimed structure would not routinely have been located under the sealant, and more than only ordinary skill was required to provide the claimed configuration. Ex. 2012, Escuti Decl., at ¶¶ 124, 125.

Nakamoto FIG. 5 shows that the sealant is separated from the edge of the LCD by the thickness of an epoxy EPX. There is no disclosure in Nakamoto of the precise relationship between the sealant SL and the edge of the substrates. *See Id.*, at ¶ 126.

For these reasons, Dr. Hatalis' assertions in ¶ 101 of his declaration and his deposition testimony do not provide a basis for modifying Sukegawa by extending the upper layer metal wiring 7 away from the terminal portion all the way to under the sealant.

Dr. Hatalis also asserts that placing the sealant in close proximity to the multilayer terminal portion in Sukegawa would conserve space and result in a small system size and reduce parasitic wiring resistance. Ex. 1005, at ¶144.

However, extending the multilayer structure (lower metal wiring 2, insulation film 3, contact holes 6, and upper metal wiring 7) of Sukegawa to the sealant was not contemplated by Nakamoto or Sukegawa. While Nakamoto contemplated running two different, independent wirings beneath orthogonal sections of sealant, it contains no suggestion of running a double wiring structure per the '413 challenged claims beneath the sealant. Ex. 2012, Escuti Decl., at ¶¶ 127, 128.

The problem of the corrosion was addressed above and is another reason why ordinarily skilled artisans would not extend the double wiring arrangement

from the terminal region all the way to the sealant region. *Id.*, at ¶ 130.

Furthermore, as explained in Section IV.A., Sukegawa was addressing corrosion problems resulting from a pin-hole defect in transparent conductive film 8 made of ITO and the inability of ITO to seal against moisture.. Ex. 1003, at col. 1, ll. 28-49 and col. 3, ll. 37-42. Sukegawa's solution was to *remove the upper layer metal wiring 7* at the probe test region 14 (FIG. 3E and FIG. 4B). *Id.*, at col. 6, ll. 9-38, col. 7, ll. 35-57, FIGS. 3E and 4B. Sukegawa actually teaches *not* to extend the upper layer metal wiring 7 to the probe test region 14. Ex. 2012, Escuti Decl., at ¶¶ 131, 132.

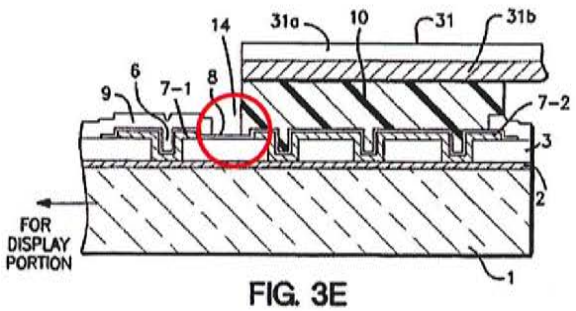


FIG. 3E

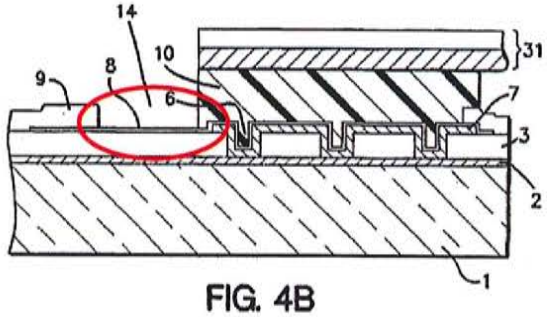


FIG. 4B

For these reasons, the claim elements "a sealant over the first wiring and a second region of the second wiring," (claim elements 1.8, 7.8, 10.8, 17.9, 22.9, 24.9) were not obvious over Sukegawa and Nakamoto.

