

## **ABSTRACT OF THE DISCLOSURE**

Disclosed is a conductor pattern structure of a capacitive touch panel. First-axis conductor assemblies and second-axis conductor assemblies are formed on a surface of a substrate. Each first-axis conductor assembly includes a plurality of first-axis conductor cells that are interconnected by first-axis conduction lines. An insulation layer is formed on a surface of each first-axis conduction line. Each second-axis conductor assembly includes a plurality of second-axis conductor cells that are interconnected by second-axis conduction lines. Each second-axis conduction line extends across the insulation layer of the associated first-axis conduction line.

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	TVM-002
		Application Number	
Title of Invention	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

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**Applicant Information:**

<b>Applicant 1</b>					<input type="button" value="Remove"/>
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>		<b>Suffix</b>
	Ching-Yang		Chang		
<b>Residence Information (Select One)</b> <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
<b>City</b>	Taipei	<b>Country Of Residence<sup>i</sup></b>	TW		
<b>Citizenship under 37 CFR 1.41(b)<sup>i</sup></b>					
<b>Mailing Address of Applicant:</b>					
<b>Address 1</b>	2F-1, No. 5, Alley 22, Lane 513				
<b>Address 2</b>	Rueiguang Rd., Neihsu				
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<b>Postal Code</b>	114	<b>Country<sup>i</sup></b>	TW		
<b>Applicant 2</b>					<input type="button" value="Remove"/>
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>		<b>Suffix</b>
	Shun-Ta		Chien		
<b>Residence Information (Select One)</b> <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
<b>City</b>	Taipei	<b>Country Of Residence<sup>i</sup></b>	TW		
<b>Citizenship under 37 CFR 1.41(b)<sup>i</sup></b>					
<b>Mailing Address of Applicant:</b>					
<b>Address 1</b>	2F-1, No. 5, Alley 22, Lane 513				
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<b>Postal Code</b>	114	<b>Country<sup>i</sup></b>	TW		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button.					<input type="button" value="Add"/>

**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below.  
For further information see 37 CFR 1.33(a).

An address is being provided for the correspondence information of this application.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	TVM-002
		Application Number	
Title of Invention	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL		
Customer Number	03897		
Email Address		<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

**Application Information:**

Title of the Invention	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL		
Attorney Docket Number	TVM-002	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	5	Suggested Figure for Publication (if any)	

**Publication Information:**

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	<b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	03897		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status			<input type="button" value="Remove"/>
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	TVM-002
	Application Number	
Title of Invention	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL	

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

<input type="button" value="Remove"/>			
Application Number	Country <sup>i</sup>	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
96115152	TW	2007-04-27	<input checked="" type="radio"/> Yes <input type="radio"/> No
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<input type="button" value="Add"/>

### Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

<b>Assignee 1</b>				<input type="button" value="Remove"/>
If the Assignee is an Organization check here. <input checked="" type="checkbox"/>				
Organization Name	TrendOn Touch Technology Corp.			
<b>Mailing Address Information:</b>				
Address 1	2F-1, No. 5, Alley 22, Lane 513			
Address 2	Rueiguang Rd., Neihu			
City	Taipei	State/Province		
Country <sup>i</sup>	TW	Postal Code	114	
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the <b>Add</b> button.				<input type="button" value="Add"/>

### Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

<b>Signature</b>	/thomas schneck/		Date (YYYY-MM-DD)	2007-08-21	
First Name	Thomas	Last Name	Schneck	Registration Number	24518

