Apple Inc. v. Samsung Electronics Co. Ltd. et al Doc. 1013 Att. 3

Exhibit 1

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA, SAN JOSE DIVISION

APPLE INC., a California corporation, Plaintiff, vs. SAMSUNG ELECTRONICS CO., LTD., a Korean business entity; SAMSUNG ELECTRONICS AMERICA, INC., a New York corporation; SAMSUNG TELECOMMUNICATIONS AMERICA, LLC, a Delaware limited liability company, Defendants.	CASE NO. 11-cv-01846-LHK **SAMSUNG'S PATENT LOCAL RULE 3-3 AND 3-4 DISCLOSURES**

- “means for fading out an image of the first window”
- “means for determining a position on a display of the digital processing system independent of a position of a cursor on the display”
- “means for restarting the timer in response to receiving a second input for the first window”
- “means for displaying a first window, the first window being translucent”
- “means for closing the first window without user input”
- “means for determining whether or not a condition is met”

These claim terms/phrases as apparently construed by Apple violate the written description, enablement, and/or definiteness requirements of 35 U.S.C. § 112.

Based on Samsung's present understanding of Plaintiff’s infringement contentions, at least one or more of these claim terms/phrases are indefinite because they are inconsistent with and broader than the alleged invention disclosed in the specification and given Plaintiff’s apparent constructions of the claims, any person of ordinary skill in the art at the time of the invention would not understand what is claimed, even when the claims are read in light of the specification. Moreover, based on Samsung's present understanding of Plaintiff’s infringement contentions, each of the asserted claims in which these claim terms/phrases appear lack written description because the specification of the ’891 Patent demonstrates that the patentee neither conceived of nor demonstrated possession of all that Apple now contends the claims cover. In addition, based on Samsung's present understanding of Plaintiff’s infringement contentions, each of the asserted claims in which these claim terms/phrases appear are invalid because the specification fails to provide sufficient disclosure to enable any person of ordinary skill in the art to which it pertains, or with which it is most nearly connected, to implement the invention without undue experimentation. Therefore, the claims fail to satisfy the requirements of § 112 ¶¶ 1 and 2.

VI. THE ’607 PATENT

A. Local Patent Rule 3-3(a): Identification of Prior Art

At this time, Samsung contends that at least the following prior art references anticipate or render obvious, either alone or in combination, the asserted claims of the ’607 Patent:

1. **Patent References**[16]

Chart No(s).	Country of Origin	Patent Number	Date of Issue	Priority Date
P-1	US	7,372,455	4/13/2008	2/10/2003
P-2	US	6,790,160	11/19/2005	12/19/2002
P-3	US	4,686,332	8/11/1987	6/26/1986
P-4	US	7,218,314	5/15/2007	6/7/2001
P-5	JP	2002-342033	11/29/2001	5/21/2001
P-6	US	5,920,309	7/6/1999	1/4/1996
P-7	US	5,543,588	8/6/1996	12/3/1993
P-8	US	2003/0069653	4/10/2003	10/9/2001

2. **Publications**[17]

Chart No(s).	Title	Date of Publication	Author	Publisher
P-9	"Integration of a Clear Capacitive Touch Screen with a 1/8-VGA FSTN-LCD To Form and LCD-Based TouchPad"	5/21/2002	A.K Leeper (Synaptics Inc.)	Society for Information Display
P-10	"Smartskin: An Infrastructure for Freehand Manipulation on Interactive Surfaces"	2001	Jun Rekimoto	Association for Computing Machinery
P-11	"DiamondTouch: A Multi-User Touch Technology"	2001	Paul Dietz and Darren Leigh	Association for Computing Machinery

3. **Systems**

All versions of the following prior art systems commercially sold, publicly known or used before the priority date of the '607 Patent, including documents and source code describing the same:

Chart No(s).	System	Date Offered	Offering Entity
P-7	Synaptics clearPad (cPad)	April 2001	Synaptics Incorporated
P-10	Sony Smartskin	2002	Sony Corp.
P-11	MERL DiamondTouch	2002	Mitsubishi Electric
P-8	Quantum Research Group QT603xx sensor	2002	Quantum Research Group

Additional prior art that has not been charted, but is still relevant to the invalidity of the '607 Patent is listed in Exhibit Q. Samsung reserves the right to amend these invalidity

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[16] Samsung incorporates by reference all prior art references cited in the patents listed herein and/or their file histories.

[17] Samsung incorporates by reference all prior art references identified in the publications listed herein.

contentions to assert these references depending on the claim construction and infringement positions Apple may take as the case proceeds. Moreover, Samsung reserves the right to use these references in combination with other references to render the claims of the ’607 Patent obvious in the event Apple takes the position that certain claim limitations are missing from the references charted in Exhibits P and R.

B. Local Patent Rule 3-3(b): Whether Each Item Anticipates or Renders Obvious the Asserted Claims

Plaintiff asserts claims 1-3, 6-8, and 10-11 of the ’607 Patent against Samsung in this lawsuit. All of those claims are invalid because the ’607 Patent fails to meet one or more of the requirements for patentability. The individual bases for invalidity are provided below and in the claim charts attached as Exhibits P and R. Each of the foregoing listed prior art documents, the underlying work, and/or the underlying apparatus or method qualifies as prior art under one or more sections of 35 U.S.C. § 102 and/or 35 U.S.C. § 103.

Although Samsung has identified at least one citation per limitation for each reference, each and every disclosure of the same limitation in the same reference is not necessarily identified. Rather, in an effort to focus the issues, Samsung has cited representative portions of identified references, even where a reference may contain additional support for a particular claim element. In addition, persons of ordinary skill in the art generally read a prior art reference as a whole and in the context of other publications and literature. Thus, to understand and interpret any specific statement or disclosure within a prior art reference, such persons would rely on other information within the reference, along with other publications and their general scientific knowledge. Samsung may rely upon uncited portions of the prior art references and on other publications and expert testimony to provide context, and as aids to understanding and interpreting the portions that are cited. Samsung may also rely on uncited portions of the prior art references, other disclosed publications, and the testimony of experts to establish that a person of ordinary skill in the art would have been motivated to modify or combine certain of the cited references so as to render the claims obvious.

4. **Anticipation**

Some or all of the asserted claims of the ’607 Patent are invalid as anticipated under 35 U.S.C. § 102 in view of each of the prior art references identified above and in the claim charts included in Exhibit P, which identify specific examples of where each limitation of the asserted claims is found in the prior art references. As explained above, the cited portions of prior art references identified in the attached claim charts are exemplary only and representative of the content and teaching of the prior art references, and should be understood in the context of the reference as a whole and as they would be understood by a person of ordinary skill in the art.

5. **Obviousness**

To the extent any limitation is deemed not to be exactly met by an item of prior art listed above and in Exhibit P, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. The item of prior art would, therefore, render the relevant claims invalid for obviousness under 35 U.S.C. § 103(a).

In addition, the references identified above render one or more asserted claims of the ’607 Patent obvious when the references are read in combination with each other, and/or when read in view of the state of the art and knowledge of those skilled in the art. Each and every reference identified is also relevant to the state of the art at the time of the alleged invention. Any of the references disclosed above may be combined to render obvious (and therefore invalid) each of Plaintiff’s asserted claims. Samsung may rely upon a subset of the above identified references or all of the references identified above, including all references in Exhibits P, Q, and R, for purposes of obviousness depending on the Court's claim construction, positions taken by Apple during this litigation, and further investigation and discovery.

Moreover, to the extent the foregoing references are found not to anticipate the asserted claims, the foregoing references render the asserted claims obvious either alone or in combination with one or more of the other references identified above pursuant to P.R. 3-3(a). As explained herein and/or in the accompanying charts, it would have been obvious to a person of skill in the art at the time of the alleged invention of the asserted claims of the ’607 Patent to combine the various references cited herein so as to practice the asserted claims of the ’607 Patent.

In accordance with P.R. 3-3(b), prior art references rendering the asserted claims obvious, alone or in combination with other references, are outlined below and included in Exhibits P and R, which includes exemplary claim charts for the asserted claims of the ’607 Patent showing specifically where in each reference or combinations of references each asserted claim is found, and an explanation of why the prior art renders the asserted claim obvious. Where applicable, the charts in Exhibit P and R include the motivation to combine references.

In particular, Samsung contends that the asserted claims of the ’607 Patent would have been obvious in view of the prior art references identified above. For example, Exhibit R includes exemplary claim charts that describe how the asserted claims of the ’607 Patent would have been obvious in view of the following references alone or in combination:

- All references identified in Exhibit P, if found not to anticipate the claims of the ’607 Patent, render the claims of the ’607 Patent obvious alone;
- Exhibit R-1: Philipp U.S. Patent No. 6,452,5154 in view of Caldwell et al. U.S. Patent No. 5,572,205
- Exhibit R-2: Gerpheide et al. U.S. Patent No. 5,565,658 in view of Gerpheide U.S. Patent No. 5,305,017

In addition to the specific combinations of prior art and the specific combinations of groups of prior art disclosed, Samsung reserves the right to rely on any other combination of any prior art references disclosed herein. Samsung further reserves the right to rely upon combinations disclosed within the prosecution history of the references cited herein. These obviousness combinations reflect Samsung’s present understanding of the potential scope of the claims that Plaintiff appears to be advocating and should not be seen as Samsung’s acquiescence to Plaintiff's interpretation of the patent claims.

Samsung also reserves the right to amend or supplement these contentions regarding anticipation or obviousness of the asserted claims, in view of further information from Plaintiff, information discovered during discovery, or a claim construction ruling by the Court. Plaintiff has not identified what elements or combinations it alleges were not known to one of ordinary skill in the art at the time. Therefore, for any claim limitation that Plaintiff alleges is not disclosed in a particular prior art reference, Samsung reserves the right to assert that any such limitation is either inherent in the disclosed reference or obvious to one of ordinary skill in the art at the time in light of the same, or that the limitation is disclosed in another of the references disclosed above and in combination would have rendered the asserted claim obvious.

C. Local Patent Rule 3-3(c): Charts Identifying where Specifically in each Alleged item of Prior Art each Asserted Claim is Found

Pursuant to Local Patent Rule 3-3(c), charts identifying where specifically in each alleged item of prior art each limitation of each asserted claim is found, including for each limitation that Apple contends is governed by 35 U.S.C. § 112(6), the identity of the structure(s), act(s), or material(s) in each item of prior art that performs the claimed function is attached in Exhibits P and R.

D. Local Patent Rule 3-3(d): Other Grounds for Invalidity

Samsung identifies the following grounds for invalidity of the asserted claims of the ’607 Patent based on 35 U.S.C. §§ 101 and/or 112. Samsung reserves the right to supplement these disclosures based on further investigation and discovery.

1. Invalidity Based on Enablement or Written Description Under 35 U.S.C. § 112(1) and/or Indefiniteness Under 35 U.S.C. § 112(2)

Based on Samsung's present understanding of Plaintiff’s infringement contentions, Samsung asserts that claims 1-3, 6-8, 10, and 11 of the ’607 Patent are invalid for reciting at least the following claim terms/phrases:

- “configured to detect multiple touches or near touches that occur at a same time and at distinct locations”
- “produce distinct signals”

- “detect changes in charge coupling between the first conductive lines and the second conductive lines”
- “substantially parallel”
- “substantially perpendicular”
- “pixilated image”
- “recognizing multiple touch events that occur at different locations on the touch panel at a same time”
- “dummy features”

These claim terms/phrases as apparently construed by Apple violate the written description, enablement, and/or definiteness requirements of 35 U.S.C. § 112.

Based on Samsung's present understanding of Plaintiff’s infringement contentions, at least one or more of these claim terms/phrases are indefinite because they are inconsistent with and broader than the alleged invention disclosed in the specification and given Plaintiff’s apparent constructions of the claims, any person of ordinary skill in the art at the time of the invention would not understand what is claimed, even when the claims are read in light of the specification. Moreover, based on Samsung's present understanding of Plaintiff’s infringement contentions, each of the asserted claims in which these claim terms/phrases appear lack written description because the specification of the ’607 Patent demonstrates that the patentee neither conceived of nor demonstrated possession of all that Apple now contends the claims cover. In addition, based on Samsung's present understanding of Plaintiff’s infringement contentions, each of the asserted claims in which these claim terms/phrases appear are invalid because the specification fails to provide sufficient disclosure to enable any person of ordinary skill in the art to which it pertains, or with which it is most nearly connected, to implement the invention without undue experimentation. Therefore, the claims fail to satisfy the requirements of § 112 ¶¶ 1 and 2.

DATED: October 7, 2011

QUINN EMANUEL URQUHART & SULLIVAN, LLP

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CERTIFICATE OF SERVICE

I hereby certify that on October 7, 2011, I caused **SAMSUNG'S PATENT LOCAL RULE 3-3 AND 3-4 DISCLOSURES** to be electronically served on the following via email:

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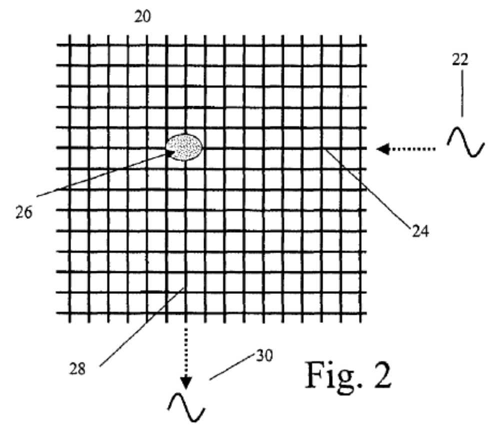
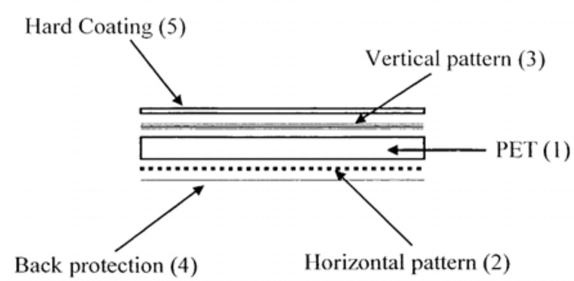
I declare under penalty of perjury that the foregoing is true and correct. Executed in Redwood Shores, California on October 7, 2011.

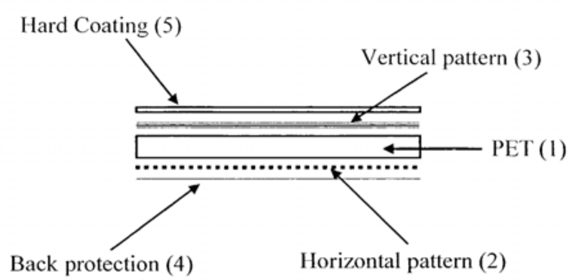
/s/ Mark Tung

EXHIBIT P-1
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 7,372,455 ("PERSKI '455")

U.S. Patent No. 7,663,607	Perski '455[1]
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Perski '455 discloses a touch panel (e.g., two-dimensional sensor matrix 20 in Figure 2) comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches (e.g., with finger 26 in Figure 2) that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals (e.g., output signal 30 in Figure 2) representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  Fig. 2 Perski '455 states: "A two-dimensional sensor matrix 20 lies in a transparent layer over an electronic display device. An electric signal 22 is applied to a first conductor line 24 in the two-dimensional sensor matrix 20. At each junction between two conductors a certain minimal amount of capacitance exists. A finger 26 touches the sensor 20 at a certain position

[1] Perski '455 expressly incorporates by reference U.S. Prov. Pat. App. No. 60/406,662 ("the '662 App."). Because the disclosure of the '662 App. was expressly incorporated by reference in Perski '455, both the '662 App. and Perski '455 will be treated as a single invalidating reference for purposes of this analysis. *See Advanced Display Sys. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000).

U.S. Patent No. 7,663,607	Perski ’455[1]
	and increases the capacitance between the first conductor line 24 and the orthogonal conductor line 28 which happens to be at or closest to the touch position. As the signal is AC, the signal crosses by virtue of the capacitance of the finger 26 from the first conductor line 24 to the orthogonal conductor 28, and an output signal 30 may be detected.” Perski ’455 at 13:32-43. Perski ’455 also states: “Preferably, the sensor is substantially transparent and suitable for location over a display screen. Preferably, the detection region is the surface of a display screen and wherein the sensor including the at least one conductive element is substantially transparent.” Id. at 3:39-3:43. The sensing medium disclosed in Perski ’455 is configured to detect multiple touches or near touches that occur at a same time. Perski ’455 states: “The goal of the finger detection algorithm, in this method, is to recognize all the sensor matrix junctions that transfer signals due to external finger touch. It should be noted that this algorithm is preferably able to detect more than one finger touch at the same time.” Id. at 14:15-19.1
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Perski ’455 teaches a transparent capacitive sensing medium (e.g., two-dimensional sensor matrix 20 in Figure 2) comprising a first layer having a plurality of transparent first conductive lines (e.g., vertical pattern/conductors 3 in Figure 3 of the ’662 App.) that are electrically isolated from one another. 

U.S. Patent No. 7,663,607	Perski ’455[1]
	The ’662 App. states: “the sensor is a grid of conductive lines made of conductive polymers patterned on a PET foil. The grid is made of two layers, which are electrically separated from each other. One of the layers contains a set of parallel conductors. The other layer contains a set of parallel conductors orthogonal to the set of the first layer.” ’662 App. at 4. “It is a general object of the present invention to enable as higher transparency as possible, and therefore in a preferred embodiment only one foil is used. Figure number 3 described a one-foil configuration in which a Polyester foil (1) patterned on its lower size with horizontal conductors (2) and on its upper side with vertical conductors (3). The upper side is covered by protection layer (5) to avoid integration or shipping damage. It should be noted that the present invention could be implemented in additional combinations, such as using two foils.” ’662 App. at 6. “In a preferred embodiment, the conductors are straight lines having 1 mm width, equally spaced in 4 mm intervals. In different embodiments different patterns could be used. Larger interval between the lines could be selected in order to reduce the total number of conductors and therefore to reduce the electronic and the price of the system. Smaller intervals could be selected to get higher resolution. Wider line width could be selected in order to reduce the resistance of a conductive line.” Id. at 5.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Perski ’455 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., horizontal pattern/conductors 2 in Figure 3 of the ’662 App.) that are electrically isolated from one another. 

U.S. Patent No. 7,663,607	Perski ’455[1]
	See **[1A]** and **[1B]**.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Perski ’455 teaches the second conductive lines (e.g., horizontal pattern/conductors 2 in Figure 3 of the ’662 App.) being positioned transverse to the first conductive lines (e.g., vertical conductors 3 in Figure 3 of the ’662 App.). See **[1A]** and **[1B]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Perski ’455 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., “detection circuitry”). See **[1A]** and **[1B]**. Perski ’455 states: “The detector may comprise a plurality of conductive elements and the detection circuitry may comprise a differential detector arrangement associated with the sensing conductors for detecting differences between outputs of the conductors.” Id. at 3:44-49. The ’622 App. states: “the sensor is surrounded with a non-transparent frame build of a PCB or flexible circuit. The frame hose the front-end analog components, the conductors from the grid to the front-end, the conductors from the front-end to the digital sections and the excitation coil. In additional embodiments, however, the front-end components could [be] mounted directly on the transparent foil. In this case conductors to/from the front-end could be implemented either by patterning the transparent conductive material or by printing of different material, such as silver on the foil.” Id. at 6. Perski ’455 states: “In FIG. 1A a sensor 2 comprises at least one electrical conductor 4. In the typical case there is more than one conductor, and the conductors are set in an arrangement or pattern over the sensor, most often as a grid which extends over a surface such as an electronic screen for which touch sensing is required. A detector 6 picks up the output from the conductors. An oscillator 8 provides oscillations or [AC] energy to the system comprising the sensor and detector. In one embodiment, the system is not initially

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	[AC] coupled. However a conductive object, including body parts such as fingers are capacitive and therefore touch by a finger or the like completes the [AC] coupling within the system and allows the touch to be sensed. Alternatively a touch by the finger may provide an [AC] short circuit to ground for a given conductor, again allowing the touch to be sensed." Id. at 9:19-33.  Fig. 1A
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Perski '455 teaches that the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1A]** and **[1E]**.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Perski '455 teaches the touch panel as recited in claim 1 wherein the conductive lines (e.g., of two-dimensional sensor matrix 20 in Figure 2) on each of the layers are substantially parallel to one another. See **1[A]** and **1[B]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Perski '455 teaches the touch panel as recited in claim 2 wherein the conductive lines (e.g., of two-dimensional sensor matrix 20 in Figure 2) on different layers are substantially perpendicular to one another. See **1[A]** and **1[B]**.
[6] The touch panel as recited in claim	Perski '455 teaches the touch panel as recited in claim 1 wherein the conductive lines (e.g.,

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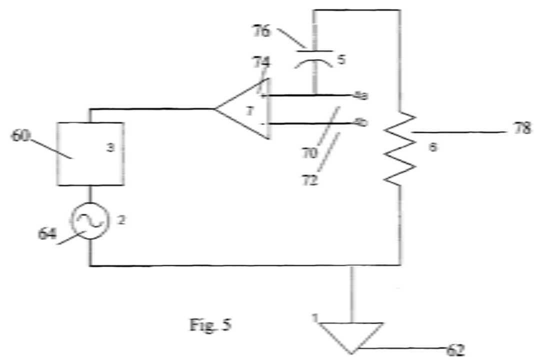
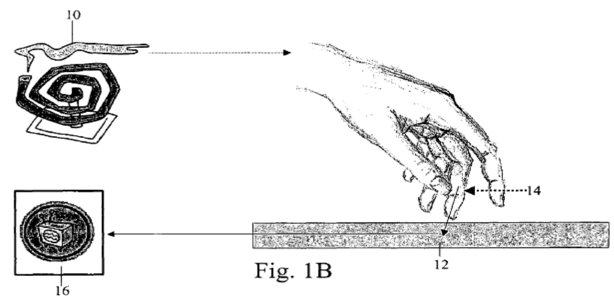
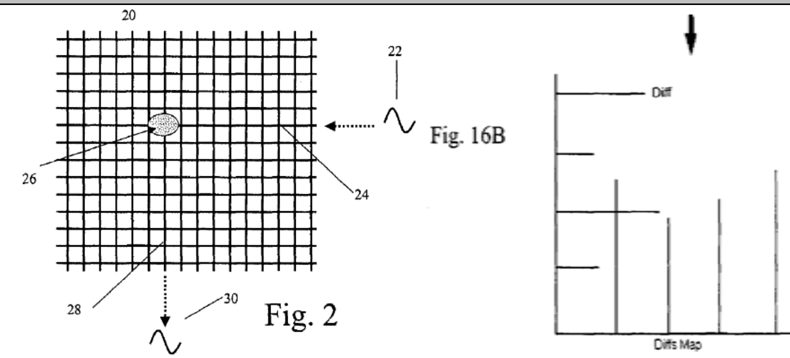
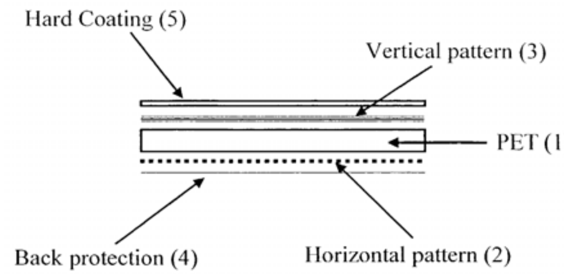
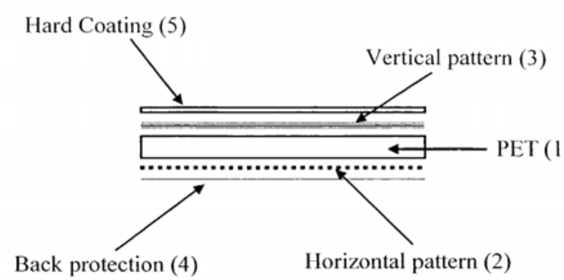
1 wherein the conductive lines are formed from indium tin oxide (ITO).	of two-dimensional sensor matrix 20 in Figure 2) are formed from indium tin oxide (ITO). The ’662 App. states: “In a preferred embodiment, the sensor is patterned with organic conductive material on a PET foil. Organic conductive materials are basically more flexible, easier to handle and enable lower visual difference between conductive and non-conductive areas. However, in different embodiments the present invention could be implemented on other transparent conductive materials such as ITO.” ’662 App. at 5.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Perski ’455 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium lines (e.g., of two-dimensional sensor matrix 20 in Figure 2) is a mutual capacitance sensing medium. See **[1A]**. Perski ’455 states: “A number of procedures for detection are possible. The most simple and direct approach is to provide a signal to each one of the matrix lines in one of the matrix axes, one line at a time, and to read the signal in turn at each one of the matrix lines on the orthogonal axis. The signal, in such a case, can be a simple cosine pattern at any frequency within the range of the sampling hardware and detection algorithms. If a significant output signal is detected, it means that there is a finger touching a junction. The junction that is being touched is the one connecting the conductor that is currently being energized with an input signal and the conductor at which the output signal is detected. The disadvantage of such a direct detection method is that it requires an order of n*m steps, where n stands for the number of vertical lines and m for the number of horizontal lines. In fact, because it is typically necessary to repeat the procedure for the second axis so the number of steps is more typically 2*n*m steps. However, this method enables the detection of multiple finger touches. When an output signal is detected on more then one conductor that means more than one finger touch is present. The junctions that are being touched are the ones connecting the conductor that is currently being energized and the conductors which exhibit an output signal.” “A faster approach is to apply the signal to a group of conductors on one axis. A group can comprise any subset including all of the conductors in that axis, and look for a signal at each

U.S. Patent No. 7,663,607	Perski '455[1]
	one of the conductors on the other axis. Subsequently, an input signal is applied to a group of lines on the second axis, and outputs are sought at each one of the conductors on the first axis. The method requires a maximum of n+m steps, and in the case in which the groups are the entire axis then the number of steps is two. However, this method may lead to ambiguity on those rare occasions when multiple touches occur simultaneously at specific combinations of locations, and the larger the groups the greater is the scope for ambiguity." "An optimal approach is to combine the above methods, starting with the faster method and switching to the direct approach upon detection of a possible ambiguity." Id. at 14:20-59.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Perski '455 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., differential amplifier 74) coupled to the touch panel for detecting the touches on the touch panel.  Fig. 5 Perski '455 states: "In FIG. 5, oscillator 64 is connected between ground 62 and detector 60. The oscillator 64 oscillates the detector 60 and the detector front end, which includes two sensor conductors 70 and 72. The two conductors are connected to the two differential inputs respectively of differential amplifier 74. As explained above, all oscillations are in reference to the common ground 62. The touch by the user's finger of a sensor conductor, say 70 creates capacitance 76. As there is a potential between conductor 70 and the user, current passes from conductor 70 through the finger to ground. Impedance 78 indicates the impedance of the finger. Consequently a potential difference is created between conductors 70 and 72. Preferably, the separation between the two conductors 70 and 72 which are

U.S. Patent No. 7,663,607	Perski ’455[1]
	connected to the same differential amplifier 74 is greater than the width of a finger so that the necessary potential difference can be formed. The differential amplifier 74 amplifies the potential difference, and the detector 60 processes the amplified signal and thereby determines the location of the user’s finger. It should be noted that in alternative embodiments the sensor may be connected to a standard amplifier rather than to a differential amplifier.” Id. at 15:44-65.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Perski ’455 teaches a display arrangement (e.g., including sensor 12) comprising a display having a screen for displaying a graphical user interface.  Fig. 1B Perski ’455 states: “Preferably, the sensor is substantially transparent and suitable for location over a display screen. Preferably, the detection region is the surface of a display screen and wherein the sensor including the at least one conductive element is substantially transparent.” Id. at 3:39-44.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Perski ’455 teaches a transparent touch panel (e.g., including two-dimensional sensor matrix 20 in Figure 2) allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image (e.g., differential map of Figure 16B).

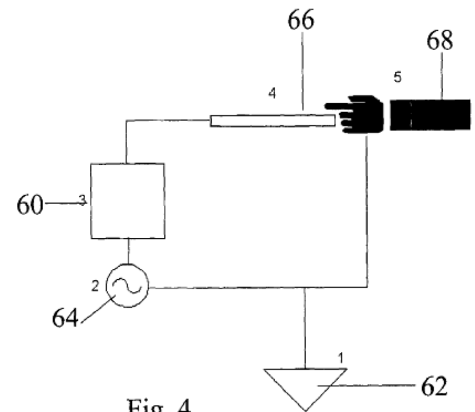
U.S. Patent No. 7,663,607	Perski ’455[1]
	Fig. 2 Fig. 16B Perski ’455 states: “The result is a map, referred to herein as a differential map, and represented by FIG. 16B which includes both the magnitude and the phase of the differential signals recorded for each sensor pair. Each recorded magnitude phase pair represents the display panel “steady noise” of each pair of sensor conductors connected by a differential amplifier. The magnitude and phase are for a specific oscillation frequency.” Id. at 21:14-20. See **[1A]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Perski ’455 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]** and **[1E]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Perski ’455 teaches the claimed touch panel comprising a first glass member (e.g., back protection 4) disposed over the screen of the display.