D. Sukegawa and Nakamoto Fail to Disclose The Claimed Second Wiring Making Direct Contact With the Transparent Conductive Layer Through an Opening in the Second Insulating Film

Independent claims 1, 7, 17, and 22 and dependent claims 15 and 29 recite that "the second wiring and the transparent conductive layer are in direct contact ***through*** an opening in the second insulating film" (claim elements 1.13, 7.13, 17.16, and 22.16 and dependent claims 15 and 29; emphasis added.) In these claims, the second insulating film is formed, and a through-hole opening is made so that a subsequently-formed transparent conductive layer will extend into the opening and make direct contact with the second (upper) wiring. This claimed structure is not disclosed in Sukegawa. Further, this achieves advantages that are completely unrecognized in the prior art, and the claimed structure is nonobvious.

1. Sukegawa Does Not Disclose the Limitation "Contact Through An Opening" In Claim Element 1.13 et al.

The Petition asserts that an area below a horizontal red arrow and between dashed vertical red lines in an annotated FIG. 2C of Sukegawa, (*see* left) corresponds to the "opening" recited in the claims. (*See* Pet., pp. 41 and 42, row 1.13, etc.). As discussed above in Section III, under the broadest definition of "through," as this claim language would be

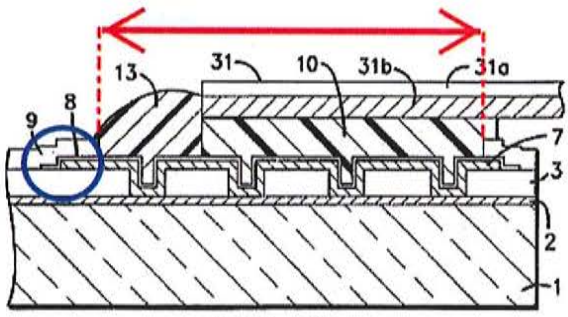


FIG. 2C
PRIOR ART

understood by persons skilled in the art, the opening in protective insulating film 9 does not constitute "contact through an opening" because the opening does not cause or permit transparent conductive film 8 to make direct contact with upper metal wiring 7. Such direct contact would exist regardless of whether protective insulating film 9 exists or not and whether protective insulating film 9 has an opening or not. *See* Ex. 2011, Hatalis Dep., at 60, ll. 12-25 (agreeing the direct contact would exist)[4]; *see also id.*, at p. 92, ll. 10-22 (suggesting that such layers that are already directly in contact would already permit some *subsequent* layer or structure to make contact with the upper one of the directly contacting layers). Thus, the upper layer metal wiring 7 is not connected to the transparent conductive film 8 *because of or by virtue of* an opening in the protective insulating film 9 according to the Board's first meaning of "through."

Contrary to Dr. Hatalis' assertion that Sukegawa discloses "contact through

[4] Sukegawa's entire upper layer metal wiring 7 is covered with the transparent conductive film 8 (*see* Ex. 1003, at col. 3, ll. 21-23) before the addition of insulating film 9 and *ipso facto* before the creation of the opening in film 9. *See* the blue circle added to FIG. 2C above. In that circle, it is plainly seen that transparent conductive film 8 is beneath the protective insulating film 9. Thus, contact between upper layer metal wiring 7 and transparent conductive film 8 is not by virtue of the opening in protective insulating film 9.

an opening" because contact is accessible below an opening, a person of ordinary skill in the art would not understand the phrase "contact through an opening in an insulator film" to mean that the insulator film and the opening therein lie *above* the two layers or structures *already* making contact. Ex. 1005, Hatalis Decl., at ¶¶ 121-123; Ex. 2012, Escuti Decl., at ¶¶ 133, 134. In Sukegawa, the transparent conductive film 8 is in intimate contact with upper layer metal wiring 7 everywhere, including *beneath* the remaining portions of protective insulating film 9. In the '413 patent, however, the contact is *restricted* to where an opening has been made in second insulating film 113. Thus, "contact through an opening" is not shown in Sukegawa FIG. 2C.