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**What is claimed is:**

1. A conductor pattern structure of a capacitive touch panel, which is adapted to form on a surface of a substrate, the touch-control pattern structure comprising:
  - a plurality of first-axis conductor assemblies, each first-axis conductor assembly comprising a plurality of first-axis conductor cells arranged on the substrate surface along a first axis in a substantially equally-spaced manner, a disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells;
  - a plurality of first-axis conduction lines respectively connecting between adjacent ones of the first-axis conductor cells of each first-axis conductor assembly so that the first-axis conductor cells of each respective first-axis conductor assembly are electrically connected together;
  - a plurality of insulation layers each covering a surface of each first-axis conduction line;
  - a plurality of second-axis conductor assemblies, each second-axis conductor assembly comprising a plurality of second-axis conductor cells arranged on the substrate surface along a second axis in a substantially equally-spaced manner, each second-axis conductor cell being set in each disposition zone; and
  - a plurality of second-axis conduction lines respectively connecting between adjacent ones of the second-axis conductor cells of each second-axis conductor assembly so that the second-axis conductor cells of each respective second-axis conductor assembly are electrically connected together, the second-axis conduction line being extended across a surface of the insulation layer of the respective first-axis conduction line.

2. The conductor pattern structure as claimed in Claim 1, wherein the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.
3. The conductor pattern structure as claimed in Claim 1, wherein the first-axis conduction lines and the second-axis conduction lines consist of a transparent conductive material.
4. The conductor pattern structure as claimed in Claim 1, wherein the insulation layer consists of a transparent insulation material.
5. The conductor pattern structure as claimed in Claim 1, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
6. A conductor pattern structure of a capacitive touch panel adapted to form on a surface of a substrate, the touch-control pattern structure comprising:  
  
at least two adjacent first-axis conductor cells; and  
  
at least two adjacent second-axis conductor cells,  
  
wherein the adjacent first-axis conductor cells are connected by a first-axis conduction line provided therebetween, characterized in that an insulation layer is formed on a surface of the first-axis conduction line and a second-axis conduction line extends across a surface of the insulation layer to connect between the adjacent second-axis conductor cells.
7. The conductor pattern structure as claimed in Claim 6, wherein the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.

8. The conductor pattern structure as claimed in Claim 6, wherein the first-axis conduction line and the second-axis conduction line consist of a transparent conductive material.
9. The conductor pattern structure as claimed in Claim 6, wherein the insulation layer consists of a transparent insulation material.
10. The conductor pattern structure as claimed in Claim 6, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.