<table>
<tr><th>U.S. Patent No. 7,663,607</th><th>Perski ’455[1]</th></tr>
<tr><td></td><td>

The ’662 App. states: “In one embodiment, the transparent sensor is built of three different layers, implemented on three different foils. Two layers are used for the grid of lines, one for x axis and one for y axis, and the third layer is used for hard coating and anti glaring. One advantage of the above embodiment is the simplicity and ability to build a sensor using off-the-shelf component[s].” Id. at 5.
The ’662 App. also states: “In a preferred embodiment, the grid is patterned on Polyester foils. However, in different embodiments, the grid (or parts of the layers) could be patterned on different materials such as glass or different types of plastic foils.” Id. at 6. </td></tr>
<tr><td>[10E] a first transparent conductive layer disposed over the first glass member,</td><td> Perski ’455 teaches a first transparent conductive layer (e.g., layer 1 in three layer embodiment) disposed over the first glass member.


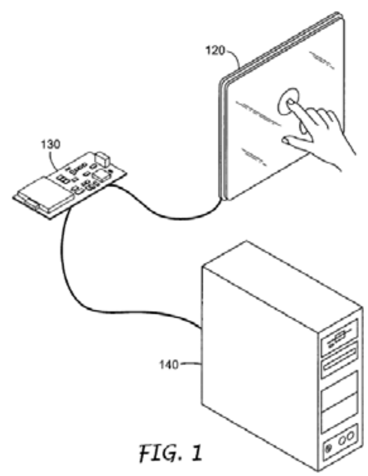
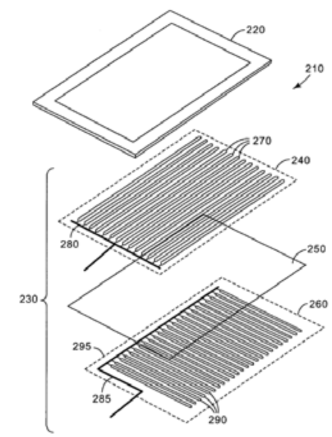
See 10[D]. </td></tr>
<tr><td>[10F] the first transparent conductive layer comprising a plurality of spaced</td><td>Perski ’455 teaches the first transparent conductive layer (e.g., layer 1 in three layer embodiment) comprising a plurality of spaced apart parallel lines having the same pitch and</td></tr>
</table>

U.S. Patent No. 7,663,607	Perski ’455[1]
apart parallel lines having the same pitch and linewidths;	linewidths. The ’662 App. states: “In one embodiment, the transparent sensor is built of three different layers, implemented on three different foils. Two layers are used for the grid of lines, one for x axis and one for y axis, and the third layer is used for hard coating and anti glaring.” Id. at 5. The ’662 App. states: “In a preferred embodiment, the conductors are straight lines having 1 mm width, equally spaced in 4 mm interval.” Id. at 5. See **10[D]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Perski ’455 teaches a second glass member (e.g., layer 2 in three layer embodiment) disposed over the first transparent conductive layer. See **10[D]**.
[10H] a second transparent conductive layer disposed over the second glass member,	Perski ’455 teaches a second transparent conductive layer (e.g., layer 2 in three layer embodiment) disposed over the second glass member. See **10[D]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Perski ’455 teaches a second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **10[D]** and **10[F]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Perski ’455 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **10[D]** and **10[F]**.

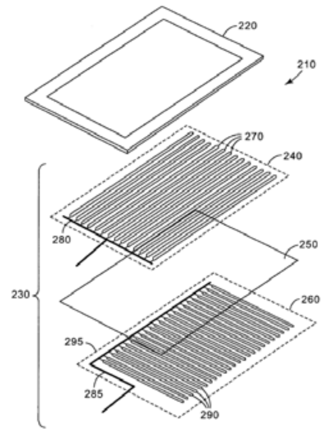
U.S. Patent No. 7,663,607	Perski '455[1]
[10K] a third glass member disposed over the second transparent conductive layer; and	Perski '455 teaches a third glass member (e.g., layer 3 in three layer embodiment) disposed over the second transparent conductive layer. See **10[D]**.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Perski '455 teaches one or more sensor integrated circuits (e.g., sensor 66 and/or detector 62) operatively coupled to the lines.  Fig. 4 Perski '455 states "In operation the detector 62 oscillates in reference to the common ground potential. As a user's finger 68 touches the sensor 66, a capacitance is formed between the finger and the sensor conductors…. The detector 62 processes the sensed current and determines the location of the user's finger according to the magnitude, that is the signal level, on certain sensor conductors." Id. at 15:5-19.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical	Perski '455 teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. The '662 App. states: "It is a general object of the present invention to enable minimum visual difference between conductive to non-conductive sensor areas. Therefore, in a

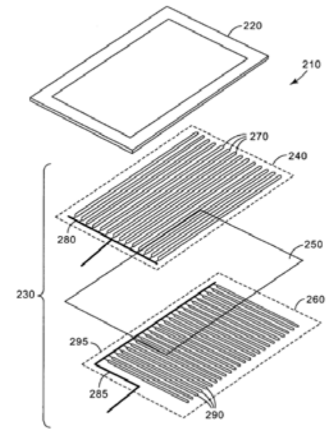
U.S. Patent No. 7,663,607	Perski '455[1]
index of the lines.	preferred embodiment, the non-conductive areas are made of conductive materials, which are treated in a special process that increased their resistance." As such, these passivated areas are "dummy features" that have a similar or identical optical index to the conductive lines, yet have been treated to be non-conductive, thereby creating an arrangement that improves the visual difference between the conducting and non-conducting areas. Id. at 5.

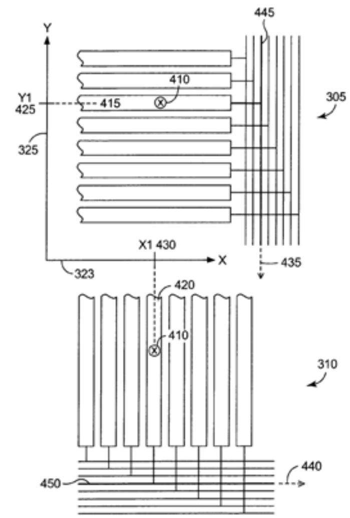
EXHIBIT P-2
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 6,970,160 ("MULLIGAN '160")

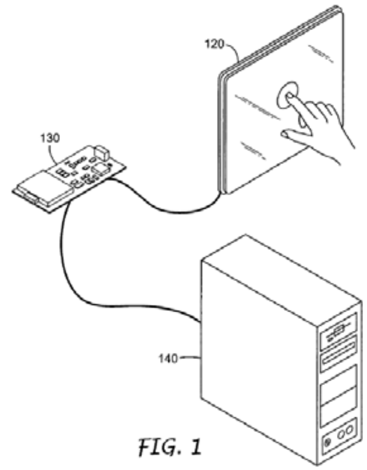
U.S. Patent No. 7,663,607	Mulligan '160
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Mulligan '160 teaches a touch panel (e.g., touch-sensitive screen 120 of Figure 1) comprising a transparent capacitive sensing medium (e.g., the touch-sensitive screen 210 of Figure 2) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  FIG. 1  FIG. 2 Mulligan '160 states: "The touch pane 220 is the uppermost layer of the touch-sensitive screen 210. The touch pane 220 may be made of an optically clear substance." Id. at 4:4-7. "The top layer of the lattice touch-sensing element 230 is the first sensor layer 240. The first sensor layer 240 includes a plurality of capacitive touch-sensitive sensor bars 270…preferably construed of indium tin oxide (ITO) for optical transparency…." Id. at 4:17-22. "The dielectric layer 250 may be an adhesive manufactured form any non-

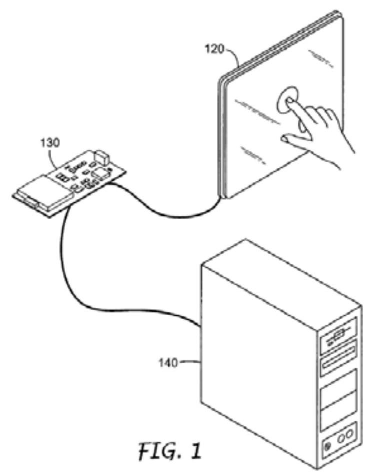
U.S. Patent No. 7,663,607	Mulligan ’160
	conductive, transparent material.” Id. at 4:62-64. Mulligan ’160 also states: “[T]he sensor bars of one or both layers may be electrically connected at both ends. Having the sensor bars connected at both ends in one or both layers provides certain benefits over the single-ended embodiments. Each sensor layer could provide more detailed information, including the touch location in both directions. This extra information could greatly improve multiple touch rejection, or, conversely, to enable multiple touch recognition. For instance, a two-layer sensor could be used in combination with a gaming application that allowed two players to simultaneously touch the touch sensor.” Id. at 6:16-26. Mulligan ’160 further states: “It should be appreciated that only one response signal from each layer is shown for simplicity of illustration. In actual operation, a touch may produce signals of various strengths on multiple sensor bars of a single sensor layer. The control circuit may determine the touch position by taking into account signals from multiple bars in the immediate neighborhood of the touched bars. A linear or non-linear interpolation of the multiple signals from each layer may be used to accurately determine the touch position.” Id. at 6:51-60.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Mulligan ’160 teaches a transparent capacitive sensing medium (e.g., the touch-sensitive screen 210 of Figure 2) comprising a first layer (e.g., first sensor layer 240 of Figure 2) having a plurality of transparent first conductive lines (e.g., sensor bars 270 of Figure 2) that are electrically isolated from one another.

U.S. Patent No. 7,663,607	Mulligan ’160
	 FIG. 2 Mulligan ’160 states: “The touch pane 220 is the uppermost layer of the touch-sensitive screen 210. The touch pane 220 may be made of an optically clear substance. The touch pane 220 may be manufactured from a chemically strengthened glass, transparent plastic, or any other acceptable dielectric material. One side of the touch pane 220 serves as the touch surface of the touch-sensitive screen 210, while the other side of the touch pane 220 is attached to the lattice touch-sensing element 230. The touch pane 220 provides the necessary dielectric material between the touching object and the sensing element, as well as protecting the touch-sensing element 230 from environmental hazards.” Id. at 4:5-16. “The top layer of the lattice touch-sensing element 230 is the first sensor layer 240. The first sensor layer 240 includes a plurality of capacitive touch-sensitive sensor bars 270 arranged substantially parallel to each other in a unidirectional manner. They are preferably constructed of indium tin oxide (ITO) for optical transparency….” Id. at 4:17-23.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are	Mulligan ’160 teaches a second layer (e.g., second sensor layer 260) spatially separated from the first layer (e.g., first sensor layer 240) and having a plurality of transparent second conductive lines (e.g., sensor bars 290) that are electrically isolated from one another (e.g., by dielectric layer 250).

U.S. Patent No. 7,663,607	Mulligan ’160
electrically isolated from one another,	 FIG. 2 Mulligan ’160 states: “The second sensor layer 260 also includes a plurality of capacitive touch-sensitive sensor bars 290 arranged substantially parallel to each other in a unidirectional manner. The sensor layers 240 and 260 are parallel to each other with the sensor bar with the sensor bars 290 of the second sensor layer 260 being oriented substantially orthogonal to the sensor bars 270 of the first sensor layer 240. As used herein, the terms “orthogonal” or “perpendicular” shall have their ordinary meanings but that the elements referred to as orthogonal or perpendicular do not actually intersect because they lie in different planes. The term intersection shall be used to mean an intersection of bars when projected onto an imaginary plane parallel to the touch sensing planes 240 and 260, even though the bars do not actually join.” Id. at 4:28-41. “The dielectric layer 250 is a non-conductive layer that separates the first sensor layer 240 and the second sensor layer 260. The dielectric layer 250 may be an adhesive manufactured from any non-conductive, transparent material. The dielectric layer 250 serves as an electrical insulator, which prevents sensor bars 270 of the first sensor layer 240 and sensor bars 290 of the second sensor layer 260 from coming into direct contact.” Id. at 4:60-67.

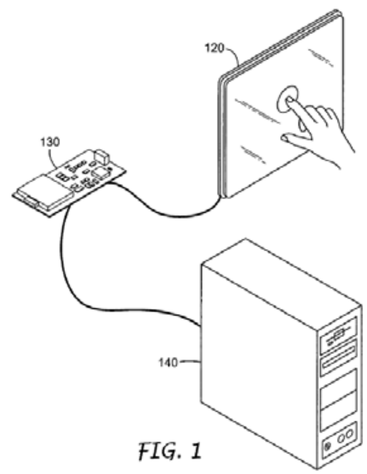
U.S. Patent No. 7,663,607	Mulligan ’160
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Mulligan ’160 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1C]**.  FIG. 4 Mulligan ’160 states: “As shown in FIG. 4, sensor bar 415 is oriented parallel to the X-axis 323, which is orthogonal to the Y-axis 325. The location of sensor bar 415 on the Y-axis 325 may be represented by Y1 425. Similarly, sensor bar 420 is oriented parallel to the Y-axis 325, which is orthogonal to X-axis 323. The location of sensor bar 420 on X-axis 323 may be represented by X1 430. By touching the touch sensitive screen at position 410, which corresponds to the intersection of sensor bar 415 and sensor bar 420, the object or the finger becomes capacitively coupled to both energized sensor bars, producing a response signal 435 on lead line 445 and a response signal 440 on lead line 450. Both signals are provided to the control circuit 130 (FIG. 1), where they are received and processed by the control circuit 130.” Id. at 6:32-50.

U.S. Patent No. 7,663,607	Mulligan '160
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Mulligan '160 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., control circuit 130).  FIG. 1 Mulligan '160 states: "As shown in FIG. 4, sensor bar 415 is oriented parallel to the X-axis 323, which is orthogonal to the Y-axis 325. The location of sensor bar 415 on the Y-axis 325 may be represented by Y1 425. Similarly, sensor bar 420 is oriented parallel to the Y-axis 325, which is orthogonal to X-axis 323. The location of sensor bar 420 on X-axis 323 may be represented by X1 430. By touching the touch sensitive screen at position 410, which corresponds to the intersection of sensor bar 415 and sensor bar 420, the object or the finger becomes capacitively coupled to both energized sensor bars, producing a response signal 435 on lead line 445 and a response signal 440 on lead line 450. Both signals are provided to the control circuit 130 (FIG. 1), where they are received and processed by the control circuit 130." Id. at 6:32-50. "It should be appreciated that only one response signal from each layer is shown for simplicity of illustration. In actual operation, a touch may produce signals of various strengths on multiple sensor bars of a single sensor layer. The control circuit may determine the touch position by taking into account signals from multiple bars in the immediate neighborhood of the touched bars. A linear or non-linear interpolation of the multiple signals

U.S. Patent No. 7,663,607	Mulligan ’160
	from each layer may be used to accurately determine the touch position.” Id. at 6:51-60. “Control circuit 130 is a circuit that provides excitation current to the capacitive sensor bars in touch-sensitive screen 120. Control circuit 130 also detects and processes signals generated by the capacitive sensor bars. While driving and sensing signals on one layer, the control circuit 130 could put the other layer in any appropriate state, such as float the other layer or drive the other layer with a known signal or guard signal. Control circuit 130 may be of any type of electronic circuit, such as an integrated circuit. Control circuit 130 may be installed by itself or integrated into a computer, such as computer 140.” Id. at 3:49-59.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Mulligan ’160 teaches the claimed touch panel wherein capacitive monitoring circuitry (e.g., control circuit 130 of Figure 1) is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.  FIG. 1 See **[1E].** Mulligan ’160 states: “Briefly stated here, and described in greater detail in conjunction with FIGS. 3 and 4, the sensor bars 270/290 receive an excitation signal via the lead lines 280/285 from the control circuit 130. The excitation signal sets up an electric field on each sensor bar

U.S. Patent No. 7,663,607	Mulligan ’160
	270/290. A touch to the touch-sensitive screen 210 results in a capacitive coupling between the touching object and the sensor bars 270/290 of both layers in the area proximate to the touch. The capacitive coupling between the touching object and the sensor bars near the touch causes an AC current to flow from the controller via the lead lines through the coupled sensor bars to ground. Since the magnitude of the current on each lead line depends on the extent of the coupling of the touching object with the bar (or bars) connected to that lead line, the controller can accurately determine the touched bars on each sensing layer by determining which bar on each sensor layer has the highest signal. The touch position on each layer may be further refined by also examining the strength of the signals on the lead lines connected to the bars in the immediate neighborhood of the sensor bars having the highest signal.” Id. at 5:1-17.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Mulligan ’160 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1C]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Mulligan ’160 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1C]** and **[1D]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Mulligan ’160 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). See [**1B]**. Mulligan ’160 states: “The plurality of capacitive touch-sensitive sensor bars…are preferably construed of indium tin oxide (ITO) for optical transparency….” Id. at 4:19-22.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance	Mulligan ’160 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.

U.S. Patent No. 7,663,607	Mulligan ’160
sensing medium.	See **[1F]**. Mulligan ’160 states: “When in operation, the control circuit 130 sets up an electric potential on sensor bars 315 and sensor bars 320 via the corresponding lead lines 330 and 335. The excitation signal electrically energizes sensor bars 315 and sensor bars 320. The excitation of the sensing layers may be simultaneous or sequential. In another embodiment, the sensing bars of each layer may be excited one at a time, while the sensing bars of the other layer are kept at a fixed potential or driven with some other signal, such as a guard signal.” Id. at 6:5-13. “It should be appreciated that only one response signal from each layer is shown for simplicity of illustration. In actual operation, a touch may produce signals of various strengths on multiple sensor bars of a single sensor layer. The control circuit may determine the touch position by taking into account the signals from multiple bars in the immediate neighborhood of the touched bars. A linear or non-linear interpolation of the multiple signals from each layer may be used to accurately determine the touch position.” Id. at 6:51-60.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Mulligan ’160 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. Mulligan ’160 states: “Control circuit 130 is a circuit that provides excitation current to the capacitive sensor bars in touch-sensitive screen 120. Control circuit 130 also detects and processes signals generated by the capacitive sensor bars. While driving and sensing signals on one layer, the control circuit 130 could put the other layer in any appropriate state, such as float the other layer or drive the other layer with a known signal or guard signal. Control circuit 130 may be of any type of electronic circuit, such as an integrated circuit. Control circuit 130 may be installed by itself or integrated into a computer, such as computer 140.” Id. at 3:49-59. To the extent a virtual ground charge amplifier is not expressly disclosed or inherent in the control circuit disclosed in Mulligan ’160, the use of a virtual ground charge amplifier coupled to the touch panel would have been obvious to one of ordinary skill in the art as a

U.S. Patent No. 7,663,607	Mulligan ’160
	predictable variant and a matter of simple implementation design. For example, Perski ’455 shows a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **Exhibit P-1**, **[8]**. Because both Perski ’455 and Mulligan ’160 describe very similar transparent capacitive touchscreens, it would have been obvious to include the charge amplifier of Perski ’455 into the Mulligan ’160 design in order to filter the signals obtained from the touchscreen from stray or parasitic noise, as is common in signal processing techniques. The resulting implementation would have been a predictable variation well within the purview of one of ordinary skill in the art.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Mulligan ’160 teaches a display arrangement comprising a display having a screen (e.g., touch-sensitive screen 120) for displaying a graphical user interface.  FIG. 1 See **[1A]**.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host	Mulligan ’160 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]**.

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device to form a pixilated image;	To the extent Mulligan ’160 may not expressly or inherently disclose forming a pixilated image, it would have been obvious to one of ordinary skill in the art for control circuit 130 to form a pixilated image when processing the received signals, as taught by Perski ’455. See **Exhibit P-1**, **[10B]**. The pixilated image would provide a logical and simple way to store the received sensor data from the grid of sensor lines as a data structure capable of being processed and analyzed by the host device (e.g., computer 140).
[10B] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Mulligan ’160 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. Mulligan ’160 states: “Control circuit 130 is a circuit that provides excitation current to the capacitive sensor bars in touch-sensitive screen 120. Control circuit 130 also detects and processes signals generated by the capacitive sensor bars. While driving and sensing signals on one layer, the control circuit 130 could put the other layer in any appropriate state, such as float the other layer or drive the other layer with a known signal or guard signal. Control circuit 130 may be of any type of electronic circuit, such as an integrated circuit. Control circuit 130 may be installed by itself or integrated into a computer, such as computer 140.” Id. at 3:49-59. “[T]he sensor bars of one or both layers may be electrically connected at both ends. Having the sensor bars connected at both ends in one or both layers provides certain benefits over the single-ended embodiments. Each sensor layer could provide more detailed information, including the touch location in both directions. This extra information could greatly improve multiple touch rejection, or, conversely, to enable multiple touch recognition. For instance, a two-layer sensor could be used in combination with a gaming application that allowed two players to simultaneously touch the touch sensor.” Id. at 6:16-26. “It should be appreciated that only one response signal from each layer is shown for simplicity of illustration. In actual operation, a touch may produce signals of various strengths on multiple sensor bars of a single sensor layer. The control circuit may determine the touch position by taking into account signals from multiple bars in the immediate neighborhood of the touched bars. A linear or non-linear interpolation of the multiple signals

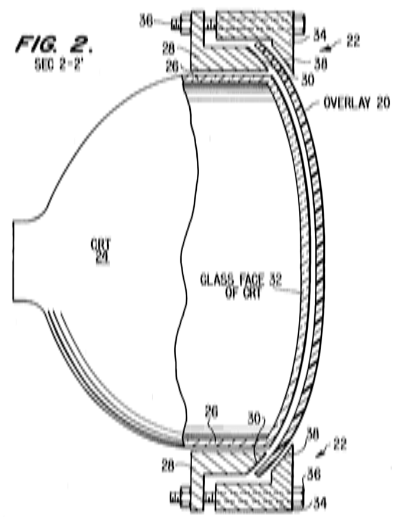
U.S. Patent No. 7,663,607	Mulligan ’160
	from each layer may be used to accurately determine the touch position.” Id. at 6:51-60.
[10C] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Mulligan ’160 teaches the claimed touch panel comprising a first glass member disposed over the screen of the display. See **[1C]** and **[1D]**. Even if Mulligan ’160 did not expressly disclose a first glass member disposed over the screen of the display, such a glass member would have been a simple design choice representing a trivial and predictable variation. Mulligan ’160 already discloses the use of both a touch pane 220 of “chemically strengthened glass” and an intermediate dielectric layer 250, which could also be glass. Id. at 3:65-4:67. It would have been obvious to one of ordinary skill in the art to use a third glass member over the screen of the display to shield the conductive lines from the display, for simplicity, and in order to use off-the-shelf components, as taught by Perski ’455. See **Exhibit P-1**, **[10C]**.
[10D] a first transparent conductive layer disposed over the first glass member,	Mulligan ’160 teaches a first transparent conductive layer disposed over the first glass member. See **[1B]**. Even if Mulligan ’160 did not expressly disclose a first transparent conductive layer disposed over the first glass member, such an arrangement would have been a simple design choice representing a trivial and predictable variation. Mulligan ’160 already discloses the use of both a touch pane 220 of “chemically strengthened glass” and an intermediate dielectric layer 250, which could also be glass. Id. at 3:65-4:67. It would have been obvious to one of ordinary skill in the art to dispose the conductive layer over the first glass member for simplicity and in order to use off-the-shelf components, as taught by Perski ’455. See **Exhibit P-1**, **[10D]**.
[10E] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Mulligan ’160 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1C]** and **[1D]**.

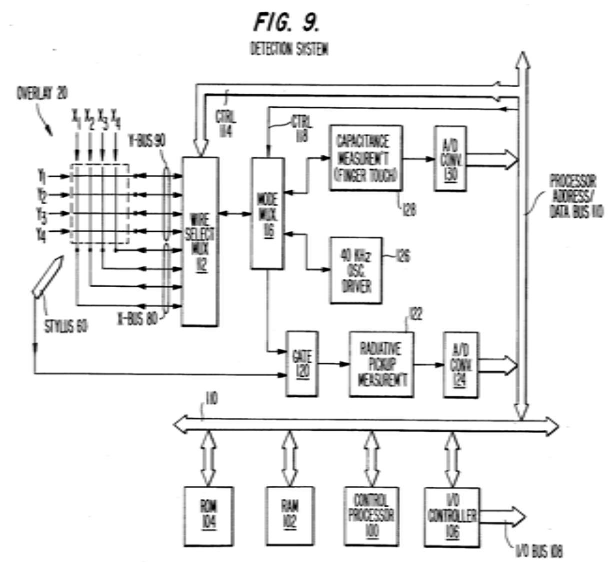
U.S. Patent No. 7,663,607	Mulligan ’160
[10F] a second glass member disposed over the first transparent conductive layer;	Mulligan ’160 teaches a second glass member (e.g., intermediate dielectric layer 250) disposed over the first transparent conductive layer. See **[1C]**. As is expressly disclosed in Mulligan ’160 (and as would be understood by one of ordinary skill in the art), a dielectric can include glass. Id. at 4:5-16.
[10G] a second transparent conductive layer disposed over the second glass member,	Mulligan ’160 teaches a second transparent conductive layer disposed over the second glass member. See **[1C]**.
[10H] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Mulligan ’160 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1C]**.
[10I] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Mulligan ’160 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1D]**.
[10J] a third glass member disposed over the second transparent conductive layer; and	Mulligan ’160 teaches a third glass member (e.g., touch pane 220) disposed over the second transparent conductive layer. See **[1B]**.
[10K] one or more sensor integrated circuits operatively coupled to the lines.	Mulligan ’160 teaches one or more sensor integrated circuits (e.g., control circuit 130) operatively coupled to the lines. See **[1E]** and **[1F]**.

U.S. Patent No. 7,663,607	Mulligan ’160
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Mulligan ’160 teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. Mulligan ’160 states that the conductive lines “are preferably constructed of indium tin oxide (ITO) for optical transparency, but may be constructed of any conductive transparent material for transparent applications, such as other transparent conductive oxides as well as transparent conductive polymers. “ Id. at 4:21-27. Since Mulligan ’160 clearly contemplates a transparent sensor in the form of a touchscreen, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

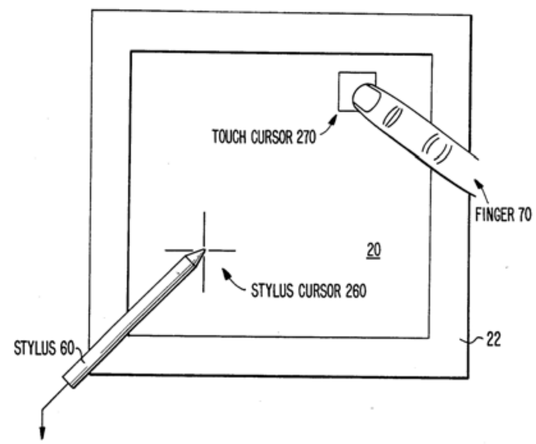
EXHIBIT P-3
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 4,686,332 ("GREANIAS '332")

<table>
<tr><th>U.S. Patent No. 7,663,607</th><th>Greanias '332</th></tr>
<tr><td>[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,</td><td>Greanias '332 teaches a touch panel comprising a transparent capacitive sensing medium (e.g., overlay 20 of Figures 2 and 9) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.