Furthermore, in Sukegawa, upper layer metal wiring 7 is protected by double coverage with transparent conductive film 8 and the insulating film 9 or the anisotropic conductive film 10, because the transparent conductive film 8 is not very effective in protecting upper layer metal wiring 7. Sukegawa suggests that in order to ensure transparency, the transparent conductive film 8 cannot be made thick, and this limitation can allow pinholes to be formed in the thin film. These pinholes will allow corrosion to occur on the upper layer metal wiring 7, which is located under the transparent conductive film 8. Ex. 1003, Sukegawa, at col. 1, ll. 39-49. In order to overcome this defect, Sukegawa teaches forming the protective insulation film 9 or the anisotropic conductive film 10 over the transparent

conductive film 8. *Id.*, at col. 6, ll. 9-20. With this double coverage structure, the upper layer meal layer 7 will not be exposed to the external air and will be protected against corrosion, even when the pinholes are formed in the transparent conductive film 8 or moisture penetrates it. *Id.,* at col. 6, ll. 22-26. That is, in Sukegawa, transparent conductive film 8 needs to be formed before and located under the insulating film 9, thereby ensuring sufficient protection against corrosion (oxidation) on the upper layer metal wiring 7. Ex. 2012, Escuti Decl., at ¶¶ 140, 141. As such, it would not have been obvious to form the transparent conductive layer *over* the second insulating film, which the '413 claims require.

In addition, the Board stated that "through-hole connection which satisfy SEL's definition were well-known" (*see* Dec., at 19). However, as described above, the structure in which claimed "transparent conductive layer" and claimed "second wiring" are in direct contact through an opening in the second insulating film is not well-known.

For these reasons, Sukegawa does not disclose "contact through an opening in the second insulating film" in claims 1, 7, 15, 17, 22, and 29.

2. Even Under the Board's Construction, Sukegawa is Deficient

Even using the Board's second interpretation of "through" ("between the vertical limits of the opening"), Sukegawa still fails to disclose the claimed "contact through an opening." In his deposition, Dr. Hatalis marked a copy of

Sukegawa FIG. 1B (Ex. 2009) to show the horizontal and vertical limits of the opening, represented by double headed arrows. (*See* left.) FIG. 1B is the precursor to FIG. 2C. In FIG. 1B, the terminal portion of the LCD is already formed. The upper layer metal wiring 7 and transparent conductive film 8 are already in place, in direct contact with one another. Protective insulating film 9 has already been added, and its opening (delineated by the two double-headed arrows drawn by Dr. Hatalis) has been created. This structure is ready for adding the flexible wiring substrate 31 and, after probe testing, silicone resin 13, which are depicted in FIG. 2C of Sukegawa. No processing steps that occur between FIGS. 1B and 2C redefine the opening in protective insulating film 9.

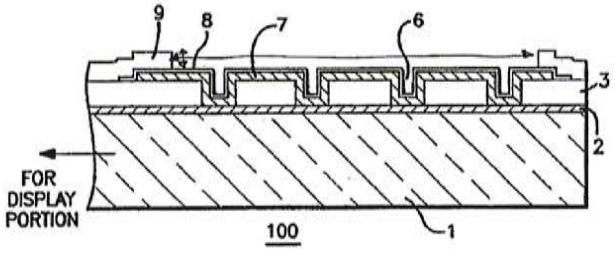


Exhibit 2009 shows that the point of contact between the upper layer metal wiring 7 and transparent conductive film 8 resides ***below*** the vertical limits of the opening in protective insulating film 9. As such, even under the Board's alternate definition, the Petition fails to show direct contact of the transparent conductive layer and the second wiring "through" an opening in the second insulating film, as required by the last element of claim 1 and all other challenged claims.

Furthermore, FIG. 2C of Sukegawa is distinctly different from FIG. 4A of the '413 patent, where the opening in resin inter-layer film 113 (a second

insulating film) allows the ITO layer 114 (a transparent conductive layer) to contact the external connection lines 403 (a second wiring). That is, in the '413 patent, the connection is made *possible by* (or by virtue of) the opening. The connection is because of the opening. Thus, unlike Sukegawa, the claims of the '413 patent disclose that the second wiring is in direct contact with the transparent conductive layer *because of* or *by virtue of* the opening in the second insulating film. Ex. 2012, Escuti Decl., at ¶¶ 142-147.