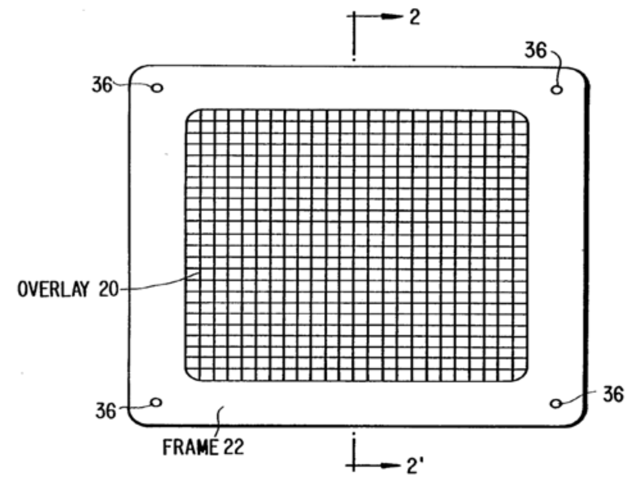


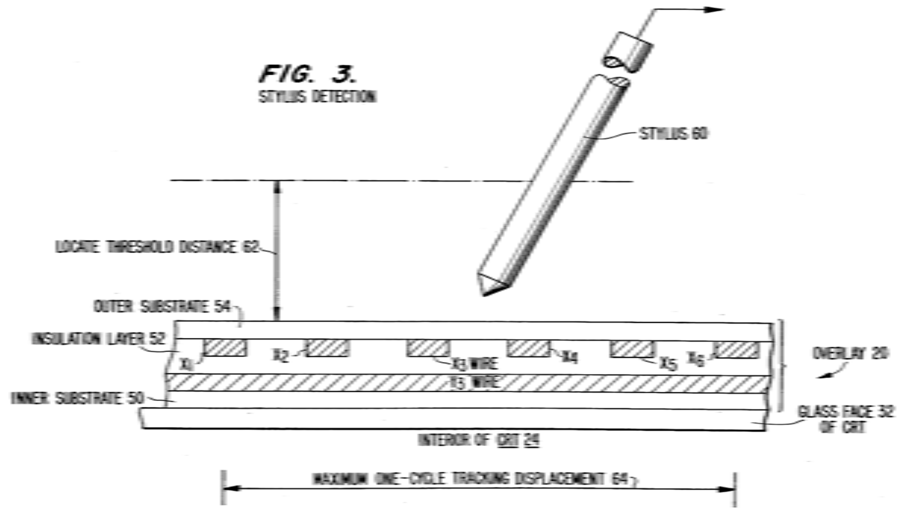


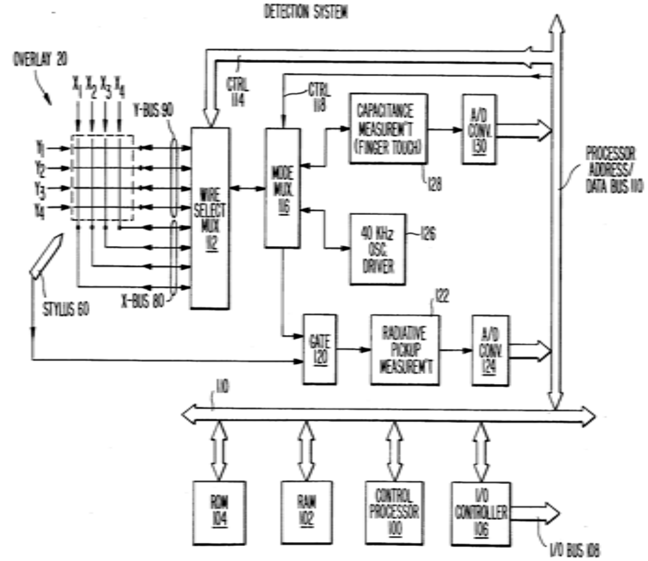
Greanias '332 states: "The combined finger touch and stylus detection system is shown in a front view in FIG. 1 and in a side cross-sectional view in FIG. 2, in association with a cathode ray tube display. The overlay 20 consists of two sheets of durable, transparent plastic, with an array of horizontal transparent conductors embedded in the first sheet and an array of vertical transparent conductors embedded in the second sheet. The overlay 20 can be mounted by means of the frame 22 onto the display surface 32 of the cathode ray tube</td></tr>
</table>

U.S. Patent No. 7,663,607	Greanias '332
	24." Id. at 4:43-52. "FIG. 9 shows an architectural diagram of the detection system. The vertical conductors X1-X112 are connected through the X bus 80 to the wire select multiplexer 112 and the horizontal Y conductors Y1-Y112 are connected through the Y bus 90 to the wire selection multiplexer 112. The radiative pickup stylus 60 is connected through the gate 120 to the radiative pickup measurement device 122. The wire selection multiplexer 112 is connected through the mode multiplexer 116 to the capacitance measurement device 128 which is used for capacitance finger touch detection." Id. at 11:63-12:5. Multiple touches or near touches that occur at a same time are supported. For example, simultaneous stylus touches and finger touches can be detected, as shown in Figure 19. These touches occur at distinct locations in a plane of overlay 20, as shown and described below. FIG. 19. DISPLAY AS SEEN THROUGH OVERLAY SHOWING SIMULTANEOUS FINGER TOUCH AND STYLUS DETECTION 

U.S. Patent No. 7,663,607	Greanias '332
	Greanias '332 states: "Thus it is seen that in the second embodiment of the invention, the system can be operated so as to provide the simultaneous detection of both the pickup stylus 60 and a finger touch. This is depicted in FIG. 19, which is a view of the display as seen through the overlay 20, showing the simultaneous display of the touch cursor 270 whose location is produced by the host computer based upon the coordinates for the finger touch output over the I/O bus 108 by the control processor 100. Also depicted in FIG. 19 is the display of the stylus cursor 260, whose image is produced by the host processor, based upon coordinates for the stylus which are output over the I/O bus 108 by the control processor 100." Id. at 16:15-23. "The resulting combined finger touch and stylus detection system provides an enhanced man-machine interface, enabling either the sequential or simultaneous detection of both stylus position and finger touch, thereby increasing the range of applications for interactive input devices." Id. at 17:26-32.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Greanias '332 teaches a transparent capacitive sensing medium (e.g., overlay 20 of Figures 2 and 9) comprising a first layer having a plurality of transparent first conductive lines (e.g., horizontal Y wires) that are electrically isolated from one another.

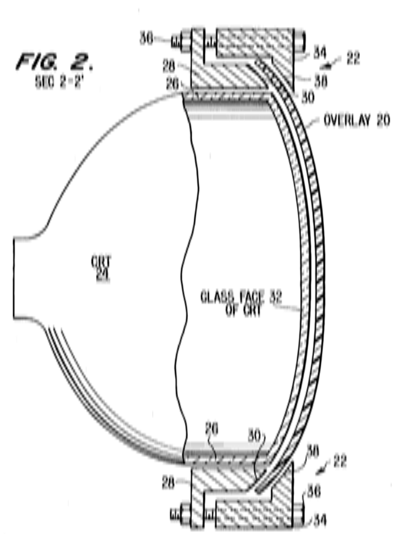
U.S. Patent No. 7,663,607	Greanias ’332
	FIG. 1. (OVERLAY AND MOUNTING FRAME)  Greanias ’332 states: “The combined finger touch and stylus detection system is shown in a front view in FIG. 1 and in a side cross-sectional view in FIG. 2, in association with a cathode ray tube display. The overlay 20 consists of two sheets of durable, transparent plastic, with an array of horizontal transparent conductors embedded in the first sheet and an array of vertical transparent conductors embedded in the second sheet. The overlay 20 can be mounted by means of the frame 22 onto the display surface 32 of the cathode ray tube 24. The mounting frame 22 consists of a base portion 28 which attaches to the sidewall 26 of the cathode ray tube (CRT) 24.” Id. at 4: 43-52.

U.S. Patent No. 7,663,607	Greanias '332
	 "An insulation layer 52 covers the horizontal Y wires and can be composed of a transparent adhesive such as ultraviolet initiated vinyl acrylic polymer having a thickness of approximately 0.002 inches. The upper portion of the overlay 20 shown in FIG. 3 consists of the outer substrate 54 which is a sheet of polyethylene terephthalate which is optically transparent, electrically insulative and has a thickness of approximately 0.002 inches. Deposited on the surface of the outer substrate 54 is a vertical array of transparent conductors designated X1, X2, X3 . . . X6 . . . . The conductors X1, etc. are also composed of indium tin oxide and have a thickness of approximately 1000 angstroms, a width of approximately 0.025 inches and a spacing of approximately 0.125 inches, center-to-center. The outer substrate 54 and the vertical conductors X are joined by the adhesive insulation layer 52 to the inner substrate 50 and the horizontal wires Y." See **[1A]**.

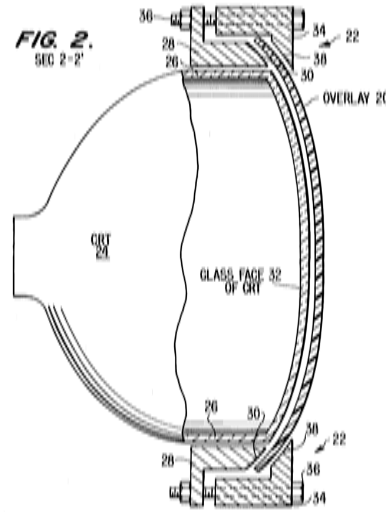
U.S. Patent No. 7,663,607	Greanias ’332
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Greanias ’332 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., vertical X wires) that are electrically isolated from one another. See **[1A]** and **[1B]**.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Greanias ’332 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]** and **[1B]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Greanias ’332 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., multiplexer 112 and/or capacitance measurement device 128 of Figure 9). *FIG. 9.* DETECTION SYSTEM 

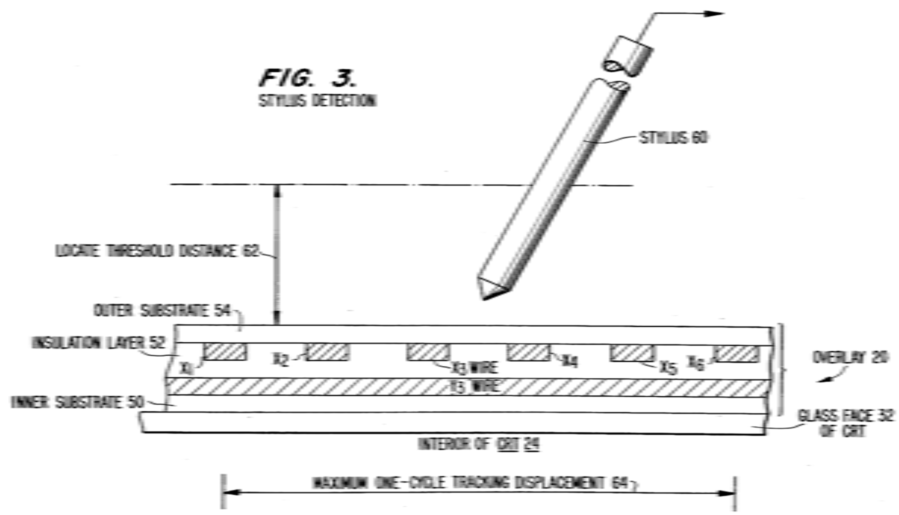
U.S. Patent No. 7,663,607	Greanias ’332
	Greanias ’332 states: “The vertical conductors X1-X112 are connected through the X bus 80 to the wire select multiplexer 112 and the horizontal Y conductors Y1-Y112 are connected through the Y bus 90 to the wire selection multiplexer 112. The radiative pickup stylus 60 is connected through the gate 120 to the radiative pickup measurement device 122. The wire selection multiplexer 112 is connected through the mode multiplexer 116 to the capacitance measurement device 128 which is used for capacitance finger touch detection. ” Id. at 11:64-12:5. See **[1A]** and **[1B]**.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Greanias ’332 teaches the claimed touch panel wherein capacitive monitoring circuitry (e.g., capacitance measurement device 128) is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. Greanias ’332 states: “During finger touch operations, the capacitance measuring device 128 has its input coupled through the mode multiplexer 116 and the wire selection multiplexer 112 to selected ones of the horizontal and vertical conductors in the overlay 20 in response to control signals from the control processor 100. The output of the capacitance measurement device 128 is converted to digital values by the converter 130 and is applied over the bus 110 to the control processor 100, which executes a sequence of stored program instructions to detect the horizontal array conductor pair and the vertical array conductor pair in the overlay 20 which are being touched by the operator's finger.” Id. at 12:35-40. “This alternate scanning for either the initiation of a finger touch or the beginning of stylus detection is carried out by steps 140-148 and 154-160 of the flow diagram of FIG. 10. In step 140, the X-drive sequence is updated followed by step 142 where the touch sensing function of the capacitance measurement device 128 is turned on by appropriate control signals to the mode multiplexer 116 and the wire selection multiplexer 112. Then in step 144 the X axis conductors in the overlay 20 are sensed by the capacitance measurement device 128. In step 146 the signal strength for capacitive coupling by a finger touch is determined by the control processor 100. Control processor 100 then determines whether the touch threshold has been crossed in step 148. If the touch threshold has been crossed, the program

U.S. Patent No. 7,663,607	Greanias ’332
	transfers to step 150 to the touch locate mode.” Id. at 13:19-34.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Greanias ’332 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]** and **[1B]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Greanias ’332 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]** and **[1B]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Greanias ’332 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). Greanias ’332 states: “The transparent conductors can be composed of indium tin oxide, for example, which is a well-known transparent conductor material.” Id. at 3:9-12. See **[1A]** and **[1B]**.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Greanias ’332 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1A]**, **[1B]**, and **[1F]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Greanias ’332 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., within capacitance measurement device 128) coupled to the touch panel for detecting the touches on the touch panel. See **[1E]**.

U.S. Patent No. 7,663,607	Greanias ’332
	To the extent a virtual ground charge amplifier is not expressly disclosed or inherent in capacitance measurement device 128, the use of a virtual ground charge amplifier coupled to the touch panel would have been obvious to one of ordinary skill in the art as a predictable variant and a matter of simple implementation design. For example, Perski ’455 shows a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **Exhibit P-1**, **[8]**. Because both Perski ’455 and Greanias ’332 describe very similar transparent capacitive touchscreens, it would have been obvious to include the charge amplifier of Perski ’455 into the Greanias ’332 design in order to filter the signals obtained from the touchscreen from stray or parasitic noise, as is common in signal processing techniques. The resulting implementation would have been a predictable variation well within the purview of one of ordinary skill in the art.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Greanias ’332 teaches a display arrangement comprising a display (e.g., CRT 24 of Figure 2) having a screen for displaying a graphical user interface. 

U.S. Patent No. 7,663,607	Greanias ’332
	See **[1A]**. Greanias ’332 states: “A combined finger touch and stylus detection system is disclosed for use on the viewing surface of the visual display device. Transparent conductors arranged in horizontal and vertical grid are supported on a flexible, transparent overlay membrane which is adaptable to a variety of displays.” Id. at Abstract. “The combined finger touch and stylus detection system is shown in a front view in FIG. 1 and in a side cross-sectional view in FIG. 2, in association with a cathode ray tube display.” Id. at 4:43-46.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Greanias ’332 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Greanias ’332 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Greanias ’332 teaches the claimed touch panel comprising a first glass member (e.g., glass face 32 of CRT of Figure 2) disposed over the screen of the display.

U.S. Patent No. 7,663,607	Greanias ’332
	 “The overlay 20 can be mounted by means of the frame 22 onto the display surface 32 of the cathode ray tube 24. The mounting frame 22 consists of a base portion 28 which attaches to the sidewall 26 of the cathode ray tube (CRT) 24. The front facing surface 30 of the base portion 28 can have a curvature substantially the same as the curvature of the display surface 32. The overlay 20 is mechanically flexible and can be laid directly upon the surface 32 of the CRT so that its edges overlap the surface 30 of the base portion 28 for the mounting frame 22.” Id. at 4:50-60. See **[1A]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Greanias ’332 teaches a first transparent conductive layer disposed over the first glass member. See **[1A]** and **[1B]**.
[10F] the first transparent conductive	Greanias ’332 teaches the first transparent conductive layer comprising a plurality of spaced

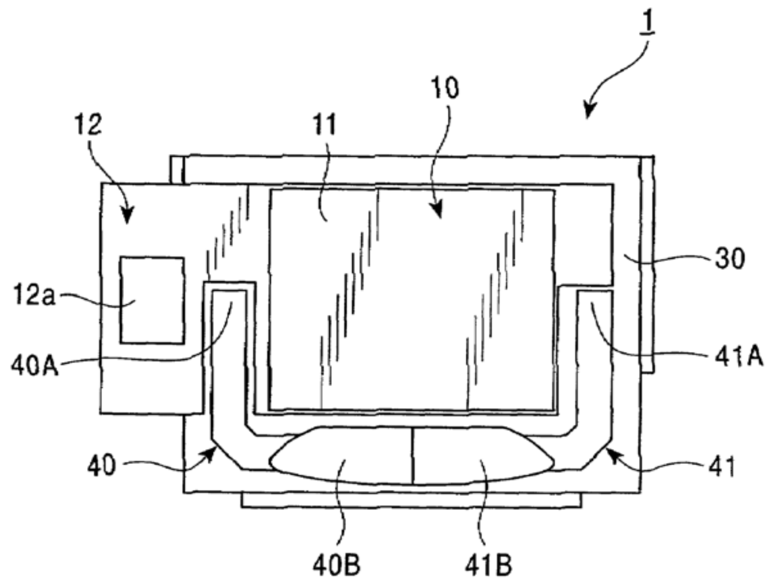
U.S. Patent No. 7,663,607	Greanias ’332
layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Greanias ’332 teaches a second glass member (e.g., inner substrate 50 of Figure 3) disposed over the first transparent conductive layer.  “The overlay shown in FIG. 3 consists of the inner substrate 50 which is a sheet of polyethylene terephthalate which is transparent, electrically insulative, and has a thickness of approximately 0.002 inches. An array of horizontal transparent conductors is deposited on the surface of the inner substrate 50 and are designated as Y1, Y2, Y3, etc., with the Y3 wire being shown in FIG. 3.… The upper portion of the overlay 20 shown in FIG. 3 consists of the outer substrate 54 which is a sheet of polyethylene terephthalate which is optically transparent, electrically insulative and has a thickness of approximately 0.002 inches. Deposited on the surface of the outer substrate 54 is a vertical array of transparent conductors

U.S. Patent No. 7,663,607	Greanias ’332
	designated X1, X2, X3 . . . X6 . . . . The conductors X1, etc. are also composed of indium tin oxide and have a thickness of approximately 1000 angstroms, a width of approximately 0.025 inches and a spacing of approximately 0.125 inches, center-to-center. The outer substrate 54 and the vertical conductors X are joined by the adhesive insulation layer 52 to the inner substrate 50 and the horizontal wires Y. The X and the Y transparent conductors can also be composed of gold and silver or other suitable materials. The thickness of the conductors is adjusted to provide resistance below 50 ohms per square and an optical transmission which is greater than 80 percent.” Id. at 5:2-38. See **[1A]** and **[1B]**. Although Greanias ’332 discloses that both the inner substrate and outer substrate are composed of transparent PET, it would have been an obvious to one of ordinary skill in the art to substitute a glass member for the PET substrate because both are transparent dielectrics. In addition, glass was already widely used as a transparent substrate in many touchscreen designs, and the plastic resins disclosed by Greanias ’332 were readily interchangeable with glass members. See **Exhibit P-1, [10G]**
[10H] a second transparent conductive layer disposed over the second glass member,	Greanias ’332 teaches a second transparent conductive layer disposed over the second glass member. See **[1A]** and **[1B]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Greanias ’332 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the	Greanias ’332 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer.

U.S. Patent No. 7,663,607	Greanias '332
parallel lines of the first transparent conductive layer;	See **[1A]** and **[1B]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Greanias '332 teaches a third glass member (e.g., outer substrate 54 of Figure 3) disposed over the second transparent conductive layer. See **[1A], [1B]**, and **[10G]**. Although Greanias '332 discloses that both the inner substrate and outer substrate are composed of transparent PET, it would have been an obvious to one of ordinary skill in the art to substitute a glass member for the PET substrate because both are transparent dielectrics. In addition, glass was already widely used as a transparent substrate in many touchscreen designs, and the plastic resins disclosed by Greanias '332 were readily interchangeable with glass members. See **Exhibit P-1, [10G]**
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Greanias '332 teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1E]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Greanias '332 teaches the display arrangement as recited in claim 10 further including dummy features (e.g., electrostatic shield layer 51) disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. Greanias '332 states: "An electrostatic shield layer 51 consists of a full panel coating of indium tin oxide which is grounded. This coating shields the vertical X conductors and horizontal Y conductors from electrostatic noise generated by the cathode ray tube 24. The electrostatic shield layer 51 must be less than 100 ohms per square and must exceed an optical transmissivity of 80 percent." Id. at 10:65-11:2. This full coating of ITO has the same optical index as the conductive lines and helps improve the optical differences between the conducting and non-conducting areas. Id. To the extent Greanias '332 does not expressly or inherently disclose "dummy features"

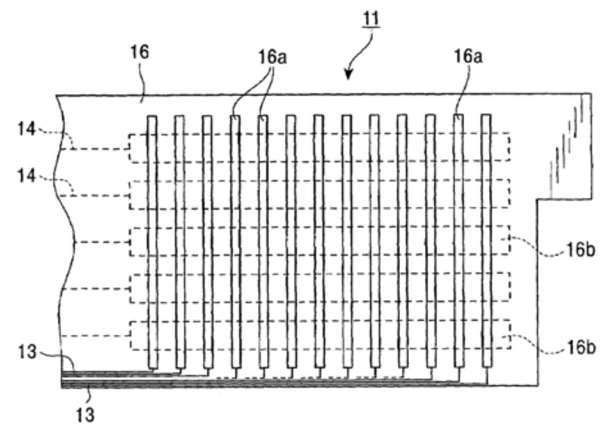
U.S. Patent No. 7,663,607	Greanias ’332
	disposed in the space between the parallel lines, such features would have been obvious to one of ordinary skill in the art. Greanias ’332 clearly contemplates a transparent sensor in the form of a touchscreen, so it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See, e.g., **Exhibit P-1, [11]**.

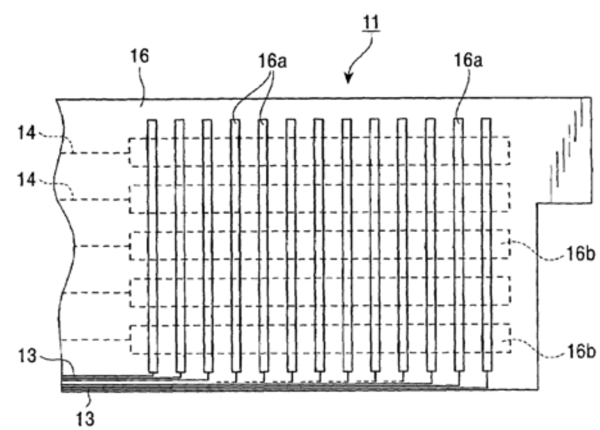
EXHIBIT P-4
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 7,218,314 ("ITOH '314")

U.S. Patent No. 7,663,607	Itoh '314[2]
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Itoh '314 teaches a touch panel (e.g., coordinate input element 10 of Figure 1) comprising a transparent capacitive sensing medium (e.g., coordinate detector 11 of Figure 1) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  Itoh ' 314 states: " The coordinate input device 1 shown in FIGS. 1 and 2 includes a coordinate input element 10, a liquid crystal display device (display device) 20 placed on the

2 Itoh '314 was also published as U.S. Pat. App. Pub. No. 2002/0186210 on December 12, 2002. This publication, which contains identical disclosure to Itoh '314, would qualify as an invalidating reference under § 102(b).

U.S. Patent No. 7,663,607	Itoh '314[2]
	back side of the coordinate input element 10, a casing 30 for holding the coordinate input element 10 and the liquid crystal display device 20, and two push button switches 40 and 41 provided on the casing 30." Id. at 6:9-15. "In the coordinate input device 1 of the present invention, since all the members of the coordinate detector 11 of the coordinate input element 10 are formed by transparent material, the user can see the display on the liquid crystal display device 20 through the coordinate detector 11. Consequently, by displaying the operating method, hints for operation, and so forth of the coordinate input element 10 on the liquid crystal display device 20, a user unaccustomed to operate the device can easily operate the coordinate input element 10. The liquid crystal display device 20 can display arbitrary information. Accordingly, by changing information to be displayed as required, the usability of electronic equipment including the coordinate input device 1 can be significantly improved." Id. at 8:44-57. "Preferably, the controller comprises a reference signal storing unit for storing a reference signal, which is a detection signal obtained by scanning the electrodes of the first electrode layer and the second electrode layer while no operation is performed; and a correction value calculating unit for subtracting the reference signal from a detection signal while an operation is performed, thereby correcting the detection signal during the operation." Id. at 4:53-60. "In the coordinate input device of the present invention, the electrodes are scanned when an indicating device such as a finger or a pen is not in contact with or is not approaching the coordinate detector (while no operation is performed), and an obtained detection signal is stored as a reference signal. Then, by subtracting the reference signal from a detection signal obtained by scanning the electrodes while the indicating device is put on the coordinate detector (during operation), variation in electrostatic capacitance generated by the indicating device is calculated so as to detect the coordinate position of the indicating device. Accordingly, variation in the electrostatic capacitance between the electrodes and the disturbance of noise from the control circuit can be removed from the detection result, and thus the coordinate input device which has a high detection accuracy and which operates stably can be achieved." Id. at 4:60-5:9.

U.S. Patent No. 7,663,607	Itoh ’314[2]
	The above form of scanning the electrodes using a non-touch reference signal and subtracting the reference signal from a detection signal as well as measuring the variation of the electrostatic capacitance at the intersections of the two layers of electrodes is the basis for a mutual capacitance detection system that inherently teaches detection of multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Itoh ’314 teaches a transparent capacitive sensing medium (e.g., coordinate detector 11 of Figure 4) comprising a first layer (e.g., substrate 16) having a plurality of transparent first conductive lines (e.g., linear transparent electrodes 16a) that are electrically isolated from one another. FIG. 4  Itoh ’314 states: “As shown in FIGS. 4 and 5, in the coordinate detector 11, a plurality of (thirteen in FIG. 4) linear transparent electrodes (a first electrode layer) 16a extending in the direction orthogonal to the longitudinal direction of the substrate 16 are provided in parallel on the upper surface of the flat substrate (second insulating layer) 16, which comprises a

U.S. Patent No. 7,663,607	Itoh '314[2]
	transparent resin film and glass. Also, on the lower surface of the substrate 16, a plurality of (five in FIG. 4) strip-like transparent electrodes (a second electrode layer) 16b extending in the direction orthogonal to the transparent electrodes 16a provided on the upper surface of the substrate 16 are formed in parallel." Id. at 6:54-65. Also, as shown in FIG. 5, a protective layer (a first insulating layer) 17 comprising a transparent resin substrate is bonded to the substrate 16 with a transparent adhesive so as to cover the transparent electrodes 16a and a lower insulating layer (a third insulating layer) 18 comprising a transparent resin material is bonded to the substrate 16 with a transparent adhesive so as to cover the transparent electrodes 16b on the lower side of the substrate 16." Id. at 6:66-7:6.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Itoh '314 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., strip-like transparent electrodes 16b of Figure 4) that are electrically isolated from one another. FIG. 4  See **[1A]** and **[1B]**.

U.S. Patent No. 7,663,607	Itoh ’314[2]
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Itoh ’314 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]** and **[1B]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Itoh ’314 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., multiplexer 112 and/or capacitance measurement device 128 of Figure 9). Itoh ’314 states: “In this case, by scanning the upper surface of the coordinate detector 11 with a finger or a pen, a part of the electric flux lines formed between the transparent electrodes 16a and 16b shown in FIG. 4 is absorbed by the finger or the pen at the positions where the transparent electrodes 16a and 16b cross, and the current applied to the transparent electrodes 16b varies and thus the electrostatic capacitance varies. The variation in the electrostatic capacitance is converted to a variation in an electrical signal by the control circuit 12a provided in the controller 12, and the variation in the electrical signal is externally output as coordinate position information. Then, the cursor displayed on the display of the personal computer moves based on the coordinate position information.” Id. at 8:30-43. “One end in the longitudinal direction (the lower end in FIG. 4) of each of the transparent electrodes 16a is connected to one end of corresponding circuit wiring line 13 comprising a transparent conductive material. The other end of each circuit wiring line 13 is connected to the control circuit 12a shown in FIG. 3 so that the control circuit 12a and the transparent electrodes 16a are electrically connected. On the other hand, one end in the longitudinal direction (the left end in FIG. 4) of each of the transparent electrodes 16b formed on the lower surface of the substrate 16 is connected to one end of corresponding circuit wiring line 14 comprising a transparent conductive material. The other end of each circuit wiring line 14 is connected to the control circuit 12a so that the control circuit 12a and the transparent

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	electrodes 16b are electrically connected.” Id. at 7:14-28. See **[1A]** and **[1B]**.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Itoh ’314 teaches the claimed touch panel wherein capacitive monitoring circuitry (e.g., capacitance measurement device 128) is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. Itoh ’314 states: “In the coordinate input device of the present invention, the electrodes are scanned when an indicating device such as a finger or a pen is not in contact with or is not approaching the coordinate detector (while no operation is performed), and an obtained detection signal is stored as a reference signal. Then, by subtracting the reference signal from a detection signal obtained by scanning the electrodes while the indicating device is put on the coordinate detector (during operation), variation in electrostatic capacitance generated by the indicating device is calculated so as to detect the coordinate position of the indicating device. Accordingly, variation in the electrostatic capacitance between the electrodes and the disturbance of noise from the control circuit can be removed from the detection result, and thus the coordinate input device which has a high detection accuracy and which operates stably can be achieved.” Id. at 4:61-5:9. “In this case, by scanning the upper surface of the coordinate detector 11 with a finger or a pen, a part of the electric flux lines formed between the transparent electrodes 16a and 16b shown in FIG. 4 is absorbed by the finger or the pen at the positions where the transparent electrodes 16a and 16b cross, and the current applied to the transparent electrodes 16b varies and thus the electrostatic capacitance varies. The variation in the electrostatic capacitance is converted to a variation in an electrical signal by the control circuit 12a provided in the controller 12, and the variation in the electrical signal is externally output as coordinate position information. Then, the cursor displayed on the display of the personal computer moves based on the coordinate position information.” Id. at 8:30-43. “The control circuit 12a provided in the coordinate input element 10 of the embodiment scans the transparent electrodes 16a and 16b of the coordinate detector 11 while the

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	coordinate input element 10 is not being operated (when a finger or a pen is not in contact with or is not approaching the coordinate detector 11) and stores an electrical signal obtained by the scan as a reference signal. Also, the control circuit 12a subtracts the reference signal from the detection signal obtained by scanning the transparent electrodes 16a and 16b so as to correct the detection signal during an operation of the coordinate input element 10 (when the surface of the coordinate detector 11 is scanned by a finger or a pen).” Id. at 8:58-9:3 “That is, by comparing the electrostatic capacitance of the coordinate detector 11 while no operation is performed and the electrostatic capacitance of the coordinate detector 11 while an operation is performed, the change in the electrostatic capacitance caused by a finger or a pen during an operation can be extracted as a detection signal. Also, even when the electrostatic capacitance is gradually disturbed by external influences, the change in the electrostatic capacitance caused by the disturbance can be canceled by performing the above-described correction. Accordingly, a malfunction is less likely to occur in the coordinate input device.” Id. at 9:3-14.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Itoh ’314 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]** and **[1B]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Itoh ’314 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]** and **[1B]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Itoh ’314 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). See **[1A]** and **[1B]**.