For these reasons, Sukegawa's FIG. 2C does not disclose the claim limitation "through an opening in the second insulating film," of claim elements 1.13, 7.13, 17.16, and 22.16, and dependent claims 15 and 29.

3. Sukegawa FIG. 3B/3E Are Similarly Deficient

As noted above, the Board (but not the Petitioner) relied on Sukegawa FIG. 3B in instituting this IPR. FIG. 3E is very similar because it simply adds the tape carrier connection (flexible wiring 31) to the structure of FIG. 3B via an anisotropic conductive film 10.

First, Patent Owner objects on the basis that the Petition does not assert FIG. 3B. As an adjudicative body in an *inter partes* proceeding, it is improper for the adjudicator to suggest positions not urged by either party and then adopt them.

Second, even if FIG. 3B or 3E were properly at issue, they are just as deficient as FIGS. 1B and 2C because contact is not made from the transparent

conductive film 8 to the upper layer metal wiring 7 because of or by virtue of the opening 14 in the protective insulating film 9. Ex. 2012, Escuti Decl., at ¶¶ 149-151. Just as with FIG. 2C, the contact would exist without the opening, so the opening cannot be the source of the contact. The contact does not occur because of the opening. *Id.*, at ¶ 152.

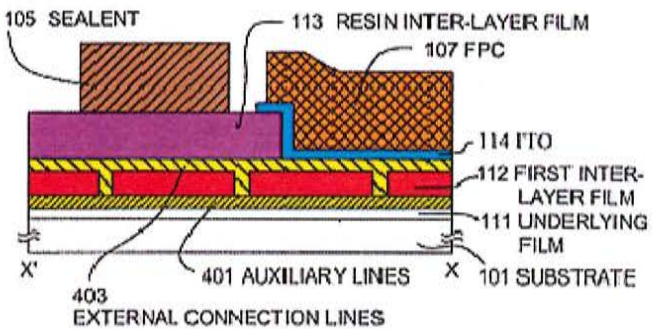
The Board suggests that the contact occurs between vertical limits of the opening. Patent Owner respectfully disagrees.

The opening in FIG. 3B is disjointed in elevation. Where upper layer metal wiring 7 has been removed from the structure, the opening is at a lower elevation. Where upper layer metal wiring 7 still exists, however, the opening in protective insulating film 9 is at a higher elevation. At all times, the opening is above the layer immediately beneath where protective insulating film 9 had been. As such, the interface between transparent conductive film 8 and upper layer metal wiring 7 is still below the vertical limits of the opening. Thus, FIG. 3B of Sukegawa does not disclose the claim limitation "through an opening in the second insulating film," of claim elements 1.13, 7.13, 17.16, and 22.16, and dependent claims 15 and 29.

4. The High Reliability Advantage

In the claimed '413 invention, a connection with high reliability can be achieved because the entire region at the terminal portion where the transparent

conductive layer is formed can be used as the connection area with the FPC. For example, in annotated FIG. 4A of the '413 patent below, because resin inter-layer film 113 (purple) is formed under the ITO film 114 (blue), there will be no layer that blocks the ITO film from connecting with the FPC (orange). Thus, the entire area where the ITO film is formed corresponds to the region where the FPC can be formed. Because the connection will not be blocked by the resin inter-layer film 113, the connection reliability between the ITO film and the FPC will increase. This advantage is achieved by the following claim limitations: "wherein the second wiring and the transparent conductive layer are in direct contact through an opening in the second insulating film" (claim elements 1.13, 7.13, 17.16, and 22.16 and dependent claims 15 and 29). Ex. 2012, Escuti Decl., at ¶¶ 40, 137.