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	To the extent the use of ITO is not expressly or inherently taught by Itoh ’314 in its description of transparent electrodes, it would have obvious to one of ordinary skill in that art to use ITO as the transparent electrodes. The use of ITO traces, which are highly transparent, as taught by, for example, Perski ’225, Mulligan ’160, or Leeper, would have been a predictable design choice well within the preview of one of ordinary skill. See **Exhibit P-1, [6]; Exhibit P-2, [6]; Exhibit P-9, [6]**.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Itoh ’314 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1A]**, **[1B]**, and **[1F]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Itoh ’314 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., within control circuit 12a) coupled to the touch panel for detecting the touches on the touch panel. See **[1E]**. To the extent a virtual ground charge amplifier is not expressly disclosed or inherent in the control circuit 12a, the use of a virtual ground charge amplifier coupled to the touch panel would have been obvious to one of ordinary skill in the art as a predictable variant and a matter of simple implementation design. For example, Perski ’455 shows a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **Exhibit P-1**, **[8]**. Because both Perski ’455 and Itoh ’314 describe very similar transparent capacitive touchscreens, it would have been obvious to include the charge amplifier of Perski ’455 into the Itoh ’314 design in order to filter the signals obtained from the touchscreen from stray or parasitic noise, as is common in signal processing techniques. The resulting implementation would have been a predictable variation well within the purview of one of ordinary skill in the art.
[10A] A display arrangement	Itoh ’314 teaches a display arrangement comprising a display (e.g., LCD device 20 of Figure

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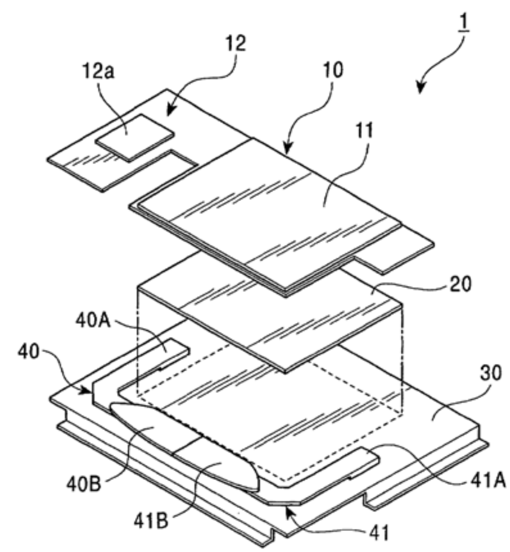
comprising: a display having a screen for displaying a graphical user interface; and	2) having a screen for displaying a graphical user interface. FIG. 2  See **[1A]**. Itoh ’314 states: “The display area of the liquid crystal display device 20 is placed on the back side of the coordinate detector 11 and the liquid crystal display device 20 is sandwiched by the coordinate input element 10 and the casing 30. In the coordinate input device 1 of the embodiment, the size of the liquid crystal display device 20 is substantially the same as that of the coordinate detector 11. Also, information displayed on the liquid crystal display device 20 is transmitted through the coordinate detector 11 so that the user can see the information. Also, a conductive ground layer is provided on a plane surface of the liquid crystal display device 20 so as to keep the coordinate detector 11 and the liquid crystal display device 20 electrically stable and to prevent an electrical disturbance from the electronic equipment.” Id.

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	at 7:47-60.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Itoh ’314 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Itoh ’314 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Itoh ’314 teaches the claimed touch panel comprising a first glass member (e.g., lower insulating layer 18 of Figure 5) disposed over the screen of the display.

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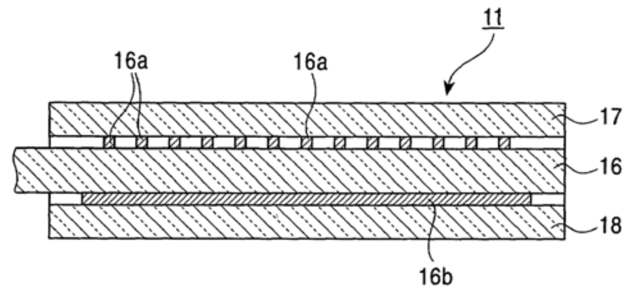
	FIG. 5  Itoh ’314 states: “As shown in FIGS. 4 and 5, in the coordinate detector 11, a plurality of (thirteen in FIG. 4) linear transparent electrodes (a first electrode layer) 16a extending in the direction orthogonal to the longitudinal direction of the substrate 16 are provided in parallel on the upper surface of the flat substrate (second insulating layer) 16, which comprises a transparent resin film and glass. Also, on the lower surface of the substrate 16, a plurality of (five in FIG. 4) strip-like transparent electrodes (a second electrode layer) 16b extending in the direction orthogonal to the transparent electrodes 16a provided on the upper surface of the substrate 16 are formed in parallel.” Id. at 6:54-53. “Also, as shown in FIG. 5, a protective layer (a first insulating layer) 17 comprising a transparent resin substrate is bonded to the substrate 16 with a transparent adhesive so as to cover the transparent electrodes 16a and a lower insulating layer (a third insulating layer) 18 comprising a transparent resin material is bonded to the substrate 16 with a transparent adhesive so as to cover the transparent electrodes 16b on the lower side of the substrate 16. A transparent hard coat layer having surface unevenness may be bonded to the upper surface of the protective layer 17 with a transparent adhesive or the like. When such a layer is provided, the friction between the tip of a finger or a pen and the scanned surface is reduced when the surface of the coordinate detector 11 is scanned by the finger or the pen, and thus the usability can be improved.” Id. at 5:66-6:13.

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	To the extent a first glass member disposed over the screen of the display is not expressly or inherently shown in Itoh ’314, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski ’455, Mulligan ’160, and Leeper show such a display arrangement. It would have been obvious to incorporate any of these display arrangements into the transparent touch sensing apparatus of Itoh ’314 in order to provide a simple touch screen input to a display, such as an LCD. See **[1A]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Itoh ’314 teaches a first transparent conductive layer disposed over the first glass member. See **[1A]** and **[1B]**.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Itoh ’314 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Itoh ’314 teaches a second glass member (e.g., substrate 16 of Figure 5) disposed over the first transparent conductive layer.

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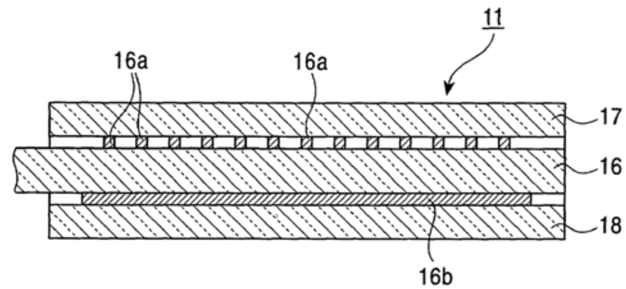
	FIG. 5  See **[10D]**. Itoh ’314 states: “As shown in FIGS. 4 and 5, in the coordinate detector 11, a plurality of (thirteen in FIG. 4) linear transparent electrodes (a first electrode layer) 16a extending in the direction orthogonal to the longitudinal direction of the substrate 16 are provided in parallel on the upper surface of the flat substrate (second insulating layer) 16, which comprises a transparent resin film and glass.” Id. at 6:54-60.
[10H] a second transparent conductive layer disposed over the second glass member,	Itoh ’314 teaches a second transparent conductive layer disposed over the second glass member. See **[1A]** and **[1B]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Itoh ’314 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10J] the parallel lines of the second transparent conductive layer being	Itoh ’314 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer.

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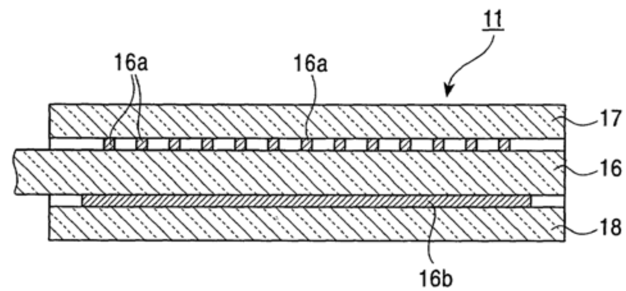
substantially perpendicular to the parallel lines of the first transparent conductive layer;	See **[1A]** and **[1B]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Itoh '314 teaches a third glass member (e.g., protective layer 17) disposed over the second transparent conductive layer. FIG. 5  See **[1A], [1B]**, and **[10G]**. Although Itoh '314 discloses that the protective layer 17 is composed of a transparent resin, it would have been an obvious to one of ordinary skill in the art to substitute a glass member for the resin substrate because both are transparent dielectrics. In addition, glass was already widely used as a transparent substrate in many touchscreen designs, and the resins disclosed by Itoh '314 were readily interchangeable with glass members. See **Exhibit P-1, [10G].**
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Itoh '314 teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1E]** and **[1F]**.
[11] The display arrangement as recited in claim 10 further including	Itoh '314 teaches the display arrangement as recited in claim 10 further including dummy features (e.g., a light setting resin) disposed in the space between the parallel lines, the

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dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. Itoh ’314 states: “Itoh ’3147 states: “However, these layers can be formed by applying a liquid resin material and then curing. For example, in order to form the protective layer 17 with this method, a light setting resin or a thermosetting resin is applied to cover the transparent electrodes 16a so that the resin is cured by ultraviolet radiation or heating. Also, only the lower insulating layer 18 may be a transparent resin substrate and the other layers may be formed by applying a resin and curing it as described above. By forming each of the layers by application of a resin and curing, an extremely thin layer can be easily formed. Accordingly, the light transmittance of the coordinate detector 11 can be easily increased compared to the case where the resin substrate is bonded with an adhesive.” Id. at 7:32-46. To the extent Itoh ’314 does not expressly or inherently disclose “dummy features” disposed in the space between the parallel lines, such features would have been obvious to one of ordinary skill in the art. Itoh ’314 clearly contemplates a transparent sensor in the form of a touchscreen, so it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See, e.g., **Exhibit P-1, [11]**.

EXHIBIT P-5
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR JAPANESE PUBLISHED PATENT APPLICATION P2002-342033A ("REKIMOTO '033")

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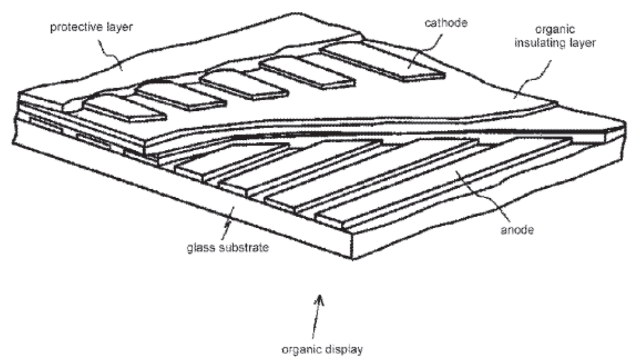
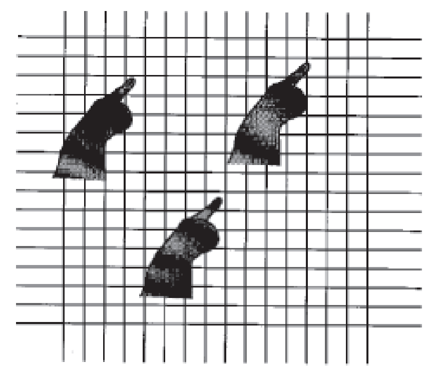
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Rekimoto '033 teaches a touch panel (e.g., organic display of Figure 9) comprising a transparent capacitive sensing medium (e.g., M x N matrix of Figure 7) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches. [FIG. 9]  [FIG. 7]  Rekimoto '033 states: "A further object of the present invention is to provide an excellent noncontact type user input device, with which it is possible to recognize two or more points of information, the shape of proximate objects, information on the distance to an object and the like." Id. ¶ [0014]. "The present invention is a noncontact type user input device for performing input in a noncontact manner using a user's fingertip or the like, the noncontact type user input device being characterized by comprising a plurality of linear transmission electrodes, a transmitter that supplies AC current for transmission to the transmission electrodes, a plurality of linear reception electrodes disposed so as not to touch the transmission electrodes, and a receiver

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	that receives AC current flowing in the reception electrodes, a circuit equivalent to a capacitor being formed at each of the points of intersection between the transmission electrodes and the reception electrodes.” Id. ¶ [0015]. “The noncontact user input device 1 according to this mode of embodiment is such that the points of intersection between the transmission electrodes 11-1… and the reception electrodes 15-1… are arrayed in an M x N matrix in the user input area. Furthermore, by virtue of a constitution such as shown in Fig. 1, it is possible to independently pick up detection values from points of intersection by independently driving the points of intersection between the electrodes.” Id. ¶ [0056]. “Accordingly, as shown in Fig. 7, if a plurality of user fingertips are present in the user input area, these can be independently recognized at the points of intersection where the user fingertip are proximate. Consequently, it is possible to receive simultaneous input from a plurality of users using one single user input device.” Id. ¶ [0057]. “Fig. 9 schematically depicts the cross-sectional structure of a noncontact user input device 1 that is constituted so as to be united with a display device comprising an electroconductive polymer-based light emitting element, which is to say, an organic LED. As shown in this figure, an anode electrode layer and a cathode electrode layer comprising an electroconductive polymer are stacked, with an insulating layer comprising an organic material therebetween. Furthermore, the anode electrodes and the cathode electrodes are disposed running straight with respect to each other.” Id. ¶¶ [0063]-[0064].
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Rekimoto ’033 teaches a transparent capacitive sensing medium comprising a first layer having a plurality of transparent first conductive lines (e.g., reception electrodes 15-1…) that are electrically isolated from one another. See **[1A]**.

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	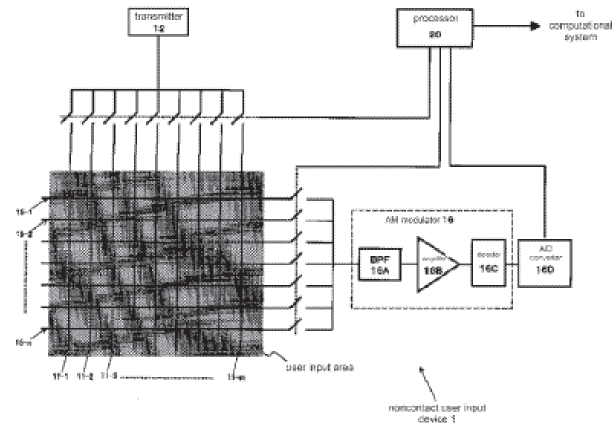 Rekimoto ’033 states: “A noncontact type user input device 1 comprises: a plurality of linear transmission electrodes 11-1, 11-2, …, 11-m; a transmitter 12 that supplies an AC current for transmission at a predetermined frequency…to the transmission electrodes 11-1…; a plurality of linear reception electrodes 15-1, 15-2, …, 15-n, which receive the AC current from the transmission electrodes 11-1…, by way of an electrostatic effect.” Id. ¶ [0030].
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Rekimoto ’033 teaches a second layer (e.g., transmission electrodes 11-1…) spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another. See **[1A]** and **[1B]**. Rekimoto ’033 states: “It will be understood from Fig. 1 that the reception electrodes have points of intersection with the [transmission] electrodes, but these electrodes do not contact each other at these points of intersection. In other words, a circuit equivalent to a capacitor that stores electrical charge is substantially formed at each intersection between the electrodes.” Id. ¶ [0031].

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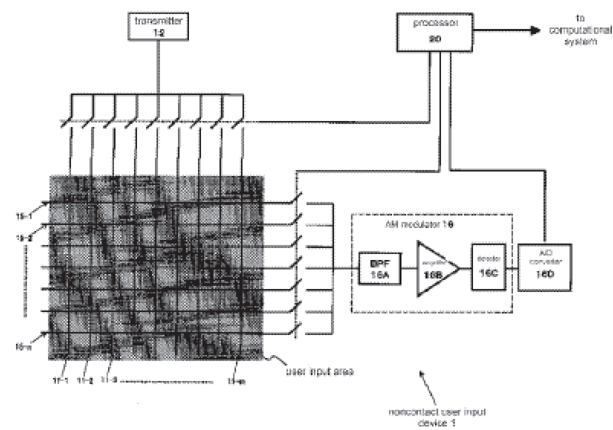
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Rekimoto ’033 teaches the second conductive lines (e.g., transmission electrodes 11-1…) being positioned transverse to the first conductive lines (e.g., reception electrodes 15-1…) . See **[1A]** and **[1B]**. Rekimoto ’033 states: “In the illustrated example, the transmission electrodes 11-1, 11-2, …, 11-m are arrayed substantially parallel, while the reception electrodes 15-1, 15-2, …, 15-n are arrayed in a direction orthogonal to the transmission electrodes 11-1…, and the user input area is a substantially planar area in which the electrodes are combined with each other, in a uniform manner, at the nodes of the lattice.” Id. ¶ [0033].
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Rekimoto ’033 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., processor 20).  See **[1A]** and **[1B]**. Rekimoto ’033 states: “It will be understood from Fig. 1 that the reception electrodes 15-1, 15-2, …, 15-n have points of intersection with the reception electrodes 11-1, 11-2, …, 11-m, but these electrodes do not contact each other at these points of intersection. In other words,

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	a circuit equivalent to a capacitor that stores electrical charge is substantially formed at each intersection between the electrodes.” Id. ¶ [0031]. “For example, by performing predetermined computational processing of the A/D converted output signals from the reception electrodes 15-1… with processor 20, two-dimensional user input can be detected via the user input area.” Id. ¶ [0032].
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Rekimoto ’033 teaches the claimed touch panel wherein capacitive monitoring circuitry (e.g., the signal processing unit and/or processor 20) is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. Rekimoto ’033 states: “The capacitance of the second capacitor equivalent circuit changes in accordance with the degree of proximity of the electroconductive object such as a fingertip. Accordingly, the AC current passing through the first capacitor equivalent circuit, which is connected in parallel with the second capacitor equivalent circuit, likewise changes in accordance with the degree of proximity of the electroconductive object such as a fingertip. Utilizing such a phenomenon, the noncontact type user input device can measure, not only the fact that the fingertip has approached, but also the distance to the fingertip when this has approached.” “Furthermore, the transmitter may scan the transmission electrodes with the AC current, and a signal processing unit may be further provided, which detects the input position by way of the positional relationship between the transmission electrode that transmitted the AC current and the reception electrode that received the AC current.” “In such a case, the noncontact user input device can measure the contour of the proximate object by tracking the points of intersection between the transmission electrodes and the reception electrodes at which input positions have been detected. In other words, the noncontact user input device can recognize not just simply the fact that an object such as a user’s fingertip has approached, but also the shape of the object. Furthermore, even if two or more users try to access the noncontact user input device at the same time, it is possible to recognize the fingertips of each person separately.”

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	“The transmitter may apply AC current to the transmission electrodes while scanning. Then, the noncontact user input device may be further provided with a signal processing unit, which detects the input position by way of the positional relationship between the transmission electrode that transmitted the AC current and the reception electrode that received the AC current.” “The signal processing unit utilizes the difference between the capacitance of the first virtual capacitor that is formed at the point of intersection between the transmission electrode and the reception electrode and the capacitance of the second virtual capacitor that is formed in response to an electroconductive object such a user’s fingertip having approached [the] point of intersection between [the] transmission electrode and [the] reception electrode, so as to detect the electroconductive object having approached.” Id. ¶¶ [0018] – [0022]. “Here, if AC voltage is applied to the transmission electrode 11 side, capacitive coupling occurs, by way of a capacitance C_a, between the transmission electrode 11 and the reception electrode 15, and an AC current is generated in the reception electrode 15. The strength of the current that passes through this capacitor C_a is picked up as digital data by way of performing signal processing with parts [that include] the band pass filter 16A, which is tuned to the transmission frequency of the AC voltage at the transmitter 23, the amplifier 16B, the detector 16C and the A/D converter 16D. The strength of the AC current received by the receptions electrode 11 is dependent only on the capacitance C_a of the capacitor.” Id. ¶ [0036].
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Rekimoto ’033 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]** and **[1D]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially	Rekimoto ’033 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.

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perpendicular to one another.	See **[1A]** and **[1D]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Rekimoto ’033 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). See **[1A]** and **[1B]**. To the extent Rekimoto ’033 does not inherently or expressly disclose the use of indium tin oxide (ITO) conductive lines, the use of such lines would have been obvious to one of ordinary skill in the art. Rekimoto ’033 clearly contemplates a transparent touch sensor over an organic display, such as a organic LCD or organic electroluminescent (EL) display, “without removing [ ] line of sight from the display screen.” See Id. at ¶ [0062]. As such, the use of ITO traces, which are highly transparent, as taught by, for example, Perski ’225, Mulligan ’160, or Leeper, would have been a predictable design choice well within the preview of one of ordinary skill. See **Exhibit P-1, [6]; Exhibit P-2, [6]; Exhibit P-9, [6]**.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Rekimoto ’033 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1E]** and **[1F]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Rekimoto ’033 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., amplifier 16B of Figure 1) coupled to the touch panel for detecting the touches on the touch panel.

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	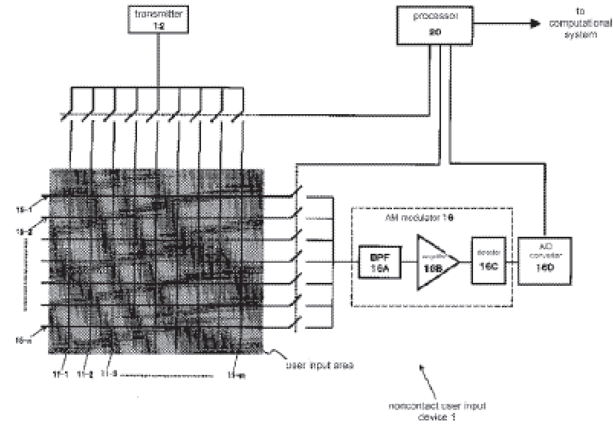 See **[1F]**. Rekimoto ’033 states: “Here, if AC voltage is applied to the transmission electrode 11 side, capacitive coupling occurs, by way of a capacitance C_a, between the transmission electrode 11 and the reception electrode 15, and an AC current is generated in the reception electrode 15. The strength of the current that passes through this capacitor C_a is picked up as digital data by way of performing signal processing with parts [that include] the band pass filter 16A, which is tuned to the transmission frequency of the AC voltage at the transmitter 23, the amplifier 16B, the detector 16C and the A/D converter 16D. The strength of the AC current received by the receptions electrode 11 is dependent only on the capacitance C_a of the capacitor.” Id. ¶ [0036].
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Rekimoto ’033 teaches a display arrangement comprising a display (e.g., organic display of Figure 9) having a screen for displaying a graphical user interface.

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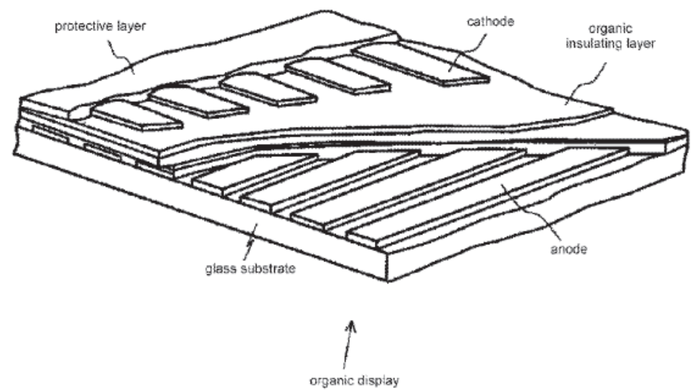
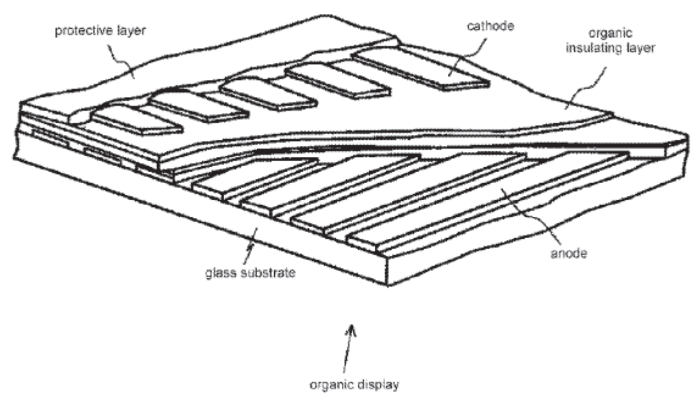
	[FIG. 9]  See **[1A]** and **[1B]**. Rekimoto '033 states: "By overlaying the user input device 1 on a flat display such as a liquid crystal display (LCD) or an organic EL, it is possible to constitute a user input device having an integrated display. With such a user input device, the user can easily and intuitively perform command input to the computer while being guided by the content of GUI screens that are output on the display." See Id. at ¶ [0062].
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Rekimoto '033 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]**, **[1B]**, and **[1F]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to	Rekimoto '033 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel.

U.S. Patent No. 7,663,607	Rekimoto '033
simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	See **[1A]** and **[1B]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Rekimoto '033 teaches the claimed touch panel comprising a first glass member (e.g., glass substrate of Figure 9) disposed over the screen of the display. [FIG. 9]  See **[1A]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Rekimoto '033 teaches a first transparent conductive layer (e.g., anode layer of Figure 9) disposed over the first glass member. See **[1A]** and **[1B]**.

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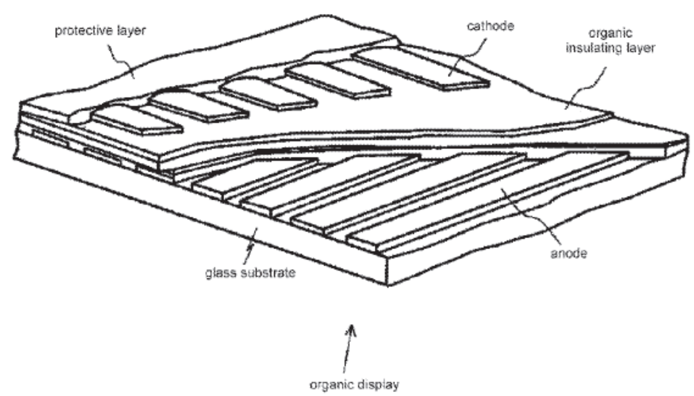
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Rekimoto ’033 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**, **[1B]**, and **[1D]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Rekimoto ’033 teaches a second glass member (e.g., organic insulating layer) disposed over the first transparent conductive layer. [FIG. 9]  See **[1A]**. To the extent the organic insulating layer is not a glass member, the use of a glass member as the organic insulating layer would have been a predictable variant. Glass, as a transparent dielectric, is widely used in touchscreen displays. It would have been obvious, therefore, to use a glass member as the insulating layer, as taught by Perski ’455, in order to sufficiently shield the cathode layer from the anode layer and provide a support for the transmission electrodes. See **Exhibit P-1, [10G]**.

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[10H] a second transparent conductive layer disposed over the second glass member,	Rekimoto ’033 teaches a second transparent conductive layer (e.g., cathode layer of Figure 9) disposed over the second glass member. See **[10G]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Rekimoto ’033 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**, **[1B]**, and **[1D]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Rekimoto ’033 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]**, **[1B]**, and **[1D]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Rekimoto ’033 teaches a third glass member (e.g., protective layer of Figure 9) disposed over the second transparent conductive layer. See **[1A]**. To the extent the protective layer is not a glass member, the use of a glass member as the protective layer would have been a predictable variant. Glass, as a transparent dielectric, is widely used in touchscreen displays. It would have been obvious, therefore, to use a glass member as the protective layer, as taught by Perski ’455, in order to protect the underlying electrodes from debris and damage. See **Exhibit P-1, [10K]**.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Rekimoto ’033 teaches one or more sensor integrated circuits operatively coupled to the lines.

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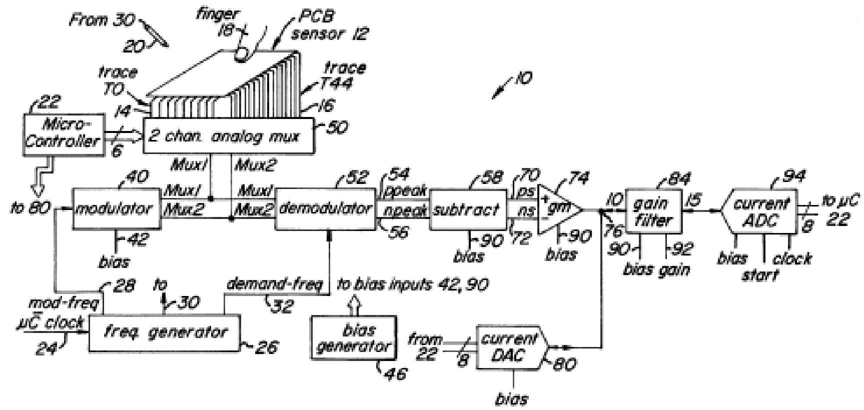
	See **[1F]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Rekimoto ’033 teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. Since Rekimoto ’033 clearly contemplates a transparent sensor in the form of a touchscreen, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

EXHIBIT P-6
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 5,920,309 ("BISSET '309")

U.S. Patent No. 7,663,607	Bisset '309
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Bisset '309 teaches a touch panel (e.g., capacitive touch sensing system 10 of Figure 1) comprising a transparent capacitive sensing medium (e.g., touch sensor 12 of Figure 1) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  FIG. 1. Bisset '309 states: "The present invention provides a novel method and apparatus for sensing the simultaneous proximity of one or more fingers or other appropriate objects to a touch sensor. Id. at 1:36-38. "It is a still further object of the rpesent invention to substantially immediately detect the presence of a finger or other appropriate object in proximate contact to a touch sensor by simultaneously driving and sensing a plurality of traces sufficient to represent the entirety of the touch sensor. Id. at 2:44-48.

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	Bisset '309 states: "In an exemplary embodiment which drives and senses two traces, the mux 50 selects adjacent traces. This permits multiple fingers to be identified, and in addition allows the relative movement of a finger to be monitored. However, in some embodiments it may be desirable to permit the mux 50 to select other than adjacent traces; for example, driving and sensing T14 and T17, which may both be X traces but are not adjacent. In other embodiments, it may be preferred to drive one or more X traces and sense one or more Y traces; for example, driving T5 (an X trace) and sensing T32 (a Y trace). In such an arrangement the selection of traces permits several fingers to be distinguished, allowing other features to be implemented. Although orthogonal traces are typically used, it is not necessary in all instances; moreover, in some instances some traces may be reserved for special purpose use, such as button functions or the like." Id. at 3:56-4:4. "An exemplary touch sensor (typically fabricated through printed circuit board techniques, through the use of other thin conductors on a transparent dielectric, or through other suitable techniques) comprises a plurality of traces arranged in an X-Y matrix of rows and columns. For an exemplary embodiment, a total of forty-five equally spaced traces . . . may be arranged in an appropriate number of rows and columns suited to the desired aspect ratio, for example two by three." Id. at 3:13-22.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Bisset '309 teaches a transparent capacitive sensing medium comprising a first layer having a plurality of transparent first conductive lines (e.g., row traces) that are electrically isolated from one another. See **[1A]**.

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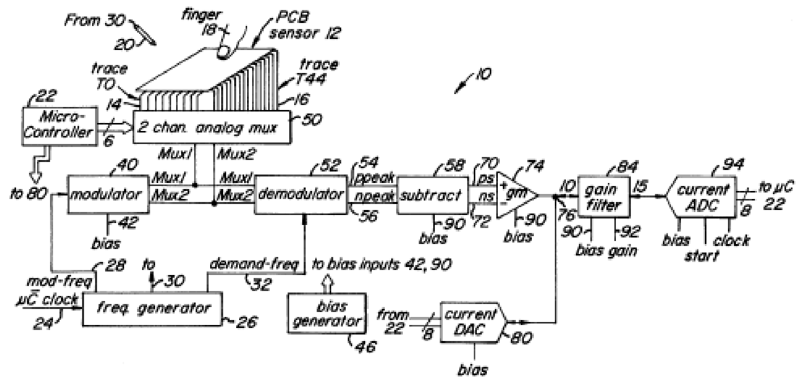
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Bisset ’309 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., columns traces) that are electrically isolated from one another. See **[1A]**.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Bisset ’309 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]**. Bisset ’309 states: “In such an arrangement the selection of traces permits several fingers to be distinguished, allowing other features to be implemented. Although orthogonal traces are typically used, it is not necessary in all instances; moreover, in some instances some traces may be reserved for special purpose use, such as button functions or the like.” Id. at 3:66-4:4.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Bisset ’309 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., mux 50 together with modulator 40 and/or demodulator 52, all of Figure 1, and associated circuitry).

U.S. Patent No. 7,663,607	Bisset '309
	 *FIG. 1.* See **[1A]** and **[1D]**. Bisset '309 states: "In response to the square wave drive currents I_{MOD1} and I_{MOD2} into the lines Mux1 and Mux2, the capacitance of the traces being sensed generates triangular sense signals on those same lines Mux1 and Mux2. The triangular signals on the lines Mux1 and Mux2 are shown in FIG. 2, and can be seen to be 180 degrees out of phase. The amplitudes of the sensed signals on the lines Mux1 and Mux2 decrease when the capacitance on the sensed traces increases due to the presence of a finger proximate to the trace; i.e., when the capacitance on either the Mux1 and/or the Mux2 line increases. The sensed signals on the Mux1 and Mux2 lines are supplied to a demodulator circuit 52." Id. at 4:19-31.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Bisset '309 teaches wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1D]** and **[1E]**.

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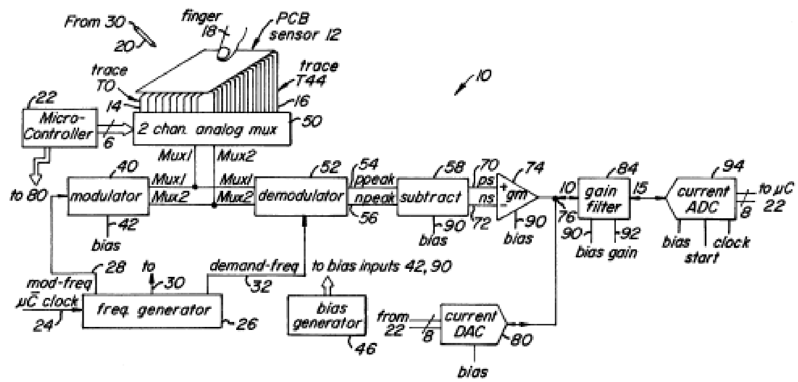
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Bisset ’309 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Bisset ’309 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1D]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Bisset ’309 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). See **[1A]**. To the extent Bisset ’309 does not inherently or expressly disclose the use of indium tin oxide (ITO) conductive lines, the use of such lines would have been obvious to one of ordinary skill in the art. Bisset ’309 clearly contemplates use of “thin conductors on transparent dielectric.” See Id. at 1:9-17. As such, the use of ITO traces, which are highly transparent, as taught by, for example, Perski ’225, Mulligan ’160, or Leeper, would have been a predictable design choice well within the preview of one of ordinary skill. See **Exhibit P-1, [6]; Exhibit P-2, [6]; Exhibit P-9, [6]**.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Bisset ’309 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1D]** and **[1E]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground	Bisset ’309 teaches the the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., gain filter 84 of Figure 1 and/or amplifier/filter stage 84 of

U.S. Patent No. 7,663,607	Bisset '309
charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Figures 8A and 8B) coupled to the touch panel for detecting the touches on the touch panel.  FIG. 1. Bisset '309 sates: "The gain filter 84 is discussed in greater detail hereinafter in connection with FIGS. 8A and 8B. The gain filter 84 functions generally to amplify the signal I_0, with the gain typically in the range of three to perhaps more than one hundred, and the resulting signal I_5 is supplied to a current analog to digital converter 94." Id. at 5:6-11 "Now referring to FIGS. 8A and 8B, the amplifier/filter stage 84 may be better understood. As previously noted, the amplifier portion may comprise a plurality of programmable gain stages 720A-720N daisy-chained together, and in an exemplary embodiment comprises five stages. The input I_0 serves as the first input, with each stage receiving associated BIAS and GAIN inputs. The several BIAS inputs are each supplied by the bias generator 46, while the several GAIN inputs, shown collectively at 92 in FIG. 1, are supplied by the microcontroller 22. The GAIN control signals, may be, for example, a total of five two bit words. The output I_5 of the final stage is provide to the A-D converter 94." Id. at 7:30-41.
[10A] A display arrangement comprising: a display having a screen	Bisset '309 teaches a display arrangement comprising a display having a screen for displaying a graphical user interface.

U.S. Patent No. 7,663,607	Bisset '309
for displaying a graphical user interface; and	See **[1A]**. To the extent a display arrangement comprising a display having a screen for displaying a graphical user interface is not expressly or inherently shown in Bisset '309, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski '455, Mulligan '160, and Leeper show such a display arrangement. It would have been obvious to incorporate any of these display arrangements into the transparent touch sensing apparatus of Bisset '309 in order to provide a simple touch screen input to a display, such as an LCD.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Bisset '309 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]** and **[10A]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Bisset '309 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member	Bisset '309 teaches the claimed touch panel comprising a first glass member disposed over the screen of the display.

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disposed over the screen of the display;	See **[10A]**. To the extent a first glass member disposed over the screen of the display is not expressly or inherently shown in Bisset ’309, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski ’455, Mulligan ’160, and Leeper show such a display arrangement. It would have been obvious to incorporate any of these display arrangements into the transparent touch sensing apparatus of Bisset ’309 in order to provide a simple touch screen input to a display, such as an LCD.
[10E] a first transparent conductive layer disposed over the first glass member,	Bisset ’309 teaches a first transparent conductive layer disposed over the first glass member. See **[1A]** and **[10D]**. Bisset ’309 states: “An exemplary touch sensor (typically fabricated through printed circuit board techniques, through the use of other thin conductors on a transparent dielectric, or through other suitable techniques) comprises a plurality of traces arranged in an X-Y matrix of rows and columns. For an exemplary embodiment, a total of forty-five equally spaced traces . . . may be arranged in an appropriate number of rows and columns suited to the desired aspect ratio, for example two by three.” Id. at 3:13-22.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Bisset ’309 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Bisset ’309 teaches a second glass member disposed over the first transparent conductive layer. See **[1A].** Bisset ’309 states: “An exemplary touch sensor (typically fabricated through printed circuit

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	board techniques, through the use of other thin conductors on a transparent dielectric, or through other suitable techniques) comprises a plurality of traces arranged in an X-Y matrix of rows and columns. For an exemplary embodiment, a total of forty-five equally spaced traces . . . may be arranged in an appropriate number of rows and columns suited to the desired aspect ratio, for example two by three.” Id. at 3:13-22. To the extent a second glass member disposed the first transparent conductive layer is not expressly or inherently shown in Bisset ’309, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the transparent touch sensing apparatus of Bisset ’309 in order to provide a simple touch screen input to a display, such as an LCD.
[10H] a second transparent conductive layer disposed over the second glass member,	Bisset ’309 teaches a second transparent conductive layer disposed over the second glass member. See **[1A]** and **[10D]**. Bisset ’309 states: “An exemplary touch sensor (typically fabricated through printed circuit board techniques, through the use of other thin conductors on a transparent dielectric, or through other suitable techniques) comprises a plurality of traces arranged in an X-Y matrix of rows and columns. For an exemplary embodiment, a total of forty-five equally spaced traces . . . may be arranged in an appropriate number of rows and columns suited to the desired aspect ratio, for example two by three.” Id. at 3:13-22.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Bisset ’309 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10J] the parallel lines of the second	Bisset ’309 teaches the parallel lines of the second transparent conductive layer being

U.S. Patent No. 7,663,607	Bisset ’309
transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1D].**
[10K] a third glass member disposed over the second transparent conductive layer; and	Bisset ’309 teaches a third glass member disposed over the second transparent conductive layer. See **[1A].** Bisset ’309 states: “An exemplary touch sensor (typically fabricated through printed circuit board techniques, through the use of other thin conductors on a transparent dielectric, or through other suitable techniques) comprises a plurality of traces arranged in an X-Y matrix of rows and columns. For an exemplary embodiment, a total of forty-five equally spaced traces . . . may be arranged in an appropriate number of rows and columns suited to the desired aspect ratio, for example two by three.” Id. at 3:13-22. To the extent a third glass member is not expressly or inherently shown in Bisset ’309, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the transparent touch sensing apparatus of Bisset ’309 in order to provide a simple touch screen input to a display, such as an LCD.
[10K] one or more sensor integrated circuits operatively coupled to the lines.	Bisset ’309 teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1A], [1D],** and **[1E].**
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy	Bisset ’309 teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.

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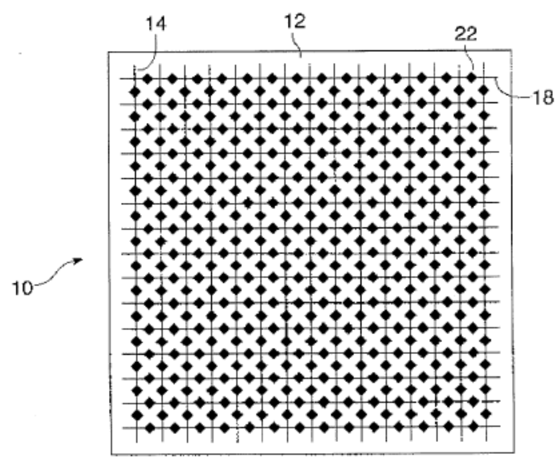
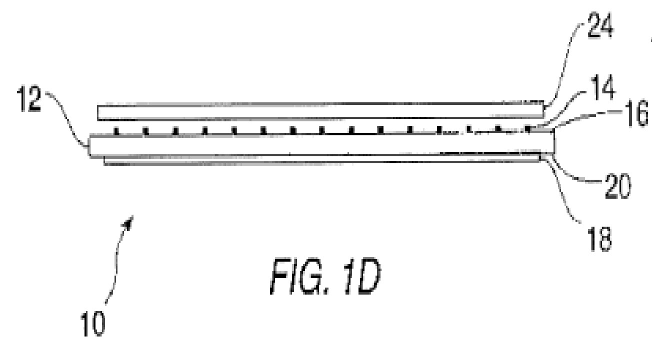
features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	See **[1A].** Since Bisset ’309 clearly contemplates a transparent sensor in the form of a touchscreen, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

EXHIBIT P-7
SAMSUNG’S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 5,543,588 (“BISSET ’588”)

U.S. Patent No. 7,663,607	Bisset ’588
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Bisset ’588 teaches a touch panel comprising a transparent capacitive sensing medium (e.g., sensor array 1 of Figure 1C) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  FIG. 1C  FIG. 1D Bisset ’588 states: “According to a preferred embodiment of the present invention, referred to herein as a "finger pointer" embodiment, a position sensing system includes a position sensing transducer comprising a touch-sensitive surface disposed on a substrate, such as a printed circuit board, including a matrix of conductive lines. A first set of conductive lines runs in a first direction and is insulated from a second set of conductive lines running in a second direction generally perpendicular to the first direction. An insulating layer is disposed over the first and second sets of

U.S. Patent No. 7,663,607	Bisset '588
	conductive lines. The insulating layer is thin enough to promote significant capacitive coupling between a finger placed on its surface and the first and second sets of conductive lines." Id. at 5:9-19. "A presently preferred sensor array 10 according to the present invention comprises a substrate 12 including a set of first conductive traces 14 disposed on a top surface 16 thereof and run in a first direction to comprise row positions of the sensor array 10. A set of second conductive traces 18 are disposed on a bottom surface 20 thereof and run in a second direction preferably orthogonal to the first direction to form the column positions of the sensor array 10. The sets of first and second conductive traces 14 and 18 are alternately in contact with periodic sense pads 22 comprising enlarged areas, shown as diamonds in FIGS. 1a-1c. While sense pads 22 are shown as diamonds in FIGS. 1a-1c, any shape, such as circles, which allows close packing of the sense pads 22 is equivalent for purposes of this invention. As an arbitrary convention herein, the set of first conductive traces 14 will be referred to as being oriented in the "X" or "row" direction and may be referred to herein sometimes as "X lines" and the set of second conductive traces 18 will be referred to as being oriented in the "Y" or "column" direction and may be referred to herein sometimes as "X lines". The number and spacing of these sense pads 22 depends upon the resolution desired. For example, in an actual embodiment constructed according to the principles of the present invention, a 0.10 inch center-to-center diamond-shaped pattern of sense pads disposed along a matrix of 15 rows and 15 columns of conductors is employed. Every other sense pad 22 in each direction in the pad pattern is connected to sets of first and second conductive traces 14 and 18 on the top and bottom surfaces 16 and 20, respectively of substrate 12." Id. at 9:12-41. "Both embodiments then take these profiles and calculate the centroid for X and Y position and integrate under the curve for the Z pressure information. The position sensor of these embodiments can only report the position of one object on its sensor surface. If more than one object is present, the position sensor of this embodiment computes the centroid position of the combined set of objects. However, unlike prior art, because the entire pad is being profiled, enough information is available to discern simple multi-finger gestures to allow for a more powerful user interface." Id. at 5:56-65.

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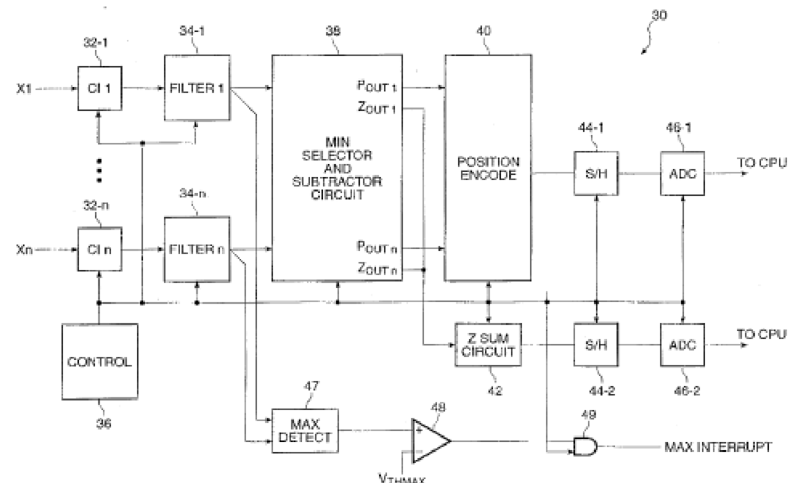
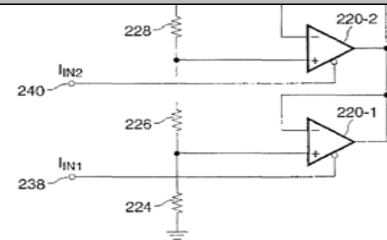
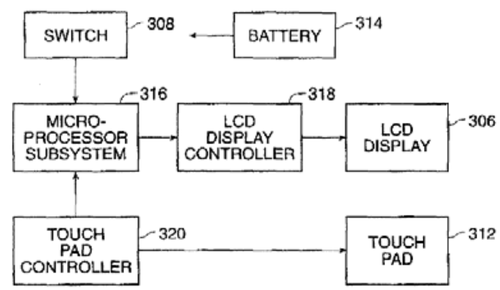
	"The sensor material can be anything that allows creation of a conductive X/Y matrix of pads. This includes not only standard PC board, but also flexible PC board, conductive elastomer materials, silk-screened conductive lines, and piezo-electric Kynar plastic materials. This renders it useful as well in any portable equipment application or in human interface where the sensor needs to be molded to fit within the hand." Id. at 8:34-41. "There are two different capacitive effects taking place when a finger approaches the sensor array 10. The first capacitive effect is trans-capacitance, or coupling between sense pads 22, and the second capacitive effect is self-capacitance, or coupling to virtual ground. Sensing circuitry is coupled to the sensor array 10 of the present invention and responds to changes in either or both of these capacitances. This is important because the relative sizes of the two capacitances change greatly depending on the user environment. The ability of the present invention to detect changes in both self capacitance and trans-capacitance results in a very versatile system having a wide range of applications." Id. at 10:1-12.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Bisset '588 teaches a transparent capacitive sensing medium comprising a first layer having a plurality of transparent first conductive lines (e.g., conductive traces 14) that are electrically isolated from one another. See **[1A]**.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Bisset '588 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., conductive traces 18) that are electrically isolated from one another. See **[1A]**.
[1D] the second conductive lines being positioned transverse	Bisset '588 teaches the second conductive lines being positioned transverse to the first conductive lines.

U.S. Patent No. 7,663,607	Bisset ’588
to the first conductive lines,	See **[1A]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Bisset ’588 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., sensing circuitry 30 of Figure 2).  FIG. 2 See **[1A]**. Bisset ’588 states: “The sensor electronic circuit employed in the present invention is very robust and calibrates out process and systematic errors. It will process the capacitive information from the sensor and provide digital information to an external device, for example, a microprocessor.” Id. at 21:44-48. “The capacitance at each sensor matrix node is measured simultaneously using charge integrator circuits 32-1 through 32-n. The function of each charge integrator is to develop an output voltage proportional to the capacitance sensed on the corresponding X matrix line. According to the

U.S. Patent No. 7,663,607	Bisset ’588
	presently preferred drive/sense method, the capacitance measurements are performed simultaneously across all inputs in one dimension….” Id. at 11:20-36.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Bisset ’588 teaches the claimed touch panel wherein capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1A]**. The capacitance at each sensor matrix node is measured simultaneously using charge integrator circuits. The function of each charge integrator is to develop an output voltage proportional to the capacitance sensed on the corresponding X matrix line. According to the presently preferred drive/sense method, the capacitance measurements are performed simultaneously across all inputs in one dimension, providing a snapshot of all inputs simultaneously. *See, e.g.,* 11:20-36. The sensor can sense transcapacitance between table rows and columns. *See, e.g.,* 4:58-60.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Bisset ’588 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Bisset ’588 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin	Bisset ’588 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).

U.S. Patent No. 7,663,607	Bisset ’588
oxide (ITO).	Bisset ’588 states: “The sensor material can be of anything that allows creation of a conductive X/Y matrix of pads. This includes not only standard PC board, but also flexible PC board, conductive elastomer materials, silk-screened conductive lines, and piezo-electric Kynar plastic materials. Id. at 8:34-41. To the extent one or ordinary skill in the art would not recognize ITO to be a subset of one of these materials, the use of ITO conductive lines would be a predictable variant. For example, Perski ’455 teaches a transparent touch sensor that uses a grid of ITO conductive lines. See **Exhibit P-1, [6]**. It would have been obvious to one of ordinary skill in the art to form the conductive lines from ITO in order to create a transparent sensor suitable for use in a variety of applications.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Bisset ’588 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1A]**. Bisset ’588 states: “There are two different capacitive effects taking place when a finger approaches the sensor array. The first capacitive effect is trans-capacitance, or coupling between sense pads, and the second capacitive effect is self-capacitance, or coupling to virtual ground.” Id. at 10:1-5. At least the “trans-capacitance” effect is a form of mutual capacitance sensing.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Bisset ’588 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., amplifiers 220 of Figure 9A) coupled to the touch panel for detecting the touches on the touch panel.

U.S. Patent No. 7,663,607	Bisset ’588
	 FIG. 9A Bisset ’588 states: “As presently preferred, position encoder circuit 38 includes a plurality of transconductance amplifiers 220-1 through 220-6 connected as followers. The outputs of all amplifiers 220-1 through 220-6 are connected together to a common node 222, which comprises the position encoder output node of the circuit 38.”
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Bisset ’588 teaches a display arrangement comprising a display (e..g, LCD display 306) having a screen for displaying a graphical user interface.  FIG. 13 Bisset ’588 states: “A handheld computing device according to the present invention may be packaged in a small enclosure wherein a display is disposed on a first face of the device and a touch pad input device is disposed on a second face of the device.” Id. at 6:13-16. “By locating the LCD display and touch pad surface on opposing faces, data may be entered without obscuring the user view of the display. In addition, by locating the touch pad surface exactly opposite the LCD display, finger position and movement may be well correlated with

U.S. Patent No. 7,663,607	Bisset ’588
	information and its position on the display, thus allowing the finger to, in effect, become the ‘mouse’ device.” 22:60-67.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Bisset ’588 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]** and **[10A]**. To the extent Bisset ’588 does not expressly or inherently show a transparent touch panel allowing the screen to be viewed therethrough, such an arrangement, as taught by Perski ’455, would have been obvious to one of ordinary skill in the art in order to simplify input on top of LCD display 306.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Bisset ’588 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Bisset ’588 teaches the claimed touch panel comprising a first glass member disposed over the screen of the display. See **[1A]**. To the extent a first glass member disposed over the screen of the display is not expressly or inherently shown in Bisset ’309, such an arrangement would have been obvious to one of ordinary

U.S. Patent No. 7,663,607	Bisset ’588
	skill in the art. For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the touch sensing apparatus of Bisset ’558 in order to provide a simple, transparent touch screen input to a display, such as LCD display 306.
[10E] a first transparent conductive layer disposed over the first glass member,	Bisset ’588 teaches a first transparent conductive layer disposed over the first glass member. See **[1A]**.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Bisset ’588 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Bisset ’588 teaches a second glass member disposed over the first transparent conductive layer. See **[1A]**. To the extent a second glass member disposed over the first transparent conductive layer is not expressly or inherently shown in Bisset ’309, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the touch sensing apparatus of Bisset ’558 in order to provide a simple, transparent touch screen input to a display, such as LCD display 306.
[10H] a second transparent conductive layer disposed over the second glass member,	Bisset ’588 teaches a second transparent conductive layer disposed over the second glass member. See **[1A]**.
[10I] the second transparent	Bisset ’588 teaches the second transparent conductive layer comprising a plurality of spaced apart

U.S. Patent No. 7,663,607	Bisset ’588
conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	parallel lines having the same pitch and linewidths. See **[1A]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Bisset ’588 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Bisset ’588 teaches a third glass member disposed over the second transparent conductive layer. See **[1A]**. To the extent a third glass member disposed over the second transparent conductive layer is not expressly or inherently shown in Bisset ’309, such an arrangement would have been obvious to one of ordinary skill in the art. For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the touch sensing apparatus of Bisset ’558 in order to provide a simple, transparent touch screen input to a display, such as LCD display 306.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Bisset ’588 teaches one or more sensor integrated circuits (e.g., sensing circuitry 30) operatively coupled to the lines. See **[1E]**.
[11] The display arrangement as recited in claim 10 further including dummy features	Bisset ’588 teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.

U.S. Patent No. 7,663,607	Bisset ’588
disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	See **[1A].** Since Bisset ’558 clearly contemplates a touch sensor used with a display screen, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

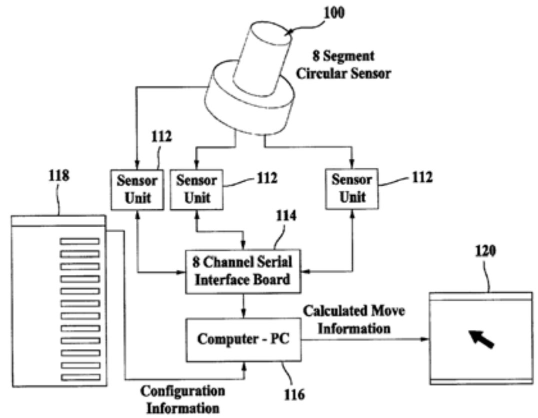
EXHIBIT P-8
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT APP. PUB. NO. 2003/0069653 ("JOHNSON '653")

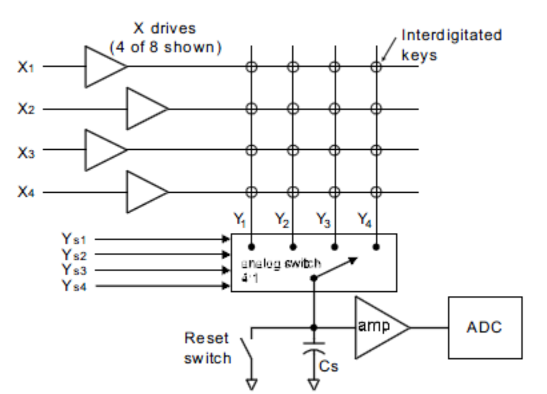
U.S. Patent No. 7,663,607	Johnson '653[3]
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Johnson '653 teaches a touch panel comprising a transparent capacitive sensing medium (e.g., sensor unit 112) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.