5. The Protected Transparent Conductive Film Advantage

In addition, because no other layer will be formed over the transparent conductive layer (*e.g.*, ITO layer 114), the transparent conductive layer will not be damaged (*e.g.*, the properties of the film changed or the layer thinned by overetching a layer over it) due to the deposition or etching process of any

subsequent layer, which, may occur when Sukegawa's protective insulating film 9 is deposited over transparent conductive layer 8 and etched. Therefore, according to the claimed invention, a reliable connection with the FPC can be achieved. *Id.*, at ¶¶ 41, 138.

6. Sukegawa Does Not Achieve These Advantages

In Sukegawa, on the other hand, transparent conductive film 8 is formed under the protective insulation film 9 (the second insulating film). As shown in annotated FIG. 3A of Sukegawa below, the red area shows the opening in insulation film 9 (the blue area is the transparent conductive film 8). The portion where tape-carrier package 300 (flexible printed circuit) can make contact with the transparent conductive film 8 through the opening (red area in the figure below) is small compared to the case where the transparent conductive layer is formed over insulation film 9.

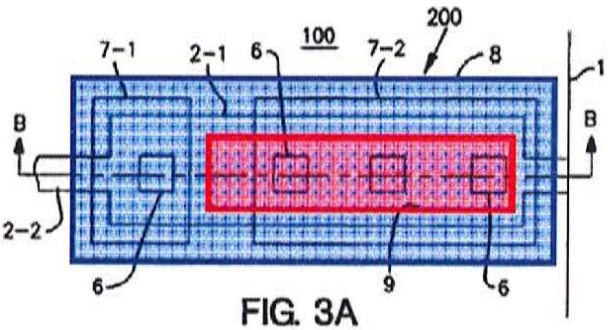


FIG. 3A

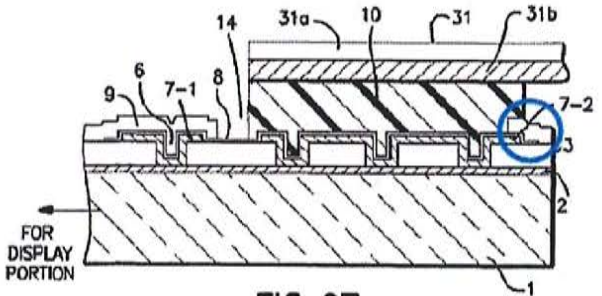


FIG. 3E

That is, because Sukegawa's protective insulation film 9 is formed over the transparent conductive film 8, the area where the tape-carrier package 300 can actually connect with the transparent conductive film 8 is more limited than it

would be if the transparent conductive film 8 were formed over the protective insulation film 9. Ex. 2012, Escuti Decl., at ¶ 139. In addition, annotated FIG. 3E above shows that the connection is not made between the transparent conductive film 8 and tape-carrier package 300 in the blue circle due to the protective insulation film 9 formed therebetween. From FIGS. 3A and 3E of Sukegawa, it is apparent that the area where the transparent conductive film 8 can be connected with the tape-carrier package 300 is reduced by the presence of the overlying protective insulation film 9. *Id.*, at ¶¶ 140, 141.

In addition, to form a structure in which protective insulation film 9 is formed over the transparent conductive film 8 may cause damage to the transparent conductive film 8 during the deposition and etching of the protective insulation film 9. *Id.*, at ¶ 138.

For the foregoing reasons, the structure in Sukegawa cannot achieve the advantageous effects of the '413 patent of increased connection area and a more reliable connection between the transparent conductive film and the FPC achieved by the following claim limitation: "through an opening in the second insulating film" specified in claim element 1.13 and similar claim elements (7.13, 15, 17.16, 22.16, and 29).