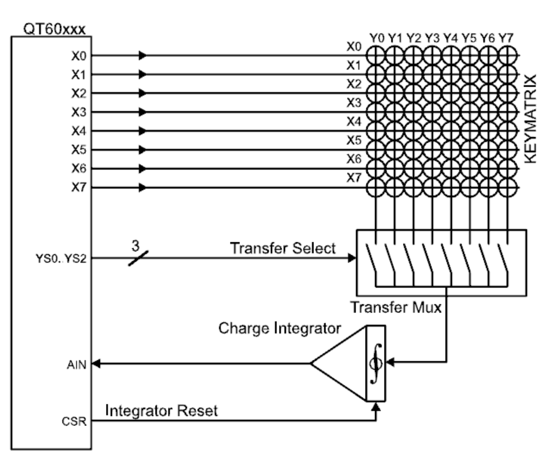
[3] With regard to the 32-segment sensor arrangement, Johnson '653 expressly discloses a Quantum Research Group QT60320 capacitive based matrix touch switch as part of its sensor unit. *See* Johnson '653 at ¶¶ [0044]-[0045]. This analysis therefore refers to two documents publicly available prior to the publication of Johnson '653 that more fully describe the operation of the Quantum Research Group QT60320 capacitive based matrix touch switch:

1. Quantum Research Group QProx QT60320 32-Key QMatrix Chart-Transfer IC Datasheet (1999) ("Datasheet")
2. Quantum Research Application Note AN-KD01: QMatrix Panel Design Guidelines (October 10, 2002) ("Application Note")

The Quantum Research Group QT60320 sensor IC is also a prior art reference in its own right, without reference to Johnson '653. The analysis for the QT60320 sensor IC is believed to be identical (or substantially similar) to the analysis shown here. Samsung is in the process of requesting additional information about the QT603xx sensor from Quantum Research Group and reserves the right to supplement this Exhibit after that information is received.

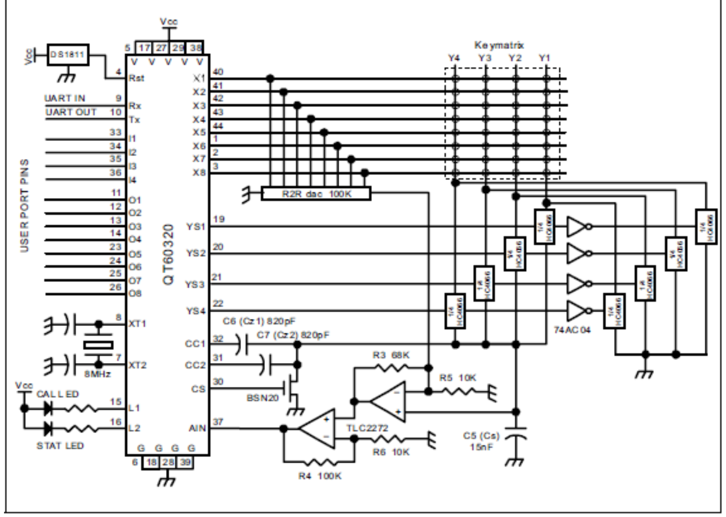
U.S. Patent No. 7,663,607	Johnson ’653[3]
	 FIG. 8 Johnson ’653 states: “The QT60320 sensor unit detects the capacitive coupling of electromagnetic fields. The matrix switch can be envisioned as 4 rows and 8 columns of "wires". The intersection of a particular row with a particular column is a "switch", though electrically there is no true intersection of the rows with the columns. Each of these wires is excited by the electronics and creates an electromagnetic field. When a finger, hand, or other object is placed in close proximity of any intersection, the electromagnetic field of the corresponding row and corresponding column are coupled, and this particular "switch" is turned ON. The output of the sensor at any given time is the state of all of the 32 switches formed by the intersection of the 4 rows and 8 columns. Unlike some "touch switches", the QT60320 sensor does not require passing electrical "leakage" currents through the object being detected. Thus, the conductive wire or foil matrix can be completely enclosed behind glass, plastic, or other material that is not electrically conductive. A true "touch", meaning direct contact to the conductive components, is not required. The switch is known as a touch switch because close proximity is required, and for practical purposes this may be indistinguishable from a touch, though electrically this non-contact technique has safety (e.g. freedom from electrical leakage currents) and reliability advantages (e.g. immunity to electrostatic discharge).” Id. at ¶ 45.

U.S. Patent No. 7,663,607	Johnson ’653[3]
	As explained in the Datasheet, the “conductive wire or foil matrix” taught in Johnson ’653 can be made of any “conductive material, like copper, Indium-Tin-Oxide (ITO), or screened silver.” Datasheet at 1. The QT60320 can be made entirely of transparent material, including clear ITO electrodes and transparent dielectrics like glass or plastic. Id. The transparent touch panel disclosed in Johnson ’653 is configured to detect multiple touches or near touches that occur at a same time and at distinct location in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches. See, e.g., Johnson ’653 at ¶ 45 (“The output of the sensor at any given time is the state of all of the 32 switches formed by the intersection of the 4 rows and 8 columns.”); Datasheet at 7 (“After an ‘s’ character is received, the E6S2 reports back the touch-state of the buttons; it responds by transmitting back 4 bytes of data containing a total of 32 data bits, where each bit represents the state of one button (Table 3-2). Each byte holds the state of the buttons contained in a Y column. The first byte corresponds to column Y1 while the 4th byte corresponds to column Y4. Bit 0 of each byte holds the state of the button corresponding to X1; bit 7 holds the state corresponding to X8. Multiple key presses will show as multiple bits being set in the data stream. The device supports n-key rollover to a limit of all 32 keys.”). **Figure 1-5 QT60320 Matrix Configuration** 

U.S. Patent No. 7,663,607	Johnson ’653[3]
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Johnson ’653 teaches a transparent capacitive sensing medium comprising a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another. Johnson ’653 describes a touch sensitive input device in a capacitive sensing medium made up of multiple connected capacitive sensors yield information about the proximity of the operator and other objects relative to the sensor. Id. at ¶ 32. In one embodiment, the capacitive sensing medium uses QT60320 sensor units from Quantum Research Group. Each QT60320 sensor unit detects the capacitive coupling of electromagnetic fields. A matrix of 4 rows and 8 columns of wires is used in each QT60320 sensor unit. See, e.g., id. at 45. Figure 1 – XY Matrix Configuration  As explained in the QMatrix Panel Design Guidelines, the QT60320 comprises pulse driven rows (X) and charge-receiving columns (Y) of traces. See Application Note at 1. On some matrix panels, the X and Y lines can be placed on opposite sides of a single dielectric,

U.S. Patent No. 7,663,607	Johnson ’653[3]
	eliminating the need for a separate insulating layer between traces. Id. at 2.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Johnson ’653 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another. See **[1A]** and **[1B]**.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Johnson ’653 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]** and **[1B]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Johnson ’653 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry. See **[1A]** and **[1B]**.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Johnson ’653 teaches the claimed touch panel wherein capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1A]** and **[1B]**.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Johnson ’653 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]** and **[1B]**.

U.S. Patent No. 7,663,607	Johnson ’653[3]
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Johnson ’653 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]** and **[1B]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Johnson ’653 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). As explained in the QT60320 Datasheet, the “conductive wire or foil matrix” taught in Johnson ’653 can be made of any conductive material, including transparent Indium Tin Oxide (ITO). *See, e.g.*, Datasheet at 1. See **[1A]** and **[1B]**.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Johnson ’653 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1A]** and **[1B]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Johnson ’653 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., within basic QT60320 circuit) coupled to the touch panel for detecting the touches on the touch panel. Johnson ’653 states: “The QT60320 calibrates and processes all signals using a number of algorithms pioneered by Quantum.” Datasheet at 4.

U.S. Patent No. 7,663,607	Johnson ’653[3]
	Figure 2-1 Basic QT60320 Circuit  See **[1A]** and **[1B]**.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Johnson ’653 teaches a display arrangement comprising a display having a screen for displaying a graphical user interface. See **[1A]** and **[1B]**.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Johnson ’653 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]** and **[1B]**.

U.S. Patent No. 7,663,607	Johnson ’653[3]
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Johnson ’653 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]** and **[1B]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Johnson ’653 teaches the claimed touch panel comprising a first glass member disposed over the screen of the display. The QT60320 will project its 32 touch-sensing keys through almost any dielectric, like glass, plastic, stone, ceramic, and even most kinds of wood, up to thicknesses of 5 cm or more. See, e.g., Datasheet at 1. See **[1A]** and **[1B]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Johnson ’653 teaches a first transparent conductive layer disposed over the first glass member. See **[1A]** and **[1B]**.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Johnson ’653 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10G] a second glass member disposed over the first transparent	Johnson ’653 teaches a second glass member disposed over the first transparent conductive layer.

U.S. Patent No. 7,663,607	Johnson ’653[3]
conductive layer;	See **[1A]** and **[1B]**.
[10H] a second transparent conductive layer disposed over the second glass member,	Johnson ’653 teaches a second transparent conductive layer disposed over the second glass member. See **[1A]** and **[1B]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Johnson ’653 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Johnson ’653 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]** and **[1B]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Johnson ’653 teaches a third glass member disposed over the second transparent conductive layer. See **[1A]** and **[1B]**.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Johnson ’653 teaches one or more sensor integrated circuits (e.g., basic QT60320 circuit) operatively coupled to the lines. “The QT60320 calibrates and processes all signals using a number of algorithms pioneered by Quantum.” Datasheet at 4.

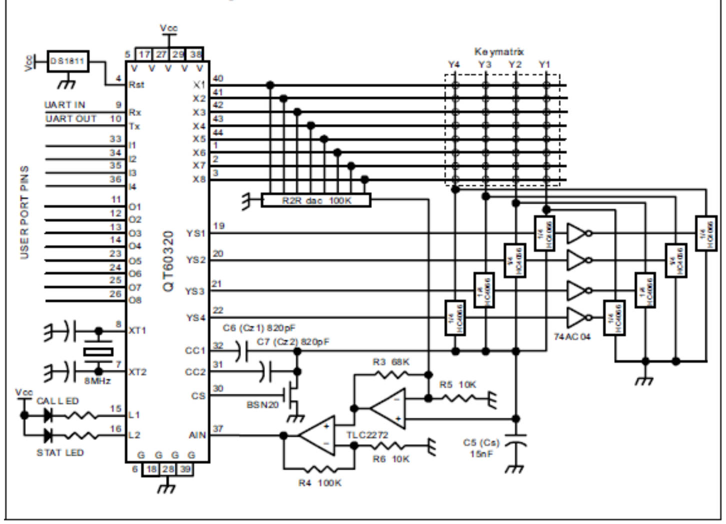
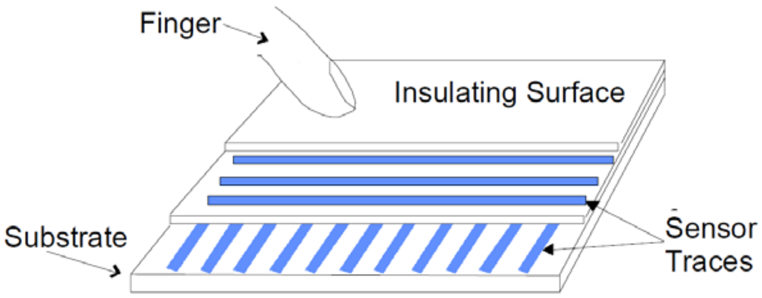
U.S. Patent No. 7,663,607	Johnson ’653[3]
	Figure 2-1 Basic QT60320 Circuit  QT60320 Datasheet at 5.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Johnson ’653 teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. See **[1A]** and **[1B]**. Since Johnson ’653 clearly contemplates a touch sensor used with a display screen, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

EXHIBIT P-9
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR A.K. LEEPER, "INTEGRATION OF A CLEAR CAPACITIVE TOUCH SCREEN WITH A 1/8-VGA FSTN-LCD TO FORM LCD-BASED TOUCHPAD" ("LEEPER")

U.S. Patent No. 7,663,607	Leeper[4]
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Leeper teaches a touch panel comprising a transparent capacitive sensing medium (e.g., Synaptics Capacitive TouchPad Sensor of Figure 2) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  **Figure 2. Synaptics Capacitive TouchPad Sensor** Leeper states: "The Synaptics ClearPad is a unique and innovative touch screen for personal computers and portable handheld devices. The clear and thin sensing surface allows Synaptics proven capacitive touch sensing technology to be placed upon any surface without impacting the view-ability of the underlying component. Capacitive finger sensing is far

4 Leeper describes a commercial product from Synaptics Incorporated called the ClearPad (or cPad). This commercial product is also an invalidating reference in its own right. The invalidity analysis for this commercial product is believed to be identical (or substantially similar) to the analysis shown here. Samsung is in the process of requesting additional information about the ClearPad from Synaptics Incorporated and reserves the right to supplement this Exhibit after that information is received.

U.S. Patent No. 7,663,607	Leeper[4]
	more sensitive than all other transparent membrane touch technologies." Id. at 187. "The Synaptics ClearPad is based on the same principles of operation as a standard Synaptics TouchPad (see Figure 2). The touch sensor is comprised of two arrays of sensor traces perpendicular to one another, separated by an insulating material, and covered by insulating surface material. To form a clear sensor, the traces are made of a clear conductor such as indium tin oxide (ITO) and the insulation layers consist of optically clear adhesives and clear polyethylene terephthalate (PET), a plastic resin and a form of polyester. Each trace possesses a capacitance to free space that can be measured by the controlling circuitry" Id. at 188. "Synaptics' proprietary ASIC utilizes a custom analog circuit to measure trace capacitance…. the controller is capable of computing finger pressure as an increase in the finger contact area (thereby adding capacitance to more traces), as well as detecting the presence of multiple fingers." Id. at 188.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Leeper teaches a transparent capacitive sensing medium (e.g., Synaptics Capacitive TouchPad Sensor of Figure 2) comprising a first layer (e.g., first array of sensor traces of Figure 2) having a plurality of transparent first conductive lines that are electrically isolated from one another. See **[1A]**.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Leeper teaches a second layer (e.g., second array of sensor traces of Figure 2) spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another. See **[1A]**.

U.S. Patent No. 7,663,607	Leeper[4]
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Leeper teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Leeper teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., custom analog circuit, controlling circuitry and/or module PCB). Leeper states: "The presence of a finger changes the capacitance of the nearest traces by about 10%. This capacitance change is measured by the controlling circuitry and finger position is computed from this information." Id. at 188. "Synaptics' proprietary ASIC utilizes a custom analog circuit to measure trace capacitance. This involves the controller outputting a fixed current over a set time period and then measuring the resultant voltage on each trace. Because finger presence is computed by changes in trace array capacitances, the controller is capable of computing finger pressure as an increase in the finger contact area (thereby adding capacitance to more traces), as well as detecting the presence of multiple fingers." Id. "To minimize transcapacitance and maximize sensor performance, the ClearPad sensor was transformed from a single sensor trail design into a double tail design with separate connections for the x and y sensor traces. This resulted in four individual tails that needed to be joined to the cPad module PCB (x/y tails of the LCD and the x/y tails of the ClearPad sensor)." Id.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Leeper teaches the claimed touch panel wherein capacitive monitoring circuitry (e.g., custom analog circuit and/or cPad module PCB) is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1E]**.

U.S. Patent No. 7,663,607	Leeper[4]
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Leeper teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Leeper teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Leeper teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). Leeper states: "To form a clear sensor, the traces are made of a clear conductor such as indium tin oxide (ITO) and the insulation layers consist of optically clear adhesives and clear polyethylene terephthalate (PET), a plastic resin and a form of polyester." Id. at 188.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Leeper teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1E]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Leeper teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **[1E]**. To the extent a virtual ground charge amplifier is not expressly disclosed or inherent in the proprietary ASIC or controlling circuitry disclosed in Leeper, the use of a virtual ground

U.S. Patent No. 7,663,607	Leeper[4]
	charge amplifier coupled to the touch panel would have been obvious to one of ordinary skill in the art as a predictable variant and a matter of simple implementation design. For example, Perski ’455 shows a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **Exhibit P-1**, **[8]**. Because both Perski ’455 and Leeper describe very similar transparent capacitive touchscreens, it would have been obvious to include the charge amplifier of Perski ’455 into the Leeper design in order to filter the signals obtained from the touchscreen from stray or parasitic noise, as is common in signal processing techniques. The resulting implementation would have been a predictable variation well within the purview of one of ordinary skill in the art.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Leeper teaches a display arrangement comprising a display (e.g., LCD of Figure 1) having a screen for displaying a graphical user interface.  See **[1A]**. Leeper states: “Synaptics cPad, as pictured in Figure 1, is the trade name given to a specific application of the ClearPad sensor over a 40 by 60mm 1/8 VGA (240 x 160 pixel) LCD designed to function as an enhanced PC notebook TouchPad.”
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that	Leeper teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image.

U.S. Patent No. 7,663,607	Leeper[4]
occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	See **[1A]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Leeper teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Leeper teaches the claimed touch panel comprising a first glass member (e.g., substrate of Figure 2) disposed over the screen of the display. See **[1A]**. Even if Leeper did not expressly disclose a first glass member disposed over the screen of the display, the use of such a glass member would have been obvious to one of ordinary skill in the art as a simple design choice representing a trivial and predictable variation. Glass was already widely used as a transparent substrate in many touchscreen designs, and the plastic resins disclosed by Leeper were readily interchangeable with glass members. See **Exhibit P-1, [10D]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Leeper teaches a first transparent conductive layer disposed over the first glass member. See **[1A]**.
[10F] the first transparent conductive layer comprising a plurality of spaced	Leeper teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths.

U.S. Patent No. 7,663,607	Leeper[4]
apart parallel lines having the same pitch and linewidths;	See **[1A]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Leeper teaches a second glass member (e.g., insulating layer) disposed over the first transparent conductive layer. See **[1A]**. Even if Leeper did not expressly disclose a second glass member disposed over the first transparent conductive layer, such an arrangement would have been obvious to one of ordinary skill in the art as a simple design choice representing a trivial and predictable variation. Glass was already widely used as a transparent substrate in many touchscreen designs, and the plastic resins disclosed by Leeper were readily interchangeable with glass members. See **Exhibit P-1, [10D]**.
[10H] a second transparent conductive layer disposed over the second glass member,	Leeper teaches a second transparent conductive layer disposed over the second glass member. See **[1A]**. Even if Leeper did not expressly disclose a second transparent conductive layer disposed over the second glass member, such an arrangement would have been obvious to one of ordinary skill in the art as a simple design choice representing a trivial and predictable variation. Glass was already widely used as a transparent substrate in many touchscreen designs and the sensor traces disclosed in Leeper are transparent. See **Exhibit P-1, [10D]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Leeper teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.

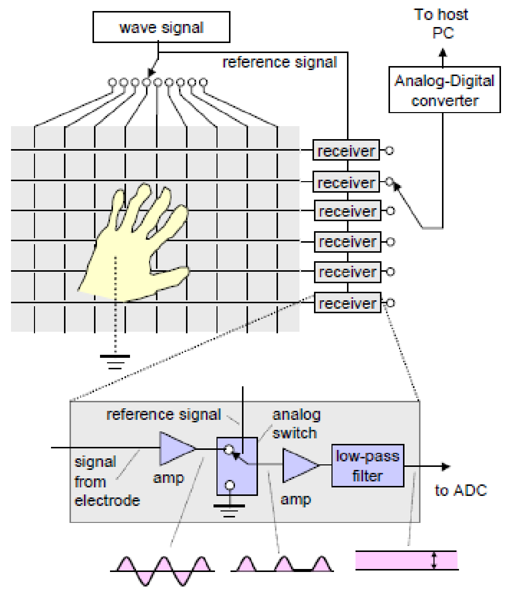
U.S. Patent No. 7,663,607	Leeper[4]
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Leeper teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Leeper teaches a third glass member disposed over the second transparent conductive layer. See **[1A]**. Even if Leeper did not expressly a third glass member disposed over the second transparent conductive layer, such an arrangement would have been obvious to one of ordinary skill in the art as a simple design choice representing a trivial and predictable variation. Glass was already widely used as a transparent substrate in many touchscreen designs, and the plastic resins disclosed by Leeper were readily interchangeable with glass members. See **Exhibit P-1, [10D]**.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Leeper teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1E]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Leeper teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. See **[1A]**. Since Leeper clearly contemplates a transparent sensor in the form of a touchscreen, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting

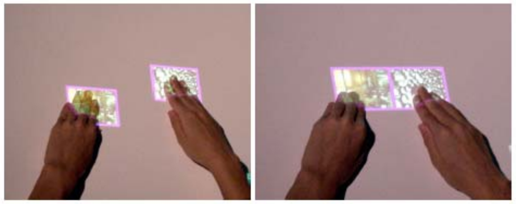
U.S. Patent No. 7,663,607	Leeper[4]
	and non-conducting areas. See, e.g., **Exhibit P-1, [11]**. In addition, both Leeper and Mackey '935 describe products by the same manufacturer and are assigned or authored by the same entity (Synaptics Incorporated), providing yet another reason one skilled in the art would combine the teachings of the references.

EXHIBIT P-10
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR JUN REKIMOTO, "SMARTSKIN: AN INFRASTRUCTURE FOR FREEHAND MOVEMENT OF INTERACTIVE SURFACES" ("REKIMOTO")

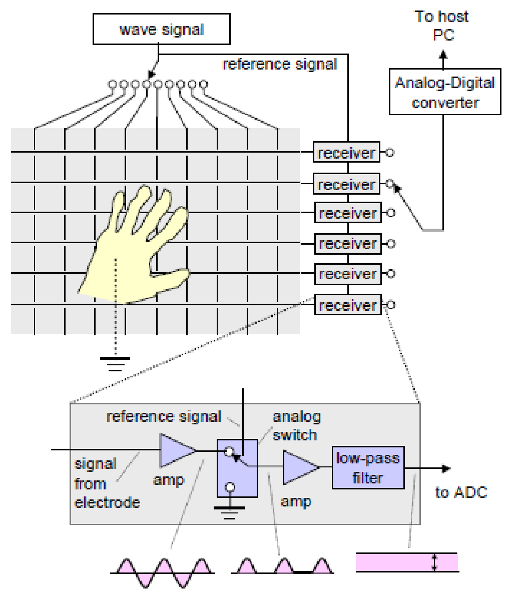
U.S. Patent No. 7,663,607	Rekimoto[5]
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Rekimoto teaches a touch panel comprising a transparent capacitive sensing medium (e.g., the SmartSkin sensor of Figure 2) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.

5 The Sony Smartskin system is also a prior art reference in its own right. The analysis for Sony Smartskin system is believed to be identical (or substantially similar) to the analysis shown here. Samsung is in the process of requesting additional information about Sony Smartskin system from Sony Corp. and reserves the right to supplement this Exhibit after that information is received.

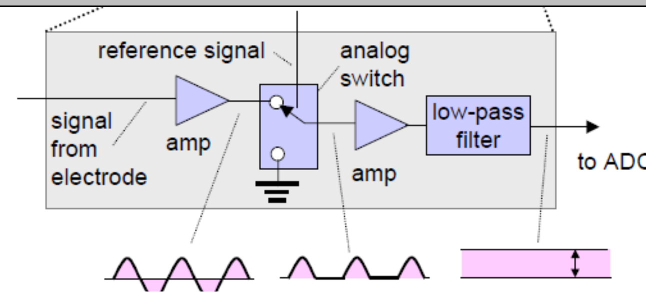
U.S. Patent No. 7,663,607	Rekimoto[5]
	 **Figure 2: The SmartSkin sensor configuration: A mesh-shaped sensor grid is used to determine the hand's position and shape.** Rekimoto states: "The sensor consists of grid-shaped transmitter and receiver electrodes (copper wires). The vertical wires are transmitter electrodes, and the horizontal wires are receiver electrodes. When one of the transmitter lines is excited by a wave signal (of typically several hundred kilohertz), the receiver receives this wave signal because each crossing point (transmitter/receiver pairs) acts as a (very weak) capacitor. The magnitude of the received signal is proportional to the frequency and voltage of the transmitted signal, as well as to the capacitance between the two electrodes. When a conductive and grounded object approaches a crossing point, it capacitively couples to the electrodes, and drains the wave signal. As a result, the received signal amplitude becomes weak. By measuring this effect, it is possible to detect the proximity of a conductive object, such as a human hand." Id. at 2.

U.S. Patent No. 7,663,607	Rekimoto[5]
	 **Figure 7: Two-handed operation is used to concatenate two objects.** "A notable advantage of SmartSkin over traditional mouse-based systems is its natural support for multiple-hand, multiple-user operations. Two or more users can simultaneoulsy interact with the surface at the same time…. He or she can also 'concatenate' two objects by using both hands, as shown in Figure 7, or can take objects apart in the same manner." Id. at 4. "The system time-dividing transmitting signal is sent to each of the vertical electrodes and the system independently measures values from each of the receiver electrodes. These values are integrated to form two-dimensional sensor values, which we called "proximity pixels." Once these values are obtained, algorithms similar to those used in image processing, such as peak detection, connected region analysis, and template matching, can be applied to recognize gestures. As a result, the system can recognize multiple objects (e.g., hands). If the granularity of the mesh is dense, the system can recognize the shape of objects." Id. at 2. "A transparent SmartSkin sensor can be obtained by using indium tin oxide (ITO). This sensor can be mounted in front of a flat panel display or on a rear-projection screen." Id. at 7.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that	Rekimoto teaches a transparent capacitive sensing medium comprising a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another. See **[1A]**.

U.S. Patent No. 7,663,607	Rekimoto[5]
are electrically isolated from one another; and	A person of ordinary skill in the art would understand that it is inherent that indiviudal transmitter lines and indiviudal receiver lines of the SmartSkin sensor are electrically isolated from one another and each layer is electrically isolated from the other layer, otherwise the lines could not be individually driven and sensed, nor would each crossing point between the transmitter and receiver lines act as a capacitor—as expressly disclosed in Rekimoto. Id. at 2.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Rekimoto teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another. See **[1A]** and **[1B]**.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Rekimoto teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Rekimoto teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry (e.g., receiver circuitry, A/D converter, and/or host PC of Figure 2) .

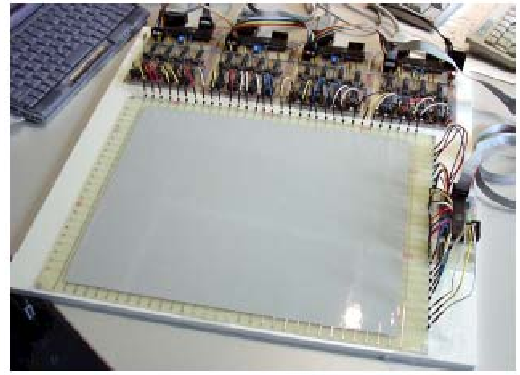
U.S. Patent No. 7,663,607	Rekimoto[5]
	 **Figure 2: The SmartSkin sensor configuration: A mesh-shaped sensor grid is used to determine the hand's position and shape.** See **[1A]**.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Rekimoto teaches the claimed touch panel wherein capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1A]**.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Rekimoto teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]**.

U.S. Patent No. 7,663,607	Rekimoto[5]
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Rekimoto teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Rekimoto teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). See **[1A]**. Rekimoto states: "A transparent SmartSkin sensor can be obtained by using indium tin oxide (ITO) so that the lines on each layer are transparent. This sensor can be mounted in front of a flat panel display or on a rear-projection screen." Id. at 7.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Rekimoto teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1A]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Rekimoto teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., "lock-in amplifier" of Figure 2) coupled to the touch panel for detecting the touches on the touch panel. See **[1A]**.

U.S. Patent No. 7,663,607	Rekimoto[5]
	 Rekimoto states: "To accurately measure signals only from the transmitter electrode, a technique called "lock-in amplifier" is used. This technique uses an analogue switch as a phase-sensitive detector. The transmitter signal is used as a reference signal for switching this analog switch, to enable the system to select signals that have the synchronized frequency and the phase of the transmitted signal." Id. at 2.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Rekimoto teaches a display arrangement comprising a display (e.g., flat panel display or rear-projection screen) having a screen for displaying a graphical user interface. Rekimoto states: "A transparent SmartSkin sensor can be obtained by using indium tin oxide (ITO) so that the lines on each layer are transparent. This sensor can be mounted in front of a flat panel display or on a rear-projection screen." Id. at 7. See **[1A]**.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Rekimoto teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]**.