7. Sukegawa Combined With Nakamoto Do Not Meet the Limitation "Contact Through An Opening" In Claim Element 1.13 et al.

Further, it is undisputed that Nakamoto also does not disclose claim elements 1.13, 7.13, 15, 17.16, 22.16, and 29. Nakamoto discloses only that a terminal portion consists of silicon oxide SIO formed on the substrate SUB 1, conductive film g1 formed on the SIO, ITO d1 formed on the conductive film g1, and protective film PSV1 formed over the ITO d1. *See, e.g.*, Ex. 1004, Nakamoto, at FIG. 9. Ex. 2012, Escuti Decl., at ¶ 123.

Accordingly, Nakamoto cannot cure the failures of Sukegawa. Therefore, Sukegawa with Nakamoto fail to disclose claim elements 1.13, 7.13, 15, 17.16, 22.16, and 29.

E. Reconnecting After "Peel-Off" Does Not Suggest the Claimed Element

The Board cited the "peel-off" provisions of Sukegawa for the disclosure of the claimed "contact through an opening . . . in the second insulating film." Dec. at 19-20. In response to the Patent Owner's argument in the Preliminary Response that the remanufacturing contemplated by the Decision is technically impossible, the Board stated in its Rehearing Decision that "at this preliminary stage, the record does not support Patent Owner's characterization of a deposition or etching apparatus" and "SEL also does not contend that forming metal contact layers other than by 'deposition or etching' would have been impossible or unobvious" *See*

Reh. Dec. at 5, ll. 10-11 and ll. 14-15. Patent Owner now submits evidence in support of its explanation and respectfully submits that the "peel-off" provisions of Sukegawa fail to demonstrate that Sukegawa discloses the claimed "contact through an opening."

The Board noted that in Sukegawa, in some test and fault situations, the FPC 300 is peeled away from the active matrix substrate 100, and the "transparent conductive layer 8 along with upper layer metal wiring 7-2 may also be peeled off ***together*** sometimes from the active matrix substrate 100." *Id.*, at col 6, ll. 39-48 (emphasis added); Dec., at 19-20. The Board also noted that Sukegawa states that the FPC can be reconnected to the substrate, without giving the details of how this occurs. *Id.* at 19. The Board suggested that skilled artisans would have recognized that "new terminal contact wiring 7 and transparent conductive layer 8 sections could have been provided through the pre-existing opening in the [protective insulating film 9] in order to replace the peeled off wiring 7 and film 8...." *Id.* However, the reconnecting after peeling off does not relate to creating a new upper layer metal wiring 7 and transparent conductive film 8 on the substrate. Instead it relates to using a new anisotropic conductive film (ACF) 10. Ex. 2012, Escuti Decl., at ¶¶ 153-160.; Ex. 1003, Sukegawa, at col. 6, l.39, *et seq.*

In its Rehearing Decision (at 5), the Board stated that SEL does not contend that forming metal contact layers other than by 'deposition or etching' would have

been impossible or unobvious. However, we note that Sukegawa does not describe or contemplate wiring 7 and film 8 being separated from one another. Rather, wiring 7 and film 8 are either both separated from ACF 10 or they both are separated from the substrate 100. In any case, the only repair disclosed in Sukegawa is that "the copper foil wirings 31*b* of the tape carrier package 300 and the transparent conductive film 8 ... are connected again by a new anisotropic conductive film 10 upon [a] repairing operation," *See Id.* at col. 6, ll. 52-56; Ex. 2012, Escuti Decl., at ¶ 160. There is no disclosure of repairing or replacing wiring 7 and film 8. *See id,.* at col. 6, l. 39 – col. 7, l. 15; Ex. 2012, Escuti Decl., at ¶ 164b.

Because wiring 7 and film 8 are below insulating film 9, it is not possible for them to connect "through the opening" in insulating film 9 during the repair process where "through the opening" means "because of the opening." Nor would it be possible for wiring 7 and film 8 to pass through the opening in film 9 during the repair process from above film 9 to beneath film 9, because film 9 partially overlies wiring 7 and film 8. Instead, wiring 7, transparent conductive film 8 and insulating film 9 would have to be re-deposited (in that order) on substrate 100. As discussed below, that would not have been feasible at the time of the invention and there is no suggestion of this in Sukegawa.. Ex. 2012, Escuti Decl., at ¶ 164.

Dr. Hatalis noted during his deposition that various apparatuses for

deposition, evaporation, sputtering, and chemical vapor deposition (CVD) are typically used. In addition, he referred to apparatus for laser-assisted deposition and for screen printing during his deposition (*see* Ex. 2011, at p. 111, l. 20 – p. 112, l. 10). With respect to etching, wet etching apparatus and dry etching apparatus are typically used. Along with these apparatuses, Dr. Hatalis referred to laser ablation removing apparatus and ion beam etching apparatus during his deposition (*Id.*, at p. 115, l. 24 – p. 117, l. 3). However, materials discussing these apparatuses, reveal that only a *single* substrate is placed into each apparatus. Ex. 2012, Escuti Decl., at ¶ 161. One of ordinary skill in the art, at the time of the invention (and today), would not place a completed LCD panel (*i.e.*, the panel comprising the TFT array substrate and the counter substrate which are bonded together) into the apparatus.[5] *See id.*, at ¶ 162-168.

[5] Exhibits 2013 and 2014 are from the websites of LCD manufacturers LG Display and CPT. Both show a typical TFT manufacturing process. Exhibit 2015 is from the website of ShinMaywa, an evaporator apparatus manufacturer, and shows an evaporation method in Chart A where the object is a single substrate. Exhibit 2016 is from the website of Pascal, a laser deposition apparatus manufacturer. Exhibit 2017 is from the website of MicroTec, a screen printing apparatus manufacturer. This material describes screen printing; a single substrate is shown in the figures. Exhibit 2018 is from the website of ULVAC, a laser etching

That is, a person of ordinary skill would not understand Sukegawa to be disclosing that the upper layer metal wiring 7 and the transparent conductive film 8 are re-deposited because that would require high temperatures and low pressures that damages the device and negate the primary value of Sukegawa's invention and explicit embodiments. *See id.*, at ¶¶ 162-167.

One of ordinary skill in the art, as supported by the literature on the deposition and etching processes enumerated above, would find it generally impossible to take an already-manufactured LCD panel and re-introduce it into a deposition apparatus for a new metal wiring layer to be added, then patterned, and then etched to form new upper layer metal wiring 7. Part of Sukegawa's upper layer metal wiring 7 lies beneath the protective insulating film 9. Sukegawa does not teach adding new upper layer metal wiring 7 after protective insulating film 9 has been deposited and etched, after the LCD has been sealed, and after first

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apparatus manufacturer. Exhibit 2019 is from the website of MicroFab, one of the ion beam etching apparatus manufacturers. Exhibit 2020 comprises materials from the website of SIJ, an inkjet apparatus manufacturer. Exhibit 2021 is an article that further shows that it would be technically impossible to place an LCD panel into a deposition or etching apparatus again after the LCD is completed. *See generally* Ex. 2012, Escuti Decl., at ¶¶ 164-168.

attempts at connecting the flexible wiring substrate 31 have failed. This is impossible. *Id.*, at ¶ 167.

What Sukegawa does teach, instead, is that a new anisotropic conductive film 10 can be added. *Id.*, at ¶ 168. Thus, persons skilled in the art in 1997 would not have remanufactured either the upper layer metal wiring 7 or transparent conductive film 8 after a "peeling off." *Id.* Therefore, Sukegawa does not disclose or suggest the claimed "contract through an opening" of claimed elements 1.13, 7.13, 15, 17.16, 22.16, and 29.

VI. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board find claims 1, 2, 4-7, 9-11, 13-18, 20-22, 24, 25, and 27-29 of the '413 patent patentable in view of the Sukegawa with Nakamoto.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that the foregoing PATENT OWNER RESPONSE TO PETITION UNDER 37 C.F.R. §42.120 and each of Exhibits 2008 to 2023 was served on the Petitioner by electronic mail on July 24, 2013.

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