U.S. Patent No. 7,663,607	Rekimoto[5]
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Rekimoto teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Rekimoto teaches the claimed touch panel comprising a first glass member disposed over the screen of the display. See **[1A]**. Rekimoto clearly teaches the use of a transparant touch sensor over a LCD display. Id. at 7. To the extent a first glass member disposed over the screen of the display is not expressly or inherently shown in Rekimoto, the use of a glass member would have been a predictable variant. Glass, as a transparent dielectric, is widely used in touchscreen displays. It would have been obvious, therefore, to use a glass member, as taught by Perski ’455, in order to sufficiently shield the mesh sensor grid from the display. See **Exhibit P-1, [10D]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Rekimoto teaches a first transparent conductive layer disposed over the first glass member. See **[1A]** and **[10D]**.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Rekimoto teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10G] a second glass member	Rekimoto teaches a second glass member disposed over the first transparent conductive

U.S. Patent No. 7,663,607	Rekimoto[5]
disposed over the first transparent conductive layer;	layer. See **[1A]**. Rekimoto clearly teaches the use of a transparant touch sensor over a LCD display. Id. at 7. To the extent a first glass member disposed over the screen of the display is not expressly or inherently shown in Rekimoto, the use of a glass member would have been a predictable variant. Glass, as a transparent dielectric, is widely used in touchscreen displays. It would have been obvious, therefore, to use a glass member, as taught by Perski ’455, in order to isolate the two layers of wires from each other and broad a support for the vertical transmitter wires. See **Exhibit P-1, [10G]**.
[10H] a second transparent conductive layer disposed over the second glass member,	Rekimoto teaches a second transparent conductive layer disposed over the second glass member. See **[1A]** and **[10G]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Rekimoto teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Rekimoto teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Rekimoto teaches a third glass member disposed over the second transparent conductive layer.

U.S. Patent No. 7,663,607	Rekimoto[5]
	See **[1A]**.  **Figure 9: A gesture-recognition pad made up of a 32× 24 grid mesh. A sheet of plastic insulating film covers Sensor electrodes.** Although Figure 9 of Rekimoto shows a “sheet of plastic insulating film” covering the mesh grid of electrodes, the use of a glass member disposed over the second transparent conductive layer would have been a predictable variant, as taught by at least Perski ’455. Glass and plastic were widely interchangeable in transparent touch screen designs. See **Exhibit P-1, [10K]**. It would have been obvious to one of ordinary skill in the art, therefore, to replace the plastic film with glass.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Rekimoto teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1A]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual	Rekimoto teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.

U.S. Patent No. 7,663,607	Rekimoto[5]
appearance of the touch screen by more closely matching the optical index of the lines.	See **[1A]**. Since Rekimoto clearly contemplates a transparent sensor in the form of a touchscreen, it would have been obvious to one of ordinary skill in the art to incorporate "dummy features" that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski '455, Morag '229 (Col. 12:64-13:32), or Mackey '935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

EXHIBIT P-11
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR P. DIETZ AND D. LEIGH "DIAMONDTOUCH: A MULTI-USER TOUCH FUNCTIONALITY" ("DIETZ")

<table>
<tr><th>U.S. Patent No. 7,663,607</th><th>Dietz[6]</th></tr>
<tr><td>[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,</td><td>Dietz teaches a touch panel (e.g., DiamondTouch tabletop of Figure 1) comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.

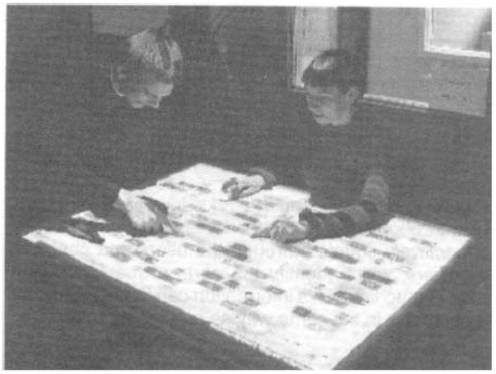
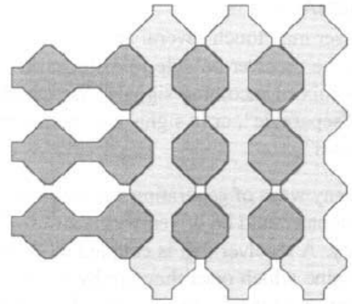


Figure 1: The collaborative work environment for Human-Guided Simple Search.

Dietz states: "DiamondTouch is a multi-user touch technology for tabletop front-projected displays. It enables several different people to use the same touch-surface simultaneously without interfering with each other, or being affected by foreign objects." Id. at 219.</td></tr>
</table>

[6] The MERL DiamondTouch system is also a prior art reference in its own right. The analysis for the MERL DiamondTouch system is believed to be identical (or substantially similar) to the analysis shown here. Samsung is in the process of requesting additional information about the MERL DiamondTouch system from Mitsubishi Electric Research Labs and reserves the right to supplement this Exhibit after that information is received.

U.S. Patent No. 7,663,607	Dietz[6]
	“A technique for creating a touch-sensitive deivce is proposed which allows multiple, simultaneous users to interact in an intuitive fashion. Touch location infomration is determined independently for each user, allowing each touch on a common surface to be associted with a particukar user.” Id. “DiamondTouch works by trasnsmitting a different electrical signal to each part of the table surface that we wish to uniquely identify. When a user touches the table, signals are capacitively coupled from directly benearth the touch point, through the user, and into a receiver unit associated with that user.” Id. at 220. “With proper design, capacitive coupling [4] through the human body can be quite relable.” Id. “While we have described DiamondTouch’s use in a front-projected format, the technology is certainly not limited to this. Because the signals are capacitvely coupled, very little electric current flows thorugh the antennas so these can be made of a relatively high-resistivity material. This means that transparant conductors such as indium tin oxide can be used, and that the techology will be useful for rear-projections application as well.” Id. at 225.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Dietz teaches a transparent capacitive sensing medium comprising a first layer having a plurality of transparent first conductive lines (e.g., one direction of “full matrix” or row antennas in row-columns antenna pattern of Figure 5) that are electrically isolated from one another.

U.S. Patent No. 7,663,607	Dietz[6]
	 Figure 5: The row-column antenna pattern that our prototype uses. Each row or column is composed of diamond shapes connected in one direction and isolated in the other. This allows the maximum surface area for both layers without the upper one shielding too much of the lower one. Dietz states: “the antennas embodied in the tabletop can be of arbitrary shape and size. A designer may chose to implement just a few large “buttons” or a much more complicated array…. The most general solution is a “full matrix” pattern, in which a very large number of antennas are arranged in a rectangular grid. Such a matrix of individually driven antenna “pixels” allows an unambiguous determination of multiple touch locations, even for a single user.” Id. at 221-222. “In reality, the full matrix pattern may be unnecessary for many applications. Although the simultaneous, multi-user feature is essential, it is usually sufficient for each user to indicate at most a single touch point or bounding box. This functionality can be obtained with a simple row/column pattern that drastically reduces the number of antennas.” Id. at 222. “The rows and columns will usually be on two different layers. Due to shielding effects, there is some subtlety to creating a good row/column antenna pattern. A simple rectangular pattern of columns on the upper layer will overlap and cover too much of the equivalent set of rows on the lower layer. This will decrease the amount of area through which the rows can capacitively couple signals, weakening their sensitivity. A good antenna pattern will minimize the area in which the rows and columns overlap, while maximizing their total

U.S. Patent No. 7,663,607	Dietz[6]
	areas. We have found the connected diamond pattern shown in Figure 5 to be a good choice. This pattern has the interesting property that the row conductors are identical to the column conductors, rotated ninety degrees. In our prototypes, this allowed us to create a single conductor pattern and use it for both rows and columns, saving manufacturing costs." Id. "The antennas are thin pieces of an electrically conductive material which are insulated from each other." Id. at 220. "While we have described DiamondTouch's use in a front-projected format, the technology is certainly not limited to this. Because the signals are capacitvely coupled, very little electric current flows thorugh the antennas so these can be made of a relatively high-resistivity material. This means that transparant conductors such as indium tin oxide can be used, and that the techology will be useful for rear-projections application as well." Id. at 225.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Dietz teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., other direction of "full matrix" or column antennas in row-columns antenna pattern of Figure 5) that are electrically isolated from one another. See **[1B]**.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Dietz teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1B]**. Dietz states: "the row conductors are identical to the column conductors, rotated ninety degrees." Id. at 222.

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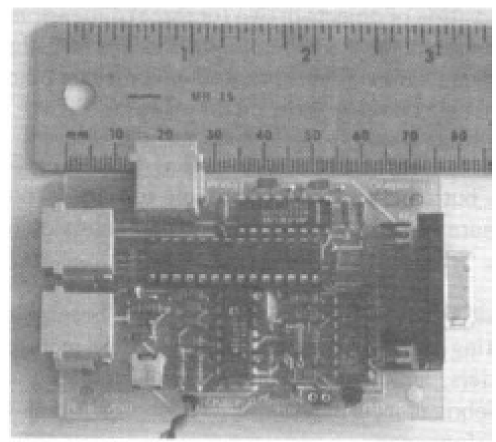
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Dietz teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry. See **[1B]**.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Dietz teaches the claimed touch panel wherein capacitive monitoring circuitry (e.g., receiver board of Figure 8) is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.  Figure 8: One of the prototype's receiver boards, based around a PIC microcontroller. One is needed for each user. Dietz states: "the receivers use synchronous demodulation, and thus require appropriate synchronization signals from the transmitter board. The receivers digitize the results and send them in raw form to a PC via fast RS-232 serial connections. There is a separate receiver board for each user. The entire table is scanned 75 times per second and the PC receives a coupling value for each user for each row and each column. The 75 Hz update

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	rate and negligible latency to the computer allow the prototype to be very responsive. The table is considered to be "touched" when the received signal at an antenna is high enough. In theory, we could use a simple threshold to determine this. However, given component drift, user variations, and varying noise levels, we have found it more practical to adapt a threshold based on current estimates of minimum coupling and noise levels. This works satisfactorily, but more sophisticated methods may yield better results…. The transmitter and receiver boards are based on PIC microcontrollers and other inexpensive, off-the-shelf electronic components." Id. at 223 "Near-field electric field (capacitive) sensing has been used for decades in applications as simple as touch switches. More elaborate forms of capacitive sensing were introduced to the user interface community in recent years. Zimmerman, et al described this technology in depth in [17] and introduced the Fish, a device used to measure the position of a hand in three space using electric fields. Related work can be found in [18] and [19]. These systems attempt to detect a hand or other object that is several centimeters from one of the electrodes, and use field strength to determine the position. DiamondTouch differs by requiring that the sensed object be very close (millimeters or less) to an electrode, but uses a large array of these to sense the position." Id. at 225.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Dietz teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1B]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Dietz teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1B]**.
[6] The touch panel as recited in claim	Dietz teaches the touch panel as recited in claim 1 wherein the conductive lines are formed

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1 wherein the conductive lines are formed from indium tin oxide (ITO).	from indium tin oxide (ITO). See **[1B]**. Dietz states: "This means that transparant conductors such as indium tin oxide can be used, and that the techology will be useful for rear-projections application as well." Id. at 225.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Dietz teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1F]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Dietz teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **[1F]**. To the extent a virtual ground charge amplifier is not expressly disclosed or inherent in the receiver boards of Dietz, the use of a virtual ground charge amplifier coupled to the touch panel would have been obvious to one of ordinary skill in the art as a predictable variant and a matter of simple implementation design. For example, Perski '455 shows a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel. See **Exhibit P-1**, **[8]**. Because both Perski '455 and Dietz describe very similar transparent capacitive touchscreens, it would have been obvious to include the charge amplifier of Perski '455 into the Dietz design in order to filter the signals obtained from the touchscreen from stray or parasitic noise, as is common in signal processing techniques. The resulting implementation would have been a predictable variation well within the purview of one of ordinary skill in the art.
[10A] A display arrangement comprising: a display having a screen	Dietz teaches a display arrangement comprising a display having a screen for displaying a graphical user interface.

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for displaying a graphical user interface; and	See **[1A]**.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Dietz teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]**.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Dietz teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Dietz teaches the claimed touch panel comprising a first glass member (e.g., substrate of Figure 3) disposed over the screen of the display.

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	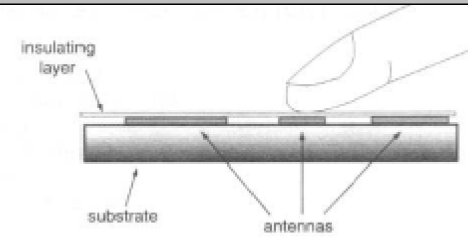 Figure 3: A set of antennas is embedded in the table-top. The antennas are insulated from each other and from the users. Dietz states: "The table surface is a constructed with a set of embedded antennas which can be of arbitrary shape and size. The antennas are thin pieces of an electrically conductive material which are insulated from each other. Since the coupling of signals to the users is done capacitively, the antennas are also insulated from the users, and the entire table surface can be covered by a layer of insulating, protective material as shown in Figure 3." Id. at 220. "Because the insulating layer between the antenna array and users does not require any special properties, it can be manufactured from a variety of materials to make the table robust under different environmental conditions. For example, glass or plastic could be used to make the table resistant to liquid and chemical spills." Id. at 224. See **[1A]** and **[1B]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Dietz teaches a first transparent conductive layer disposed over the first glass member. See **[1A]**, **[1B]**, and **[10F]**.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Dietz teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**, **[1B]**, and **[10F]**.

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[10G] a second glass member disposed over the first transparent conductive layer;	Dietz teaches a second glass member disposed over the first transparent conductive layer. See **[1A]**, **[1B]**, and **[10F]**.
[10H] a second transparent conductive layer disposed over the second glass member,	Dietz teaches a second transparent conductive layer disposed over the second glass member. See **[1A]**, **[1B]**, and **[10F]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Dietz teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**, **[1B]**, and **[10F]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Dietz teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]**, **[1B]**, and **[10F]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Dietz teaches a third glass member (e.g., insulating layer of Figure 3) disposed over the second transparent conductive layer. See **[1A]**, **[1B]**, and **[10F]**.
[10L] one or more sensor integrated circuits operatively coupled to the	Dietz teaches one or more sensor integrated circuits (e.g., receiver board of Figure 8) operatively coupled to the lines.

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lines.	See **[1F]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Dietz teaches the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. To the extent Dietz does not disclose this claim element, the use of "dummy features" disposed in the space between the parallel lines would have been a simple design choice representing a trivial and predictable variation. Since Dietz clearly contemplates a touch sensor used with a display, it would have been obvious to one of ordinary skill in the art to incorporate dummy features that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski '455, Morag '229 (Col. 12:64-13:32), or Mackey '935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

EXHIBIT Q
ADDITIONAL PRIOR ART RELEVANT TO THE INVALIDITY OF THE ’607 PATENT

Patent References

Country of Origin	Patent Number	Date of Issue
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US	4,723,056	2/2/1988
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US	4,853,493	8/1/1989
US	4,233,522	11/11/1900
US	4,550,221	10/29/1985
US	4,968,877	11/6/1990
US	5,305,017	4/19/1994
US	5,381,160	1/10/1995
US	5,534,892	7/9/1996
US	5,565,658	10/15/1996
US	5,648,642	7/15/1997
US	5,650,597	7/22/1997
US	5,790,106	8/4/1998
US	5,841,078	11/24/1998
US	5,825,352	10/20/1998
US	5,844,506	12/1/1998
US	5,854,450	12/29/1998
US	5,856,822	1/5/1999
US	5,861,875	1/19/1999
US	5,940,064	8/17/1999
US	6,023,265	2/8/2000
US	6,124,848	9/26/2000
US	6,191,828	2/20/2001
US	6,211,585	4/3/2001
US	6,288,707	9/11/2001
US	6,297,811	10/2/2001
US	6,323,846	11/27/2001
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Country of Origin	Patent Number	Date of Issue
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Nimish Mehta, Feature extraction as a tool for computer input, Acoustics, Speech, and Computer Processing, IEEE International Conference on ICASSP '82 (May 1982) ("Mehta 1982").

SK Lee et al., A multi-touch three dimensional touch-sensitive tablet, ACM SIGCHI Bulletin, Vol. 16, Issue 4 (April 1985) ("Lee 1985")

Roger B. Dannenberg et al., A Gesture Based User Interface Prototyping System, Proceedings of the ACM SIGGRAPH Symposium on User Interface Software and Technology at 127-32 (Nov. 1989) ("Dannenberg 1989").

Dean Rubine et al., The videoharp: an optical scanning MIDI controller, Contemporary Music Review, Vol. 6, Iss. 1 at 31-46 (1991) ("Rubine 1991").

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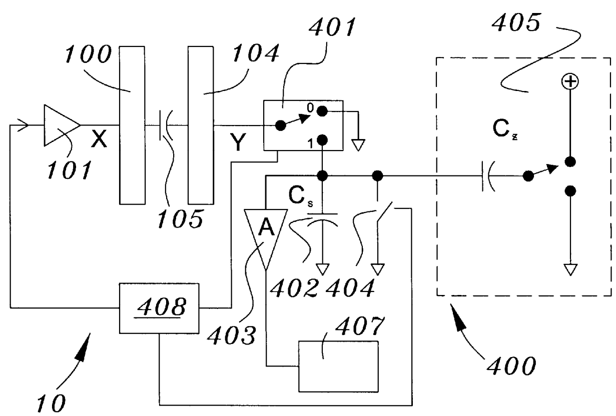
Philip T. Krein, “The Electroquasistatics of the Capacitive Touch Panel,” IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS (May/June 1990).

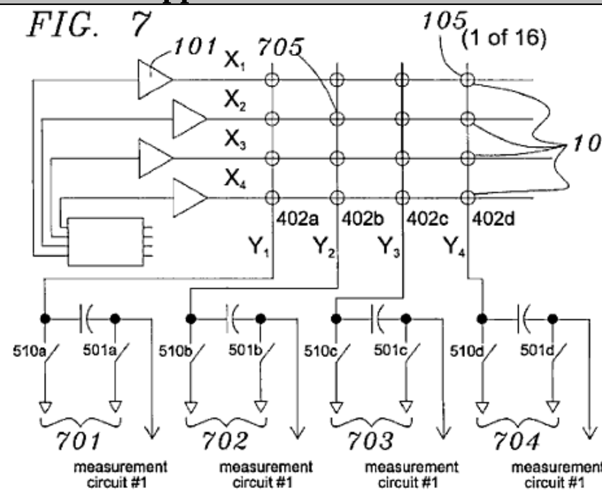
Kukjin Chun AND Kensall D. Wise, “A High-Performance Silicon Tactile Imager Based on a Capacitive Cell,” IEEE TRANSACTIONS ON ELECTRON DEVICES (July 1985).

K. Suzuki et al., “A 1024-Element High-Performance Silicon Tactile Imager,” IEEE TRANSACTIONS ON ELECTRON DEVICES (August 1990).

EXHIBIT R-1
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 6,452,514 ("PHILIPP '514") AND U.S. PATENT 5,572,205 (CALDWELL '205)

U.S. Patent No. 7,663,607	Philipp '514 and Caldwell '205
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Philipp '514 teaches a touch panel comprising a capacitive sensing medium (e.g., sensing element 10 of Figure 1 and/or circuit of Figure 7) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  Philipp '514 states: "The invention employs capacitance sensing, and in particular a form of sensing known as \`charge-transfer\` (or \`QT\`) sensing…. Charge transfer sensing uses electronic switch closures to induce a charge onto an electrode. A disturbance in the resulting electric field is sensed by measuring the amount of charge on the electrode and to thereby determine the change in capacitance at the electrode." Id. at 1:20-30.

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	“Because one of the major anticipated applications of the invention is in keyboards used in data entry, the sensing elements are sometimes hereinafter referred to as ‘keys’. It will be understood that this is done to simplify the presentation and to avoid reciting lists of known sensing or switching products that could employ the invention, and that ‘key’, when so used, represents a proximity detection zone for any possible application.” Id. at 1:51-59. “Thus, one aspect of the invention is the provision of apparatus and method for detecting proximity to an electrode pair to form a key. Another aspect of the invention is the provision of apparatus and method for detecting proximity to one or more of a matrix of electrodes so as to form a keypad, keyboard, slider switch analog, or level sensor.” Id. at 1:59-65. “The creation of a key matrix follows from the arrangement of a plurality of electrode pairs, where one of each pair is connected to a voltage drive source and the second of each pair is connected to a charge detector. In the general case for a matrix there are X drive lines and Y charge detectors. Although a minimal matrix could comprise two drive lines and a single charge detector, or vice versa, an N by M matrix is expected to usually involve at least four keys; e.g., an X=2, Y=2 arrangement. It may be noted that arrangements having the same number of drive lines as they do charge detectors (hereinafter referred to as "square matrices") are generally preferred because these yield the greatest number of keys for a given amount of circuitry and wiring. It may be noted that the terms ‘matrix’ and ‘square’ have nothing to do with the physical form of the key matrix. The keys can be arrayed linearly, circularly, or randomly on a single surface, or in any fashion desired on a plurality of surfaces. Moreover, the keys do not have to be the same physical size or shape; some can be large and circular, other small and triangular, others medium and rectangular.” Id. at 1:65-2:18.

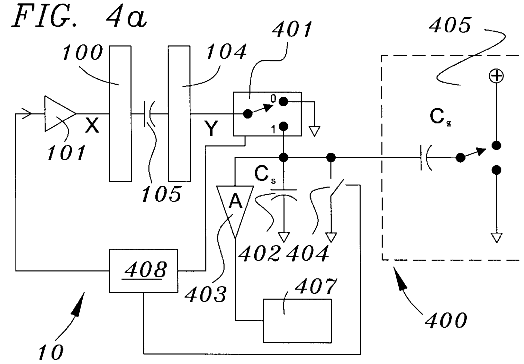
U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	FIG. 7  The capacitive sensor and array disclosed in Figure 7 of Philipp ’514 supports the detection of multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel. For example, Philipp ’514 states: “The circuit of FIG. 7 has an important advantage over that of FIG. 6. Instead of scanning key by key, as required for the circuit of FIG. 6, the FIG. 7 circuit can be scanned a whole row at a time, i.e. the keys in an entire X row can be sensed in parallel. The ability to do this results in a tremendous improvement in scan throughput and can free up enough acquisition time to allow the use of the controller 408 for other functions, thereby lowering overall system cost. To make FIG. 7 scan a complete row in one burst cycle, a row drive line (e.g. line 706) is made to toggle in a burst as described hereinbefore. During each falling drive signal within each such burst all the switch pairs 701 through 704 are enabled and toggled appropriately at the same time. Thus, each falling edge of 706 (said edge creating a dV/dt coupling across each key matrix electrode element pair within 706's row) creates a signal in each key element in its row. These signals are detected by the respective column lines, the signals being sampled by switch pairs 701 through 704 and the associated capacitors.” Id. at 11:31-47. “As with many keypads there are control functions which are desirable for safety or human factors reasons. These methods are well known in the art but are worth mentioning again

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	here. One is the use of control interlocking, whereby a function cannot be selected unless at least two keys are pressed, either sequentially or at once. Interlocking can prevent inadvertent activation, for example for safety reasons. The methods disclosed herein are suitable for control interlocking, since the key matrix is fully capable of n-key rollover (it detects all keys independently and, from a functional standpoint, simultaneously). Another function possible is the use of an array of electrode pairs arranged in a linear ‘slider’ control, for example to allow the keypad, or a subsection thereof, to act as an intensity, volume, or fader control (or other function) as normally would be implemented with a potentiometer or encoder (FIG. 9). The geometric shape of the slider is not important and the invention is not restrictive in this regard. The slider can be linear, curved, or even 3-dimensional in shape.” Id. at 13:10-28. Philipp ’514 teaches that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate. Caldwell ’205 at 3:56-4:54. It would have been obvious to make the capacitive sensing medium of Philipp ’514 transparent, as taught by Caldwell ’205, so that the sensor could be used over a display.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Philipp ’514 teaches a capacitive sensing medium comprising a first layer having a plurality of first conductive lines that are electrically isolated from one another. See **[1A]**. Philipp ’514 teaches that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate. Caldwell ’205 at 3:56-4:54. It would have been

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	obvious, therefore, to make the conductive lines of Philipp ’514 transparent, as taught by Caldwell ’205, so that the sensor could be used over a display.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Philipp ’514 teaches a second layer spatially separated from the first layer and having a plurality of second conductive lines that are electrically isolated from one another. See **[1A]**. Philipp ’514 teaches that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate. Caldwell ’205 at 3:56-4:54. It would have been obvious, therefore, to make the conductive lines of Philipp ’514 transparent, as taught by Caldwell ’205, so that the sensor could be used over a display.
[1D] the second conductive lines being positioned transverse to the first conductive lines,	Philipp ’514 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]**.

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Philipp ’514 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry. See **[1A]**.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Philipp ’514 teaches the claimed touch panel wherein capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1A]**.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Philipp ’514 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Philipp ’514 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]**.
[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Philipp ’514 does not expressly teach that the touch panel as recited in claim 1 includes conductive lines formed from indium tin oxide (ITO). Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate. Caldwell ’205 at 3:56-4:54. It would have been obvious, therefore, to use ITO conductive lines, as taught by Caldwell ’205, so that the sensor could be used over a display.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Philipp ’514 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1A]**. Philipp ’514 states: “If, on the other hand, external contact is made with the composite sense element 10 by a large body, such as a human, or perhaps by a large volume of fluid as shown in FIG. 3a, the coupling of charge between 100 and 104 will be reduced because the large object has a substantial capacitance to earth 206 (or to other nearby structures whose path will complete to the ground reference potential of the circuitry controlling the sense elements). This reduced coupling occurs because the coupled e-field between the driven 100 and receiving 104 electrodes is in part diverted away from the receiving plate 104 to earth. This is shown schematically in FIG. 3b. Capacitances 301 and 302 are set up, which in conjunction with capacitance 304 from the third object to free space or a local ground, and which act to shunt the e-field away from the direct coupling 105 present between 100 and 104. The coupling capacitance 105 in FIG. 3b is significantly less than is the corresponding coupling capacitance 105 of FIG 1a as a result of the diversion of field lines to the object 303. If the receive electrode 104 is connected to a ‘virtual ground’, then the effect of the added capacitance 302 will not be significant. If the receiving electrode 104 is connected to a high impedance amplifier, then the effect of 302 can be significant, because it will act to reduce the signal on 104 even further.” Id. at 5:5-28.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the	Philipp ’514 the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., amplifier 403) coupled to the touch panel for detecting the touches on the touch panel.

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
touch panel.	FIG. 4a  Philipp ’514 states: “The coupling capacitance 105 in FIG. 3b is significantly less than is the corresponding coupling capacitance 105 of FIG 1a as a result of the diversion of field lines to the object 303. If the receive electrode 104 is connected to a ‘virtual ground’, then the effect of the added capacitance 302 will not be significant. If the receiving electrode 104 is connected to a high impedance amplifier, then the effect of 302 can be significant, because it will act to reduce the signal on 104 even further.” Id. at 5:20-28. “The exemplar processing circuitry 400 depicted in FIG. 4a comprises a sampling switch 401, a charge integrator 402 (shown here as a simple capacitor), an amplifier 403 and a reset switch 404, and may also comprise optional charge cancellation means 405.” Id. at 5:60-65.
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Philipp ’514 does not expressly teach a display arrangement comprising a display having a screen for displaying a graphical user interface. Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate for use over a display. Caldwell ’205 at 3:56-4:54. It would have been obvious, therefore, to dispose the touch

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	sensor of Philipp ’514 over a display, as taught by Caldwell ’205, so that a user could interact with the sensor while at the same time reading information on the underlying display.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Philipp ’514 does not expressly teach a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. Caldwell ’205 at 3:56-4:54. It would have been obvious, therefore, to make the sensor of Philipp ’514 transparent, as taught by Caldwell ’205, so that the senor could be placed over a display.
[10C] wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	Philipp ’514 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel. See **[1A]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Philipp ’514 does not expressly teach the claimed touch panel comprising a first glass member disposed over the screen of the display. Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al.

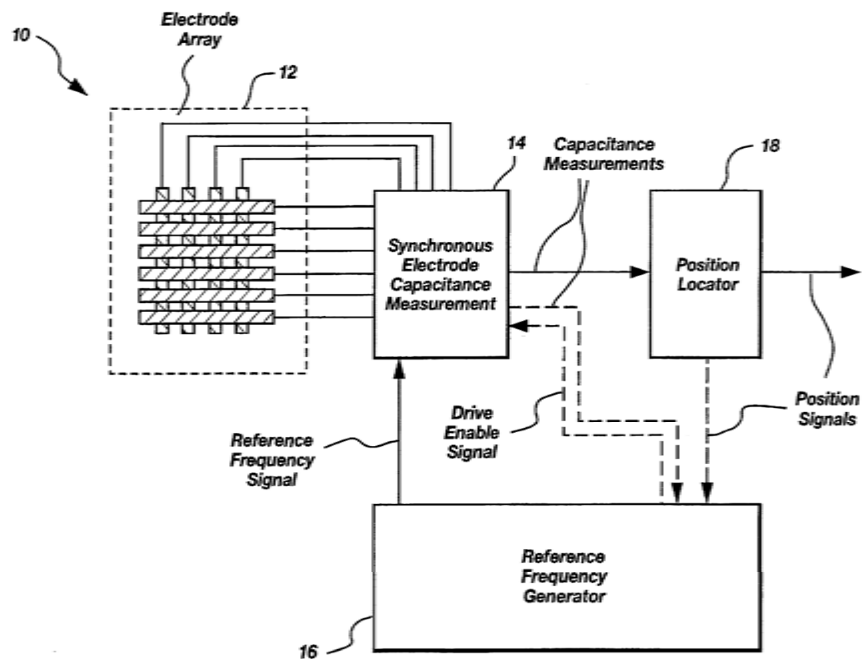
U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	(“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 states: “In a preferred embodiment, the optical correction material is a transparent adhesive that adheres a flexible carrier carrying the display device and/or the touch pad flexible conductor to the glass substrate.” Id. at 3:9-12. It would have been obvious, therefore, to use a first glass member disposed over the screen of the display, as taught by Caldwell ’205, so that a user could interact with the sensor while at the same time reading information on the underlying display.
[10E] a first transparent conductive layer disposed over the first glass member,	Philipp ’514 does not expressly teach a first transparent conductive layer disposed over the first glass member. Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate. Caldwell ’205 at 3:56-4:54. It would have been obvious, therefore, to make the conductive lines of Philipp ’514 transparent, as taught by Caldwell ’205, so that the sensor could be used over a display.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Philipp ’514 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Philipp ’514 does not expressly teach a second glass member disposed over the first transparent conductive layer. Such an arrangement, however, would have been obvious to one of ordinary skill in the art.

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the touch sensing apparatus of Philipp ’514 in order to provide a simple, transparent touch screen input to a display, such as LCD display.
[10H] a second transparent conductive layer disposed over the second glass member,	Philipp ’514 does not expressly teach a second transparent conductive layer disposed over the second glass member. Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 teaches a transparent capacitive sensing medium formed from transparent elements, including a transparent dielectric substrate, a transparent adhesive layer, and conductive elements formed from a “transparent conductive metallic oxide film” (e.g., ITO) sputtered onto the substrate. Caldwell ’205 at 3:56-4:54. It would have been obvious, therefore, to make the conductive lines of Philipp ’514 transparent, as taught by Caldwell ’205, so that the sensor could be used over a display.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Philipp ’514 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Philipp ’514 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]**.
[10K] a third glass member disposed over the second transparent conductive layer; and	Philipp ’514 does not expressly teach a third glass member disposed over the second transparent conductive layer. Such an arrangement, however, would have been obvious to one of ordinary skill in the art.

U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	For example, Perski ’455 shows such a display arrangement. It would have been obvious to incorporate this arrangement into the touch sensing apparatus of Philipp ’514 in order to provide a simple, transparent touch screen input to a display, such as LCD display.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Philipp ’514 teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1A]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Philipp ’514 does not expressly teach the display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines. Philipp ’514 does, however, teach that the invention disclosed therein could be used in the capacitive touch control system of U.S. Patent No. 5,572,205, to Caldwell, et al. (“Caldwell ’205”). Id. at 1:30-43. Caldwell ’205 states: “According to yet another aspect of the invention, a display is juxtaposed with the substrate modulated surface in order to provide visual indications to a user. An optical correction material is provided between the display and the substrate. The optical correction material corrects optical distortion of the visual indications of the display caused by the modulated surface. In a preferred embodiment, the optical correction material is a transparent adhesive that adheres a flexible carrier carrying the display device and/or the touch pad flexible conductor to the glass substrate.” Id. at 3”3-12. The optical correction material is a “dummy feature.” Caldwell ’205 states: “In order to correct optical distortion created by the presence of the modulations, or dimples, on surface 18, an optical correction material 23 is positioned between indicator 22 and modulated surface 18. Optical correction material 23 has an index of refraction that is compatible with that of substrate 12 and fills in the voids between the dimples of surface 18, as well as the space between surface 18 and indicator 22. In this manner, light emitted by indicator 22 passes through substrate 12 without substantial distortion.” Id. at 4:20-30.

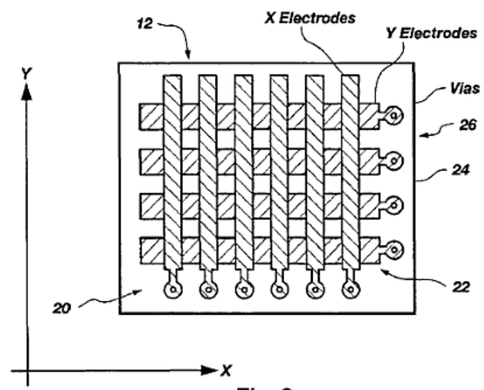
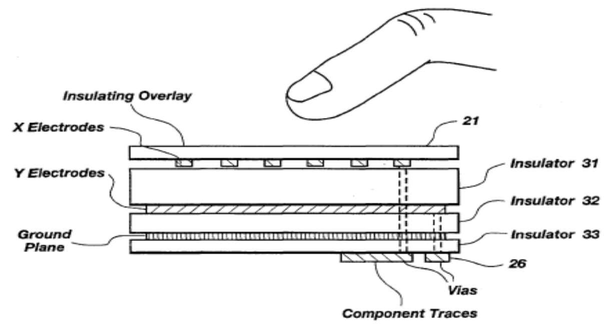
U.S. Patent No. 7,663,607	Philipp ’514 and Caldwell ’205
	To the extent Caldwell ’205 does not expressly disclose this limitation, it would have been obvious to one of ordinary skill in the art to incorporate “dummy features” that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.

EXHIBIT R-2
SAMSUNG'S INVALIDITY CLAIM CHARTS FOR U.S. PATENT NO. 5,565,658 ("GERPHEIDE '658") AND U.S. PATENT NO. 5,305,017 ("GERPHEIDE '017")

U.S. Patent No. 7,663,607	Gerpheide '658 and Gerpheide '017
[1A] A touch panel comprising a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches,	Gerpheide '658 teaches a touch panel (e.g., position sensing system 10 of Figure 1) comprising a transparent capacitive sensing medium (e.g., electrode array 12) configured to detect multiple touches or near touches that occur at a same time and at distinct locations in a plane of the touch panel and to produce distinct signals representative of a location of the touches on the plane of the touch panel for each of the multiple touches.  Fig. 1

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
	Gerpheide ’658 states: “The present invention employs a touch location device having true capacitance variation by using insulated electrode arrays to form virtual electrodes. The capacitance variation is measured by means independent of the resistance of the electrodes, so as to eliminate that parameter as a fabrication consideration. The electrical interference is eliminated regardless of frequency to provide a clear detection signal. An illustrative embodiment of the present invention includes an electrode array for developing capacitances which vary with movement of an object (such as finger, other body part, conductive stylus, etc.) near the array, a synchronous capacitance measurement element which measures variation in the capacitances, such measurements being synchronized with a reference frequency signal, and a reference frequency signal generator for generating a reference frequency signal which is not coherent with electrical interference which could otherwise interfere with capacitance measurements and thus position location.” Id. at 2:60-3:12. “FIG. 5 shows another embodiment of the synchronous electrode capacitance measurement unit 14. In this embodiment, each electrode in an electrode array 90 is connected to a dedicated capacitance measurement element 92, each of which is connected to a synchronous demodulator 94 and then to a low pass filter 96. This configuration has the advantage of continuously providing capacitance measurements for each electrode, whereas the prior preferred embodiment measures a single configuration of electrodes at any one time. The disadvantage of the embodiment of FIG. 5 is the greater expense which may be associated with the duplicated elements. This is a common tradeoff between providing multiple elements to process measurements at the same time versus multiplexing a single element to process measurements sequentially.” Id. at 7:26-41. “One skilled in the art will realize that a variety of techniques and materials can be used to form the electrode array. For example, FIG. 3A illustrates an alternative embodiment in which the electrode array includes an insulating overlay 40 as described above. Alternate layers of conductive ink 42 and insulating ink 43 are applied to the reverse surface by a silk screen process. The X electrodes 45 are positioned between the insulating overlay 40 and X

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
	electrode conductive ink layer 42. Another insulating ink layer 43 is applied below layer 42. The Y electrodes 46 are positioned between insulating ink layer 43 and conductive ink layer 44. Another insulating ink layer 47 is applied below conductive ink layer 44, and ground plane 48 is affixed to Y electrode conductive ink layer 47. Each layer is approximately 0.01 millimeters thick.” Id. at 5:11-25. “It should be understood that other variations of the preferred embodiments described above fall within the scope of this invention. Such variations include different electrode array geometry, such as a grid of strips, a grid of diamonds, parallel strips and various other shapes. Also included are different variations of electrode array fabrication, such as printed circuit board (PCB), flex PCB, silk screen, sheet or foil metal stampings. Variations of the kinds of capacitance utilized are included, such as full balance (see Gerpheide '017), stray, mutual, half balance.” Id. at 9:65-11:7. To the extent Gerpheide ’658 does not expressly disclose a transparent capacitive sensing medium, Gerpheide '017 clearly contemplates a transparent sensing medium as well as touch sensitive display devices which necessarily include a transparent sensing medium over the display. For example, Gerpheide '017 states: “Display devices which are touch sensitive have also been utilized in the art. See U.S. Pat. No. 4,476,463, Ng et al. The Ng et al. patent discloses a display device which locates a touch anywhere on a conductive display faceplate by measuring plural electrical impedances of the faceplate's conductive coating. The impedances are at electrodes located on different edges of the faceplate. See column 2, lines 7 through 12. The touch sensitive devices disclosed in Ng et al. are generally designed to overlay a computer display and provide positioning information.” Id. at 2:61-3:3. Gerpheide '017 also states: “In other preferred embodiments, the electrodes and insulator might be constructed from transparent materials for attachment to the viewing surface of a computer display screen.” Id. at 5:64-67. It would have been obvious to one of ordinary skill in the art to make the capacitive sensing medium described in Gerpheide ’658 transparent, as taught by Gerpheide '017, at least because Gerpheide ’658 claims the benefit

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
	of Gerpheide ’017 (i.e., they are related applications[1]), both are by the same inventor, both are related to systems and methods for data input using a capacitive touch sensing medium, and Gerpheide '017 is expressly referenced within the specification of Gerpheide '658.
[1B] wherein the transparent capacitive sensing medium comprises: a first layer having a plurality of transparent first conductive lines that are electrically isolated from one another; and	Gerpheide ’658 teaches a transparent capacitive sensing medium comprising a first layer (e.g., X electrodes of Figure 2a) having a plurality of transparent first conductive lines that are electrically isolated from one another.  Fig. 2a  Fig. 2b Gerpheide ’658 states: “FIG. 2A illustrates the electrodes in a preferred electrode array 12, together with a coordinate axes defining X and Y directions. One embodiment includes sixteen X electrodes and twelve Y electrodes, but for clarity of illustration, only six X electrodes 20 and four Y electrodes 22 are shown. It is apparent to one skilled in the art how to extend the number of electrodes. The array is preferably fabricated as a multilayer printed circuit board 24. The electrodes are etched electrically conductive strips, connected to vias 26 which in turn connect them to other layers in the array. Illustratively, the array 12 is approximately 65 millimeters in the X direction and 49 millimeters in the Y direction. The X

[1] Upon information and belief, Gerpheide ’658 is a continuation-in-part of Gerpheide ’017, which was expressly identified in the utility patent application transmittal and/or declaration documents of Gerpheide ’658. As such, the disclosure of Gerpheide ’017 may be considered to be incorporated by reference into Gerpheide ’658, making the two Gerpheide references a single invalidating reference under § 102.

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	electrodes are approximately 0.7 millimeters wide on 3.3 millimeter centers. The Y electrodes are approximately three millimeters wide on 3.3 millimeter centers.” Id. at 4:40-55. “FIG. 2b illustrates the electrode array 12 from a side, cross-sectional view. An insulating overlay 21 is an approximately 0.2 millimeters thick clear polycarbonate sheet with a texture on the top side which is comfortable to touch. Wear resistance may be enhanced by adding a textured clear hard coating over the top surface. The overlay bottom surface may be silk-screened with ink to provide graphics designs and colors.” Id. at 4:55-63. “The X electrodes 20, Y electrodes 22, ground plane 25 and component traces 27 are etched copper traces within a multilayer printed circuit board. The ground plane 25 covers the entire array area and shields the electrodes from electrical interference which may be generated by the parts of the circuitry. The component traces 27 connect the vias 26 and hence the electrodes 20, 22, to other circuit components of FIG. 1. Insulator 31, insulator 32 and insulator 33 are fiberglass-epoxy layers within the printed circuit board 24. They have respective thicknesses of approximately 1.0 millimeter, 0.2 millimeters and 0.1 millimeters. Dimensions may be varied considerably as long as consistency is maintained. However, all X electrodes 20 must be the same size, as must all Y electrodes 22.” Id. at 4:63-5:10.
[1C] a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines that are electrically isolated from one another,	Gerpheide ’658 teaches a second layer spatially separated from the first layer and having a plurality of transparent second conductive lines (e.g., Y electrodes of Figure 2a) that are electrically isolated from one another. See **[1A]** and **[1B]**.

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[1D] the second conductive lines being positioned transverse to the first conductive lines,	Gerpheide ’658 teaches the second conductive lines being positioned transverse to the first conductive lines. See **[1A]** and **[1B]**.
[1E] the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry;	Gerpheide ’658 teaches the intersection of transverse lines being positioned at different locations in the plane of the touch panel, each of the second conductive lines being operatively coupled to capacitive monitoring circuitry. See **[1A]** and **[1B]**. Gerpheide ’658 states: “FIG. 4 shows one embodiment of the synchronous electrode capacitance measurement unit 14 in more detail. The key elements of the synchronous electrode capacitance measurement unit 14 are (a) an element for producing a voltage change in the electrode array synchronously with a reference signal, (b) an element producing a signal indicative of the displacement charge thereby coupled between electrodes of the electrode array, (c) an element for demodulating this signal synchronously with the reference signal, and (d) an element for low pass filtering the demodulated signal. Unit 14 is coupled to the electrode array, preferably through a multiplexor or switches. The capacitances to be measured in this embodiment are mutual capacitances between electrodes but could be stray capacitances of electrodes to ground or algebraic sums (that is sums and differences) of such mutual or stray capacitances.” Id. at 5:51-67.
[1F] wherein the capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines.	Gerpheide ’658 teaches the claimed touch panel wherein capacitive monitoring circuitry is configured to detect changes in charge coupling between the first conductive lines and the second conductive lines. See **[1E]**. Gerpheide ’658 states: “FIG. 1 shows the essential elements of a capacitance variation finger (or other conductive body or non-body part) position sensing system 10, made in accordance with the invention. An electrode array 12 includes a plurality of layers of conductive

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
	electrode strips. The electrodes and the wiring connecting them to the device may have substantial resistance, which permits a variety of materials and processes to be used for fabricating them. The electrodes are electrically insulated from one another. Mutual capacitance exists between each two of the electrodes, and stray capacitance exists between each of the electrodes and ground. A finger positioned in proximity to the array alters these mutual and stray capacitance values. The degree of alteration depends on the position of the finger with respect to electrodes. In general, the alteration is greater when the finger is closer to the electrode in question.” Id. at 3:51-67 “A synchronous electrode capacitance measurement unit 14 is connected to the electrode array 12 and determines selected mutual and/or stray capacitance values associated with the electrodes. To minimize interference, a number of measurements are performed by unit 14 with timing synchronized to a reference frequency signal provided by reference frequency generator 16. The desired capacitance value is determined by integrating, averaging, or in more general terms, by filtering the individual measurements made by unit 14. In this way, interference in the measurement is substantially rejected except for spurious signals having strong frequency spectra near the reference frequency.” Id. at 4:1-13.
[2] The touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another.	Gerpheide ’658 teaches the touch panel as recited in claim 1 wherein the conductive lines on each of the layers are substantially parallel to one another. See **[1A]** and **[1B]**.
[3] The touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another.	Gerpheide ’658 teaches the touch panel as recited in claim 2 wherein the conductive lines on different layers are substantially perpendicular to one another. See **[1A]** and **[1B]**.

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[6] The touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO).	Gerpheide ’658 teaches the touch panel as recited in claim 1 wherein the conductive lines are formed from indium tin oxide (ITO). Gerpheide ’658 states: “The electrodes and the wiring connecting them to the device may have substantial resistance, which permits a variety of materials and processes to be used for fabricating them.” Id. at 3:56-59. Gerpheide ’658 further states: “One skilled in the art will realize that a variety of techniques and materials can be used to form the electrode array. For example, FIG. 3A illustrates an alternative embodiment in which the electrode array includes an insulating overlay 40 as described above. Alternate layers of conductive ink 42 and insulating ink 43 are applied to the reverse surface by a silk screen process. The X electrodes 45 are positioned between the insulating overlay 40 and X electrode conductive ink layer 42. Another insulating ink layer 43 is applied below layer 42. The Y electrodes 46 are positioned between insulating ink layer 43 and conductive ink layer 44. Another insulating ink layer 47 is applied below conductive ink layer 44, and ground plane 48 is affixed to Y electrode conductive ink layer 47. Each layer is approximately 0.01 millimeters thick. The resulting array is thin and flexible, which allows it to be formed into curved surfaces. In use it would be laid over a strong, solid support. In other examples, the electrode array may utilize a flexible printed circuit board, such as a flex circuit, or stampings of sheet metal or metal foil.” Id. at 5:11-31. One of ordinary skill in the art would recognize that ITO could be used as one of the “variety of materials” to form the conductive lines. Moreover, Gerpheide '017 states: “In other preferred embodiments, the electrodes and insulator might be constructed from transparent materials for attachment to the viewing surface of a computer display screen.” Id. at 5:64-67. ITO was a common transparent conductive material used in touch screens. See, e.g., **Exhibit P-1, [6]**. Moreover, Gerpheide ’658 expressly references U.S. Patent No. 4,698,461 to Meadows et al. (“Meadows ’461”). Meadows ’461 states: “One example of such a touch responsive

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
	terminal is manufactured by RGB Dynamics of Salt Lake City, Utah. In the RGB device, a touch sensitive surface comprises indium tin oxide which is applied to a glass base plate.” Meadows ’461 at 1:36-40. Meadows ’461 states: “As previously mentioned, the touch panel 16 includes a base plate coated on a surface 18 with an electrically conductive film. One suitable example of such a film is indium tin oxide (10% indium, 90% tin oxide) having a sheet resistivity of 200 ohms per square and a transmission of 85% for light at 520 nanometers. Such plates are commercially available, such as from Optical Coating Laboratory (OCLI) of Santa Rosa, Calif.” Id. at 14:3-14. It would have obvious to use ITO for the conductive lines, as taught by Meadows ’461, at least because Meadows ’461 was expressly referenced within the specification of Gerpheide ’658 and both references describe very similar touch screens in a wide variety of applications.
[7] The touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium.	Gerpheide ’658 teaches the touch panel as recited in claim 1, wherein the capacitive sensing medium is a mutual capacitance sensing medium. See **[1F]** and **[1E]**.
[8] The touch panel as recited in claim 7, further comprising a virtual ground charge amplifier coupled to the touch panel for detecting the touches on the touch panel.	Gerpheide ’658 teaches the touch panel as recited in claim 7, further comprising a virtual ground charge amplifier (e.g., within capacitive measurement element 78 and/or differential charge transfer circuit 80) coupled to the touch panel for detecting the touches on the touch panel.

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	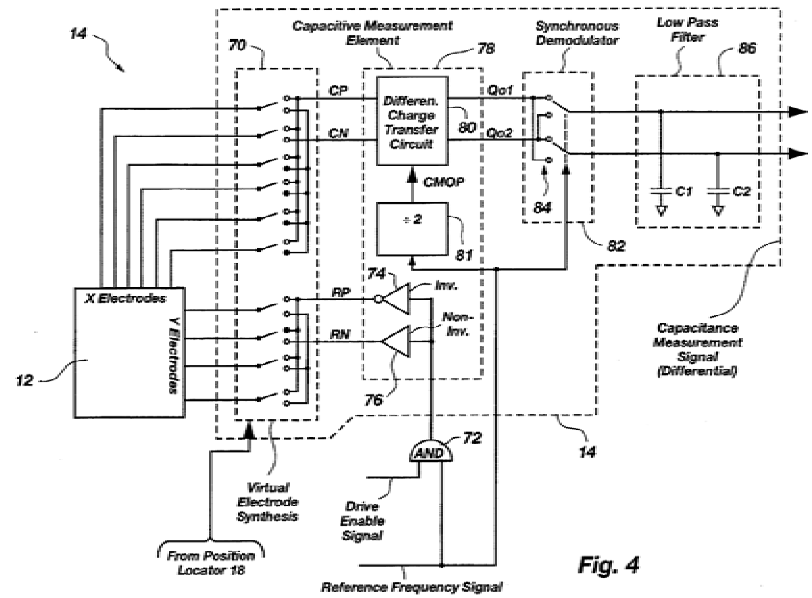 Fig. 4 “FIG. 4 shows one embodiment of the synchronous electrode capacitance measurement unit 14 in more detail. The key elements of the synchronous electrode capacitance measurement unit 14 are (a) an element for producing a voltage change in the electrode array synchronously with a reference signal, (b) an element producing a signal indicative of the displacement charge thereby coupled between electrodes of the electrode array, (c) an element for demodulating this signal synchronously with the reference signal, and (d) an element for low pass filtering the demodulated signal. Unit 14 is coupled to the electrode array, preferably through a multiplexor or switches. The capacitances to be measured in this embodiment are mutual capacitances between electrodes but could be stray capacitances of electrodes to ground or algebraic sums (that is sums and differences) of such mutual or stray capacitances.” Id. at 5:51-67. “The capacitance measurement element 78 contains a differential charge transfer circuit 80 as illustrated in FIG. 4 of Gerpheide, U.S. Pat. 5,349,303, incorporated herein by reference.

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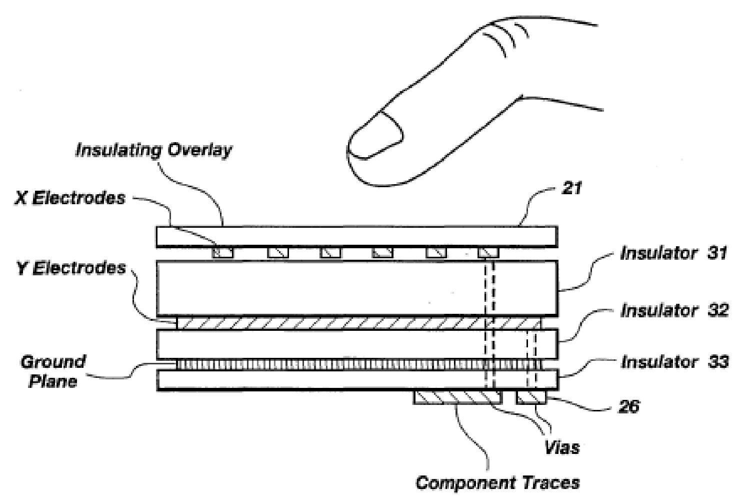
	Capacitors Cs1 and Cs2 of FIG. 4 of that patent correspond to the stray capacitances of the positive and negative virtual electrodes to ground. The CHOP signal of that FIG. 4 is conveniently supplied in the present invention as a square wave signal having half the frequency of the reference frequency signal, as generated by the divide-by-2 circuit 81 shown herein. As described in the Gerpheide '303 patent, the circuit maintains CP and CN (lines 68 and 72 therein) at a constant virtual ground voltage.” Id. at 6:35-47
[10A] A display arrangement comprising: a display having a screen for displaying a graphical user interface; and	Gerpheide ’658 teaches a display arrangement comprising a display (e.g., “display device”) having a screen for displaying a graphical user interface. “Numerous prior art devices and systems exist by which tactile sensing is used to provide data input to a data processor. Such devices are used in place of common pointing devices (such as a "mouse" or stylus) to provide data input by finger positioning on a pad or display device. These devices sense finger position by a capacitive touch pad wherein scanning signals are applied to the pad and variations in capacitance caused by a finger touching or approaching the pad are detected. By sensing the finger position at successive times, the motion of the finger can be detected. This sensing apparatus has application for controlling a computer screen cursor. More generally it can provide a variety of electrical equipment with information corresponding to finger movements, gestures, positions, writing, signatures and drawing motions.” Id. at 1:17-31.
[10B] a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;	Gerpheide ’658 teaches a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image. See **[1A]** and **[1B]**.
[10C] wherein the touch panel includes a multipoint sensing	Gerpheide ’658 teaches the claimed touch panel including a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and	coupling associated with those touch events at distinct points across the touch panel. See **[1A]** and **[1B]**.
[10D] wherein the touch panel comprises: a first glass member disposed over the screen of the display;	Gerpheide ’658 teaches the claimed touch panel comprising a first glass member (e.g., isolator 32) disposed over the screen of the display.  *Fig. 2b* See **[1A]** and **[1B]**.
[10E] a first transparent conductive layer disposed over the first glass member,	Gerpheide ’658 teaches a first transparent conductive layer disposed over the first glass member.

U.S. Patent No. 7,663,607	Gerpheide ’658 and Gerpheide ’017
	See **[1A]** and **[1B]**.
[10F] the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;	Gerpheide ’658 teaches the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10G] a second glass member disposed over the first transparent conductive layer;	Gerpheide ’658 teaches a second glass member (e.g., insulator 31) disposed over the first transparent conductive layer. See **[1A]** and **[1B]**.
[10H] a second transparent conductive layer disposed over the second glass member,	Gerpheide ’658 teaches a second transparent conductive layer disposed over the second glass member. See **[1A]** and **[1B]**.
[10I] the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths,	Gerpheide ’658 teaches the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths. See **[1A]** and **[1B]**.
[10J] the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;	Gerpheide ’658 teaches the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer. See **[1A]** and **[1B]**.

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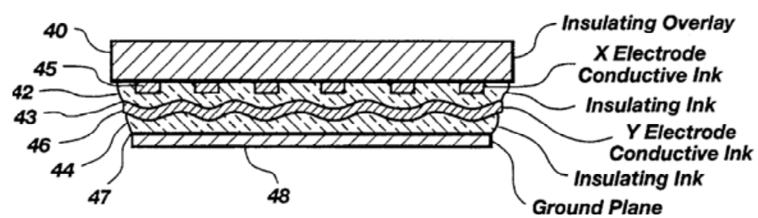
[10K] a third glass member disposed over the second transparent conductive layer; and	Gerpheide ’658 teaches a third glass member (e.g., insulating overlay 21) disposed over the second transparent conductive layer. See **[1A]** and **[1B]**.
[10L] one or more sensor integrated circuits operatively coupled to the lines.	Gerpheide ’658 teaches one or more sensor integrated circuits operatively coupled to the lines. See **[1E]** and **[1F]**.
[11] The display arrangement as recited in claim 10 further including dummy features disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.	Gerpheide ’658 teaches the display arrangement as recited in claim 10 further including dummy features (e.g., insulating ink layer 47) disposed in the space between the parallel lines, the dummy features optically improving the visual appearance of the touch screen by more closely matching the optical index of the lines.  Fig. 3a Gerpheide ’658 states: “One skilled in the art will realize that a variety of techniques and materials can be used to form the electrode array. For example, FIG. 3A illustrates an alternative embodiment in which the electrode array includes an insulating overlay 40 as

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	described above. Alternate layers of conductive ink 42 and insulating ink 43 are applied to the reverse surface by a silk screen process. The X electrodes 45 are positioned between the insulating overlay 40 and X electrode conductive ink layer 42. Another insulating ink layer 43 is applied below layer 42. The Y electrodes 46 are positioned between insulating ink layer 43 and conductive ink layer 44. Another insulating ink layer 47 is applied below conductive ink layer 44, and ground plane 48 is affixed to Y electrode conductive ink layer 47. Each layer is approximately 0.01 millimeters thick.” Id. at 5:11-25. To the extent Gerpheide ’658 does not disclose this claim element, the use of “dummy features” disposed in the space between the parallel lines would have been a simple design choice representing a trivial and predictable variation. Since Gerpheide ’658 clearly contemplates a touch sensor used with a display, it would have been obvious to one of ordinary skill in the art to incorporate dummy features that optically improve the visual appearance of the touchscreen by more closely matching the optical index of the lines, as taught by Perski ’455, Morag ’229 (Col. 12:64-13:32), or Mackey ’935 (Col. 8:17-39), in order to reduce the visual differences between the conducting and non-conducting areas. See **Exhibit P-1, [11]**.