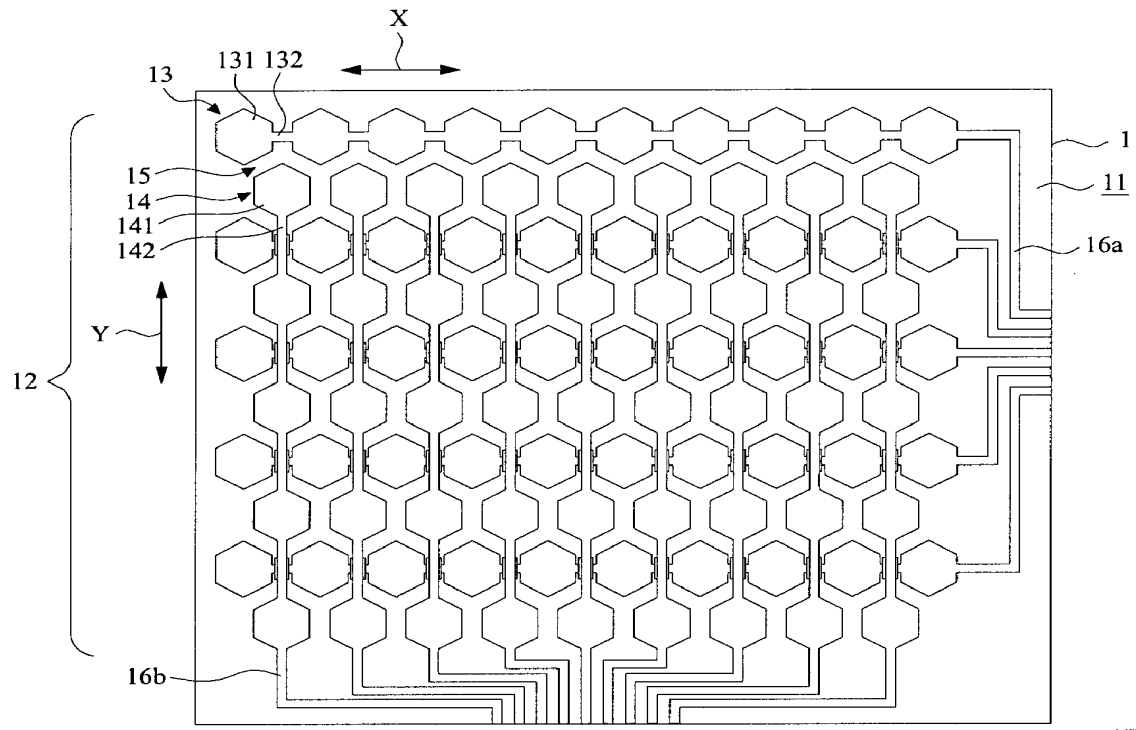


FIG. 1

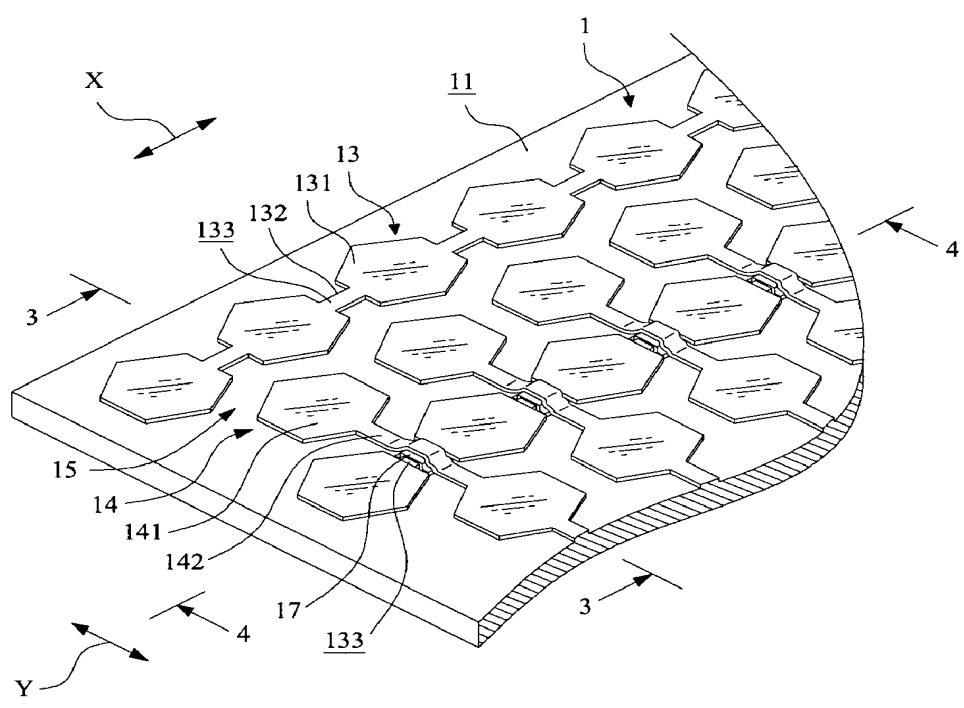


FIG. 2

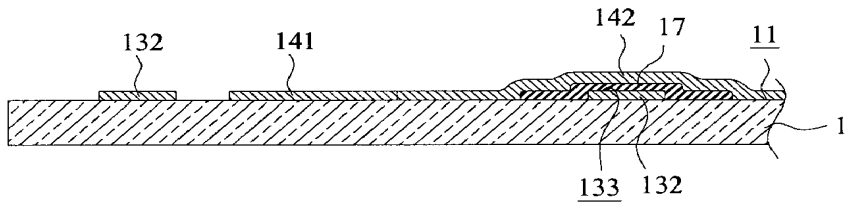


FIG.3

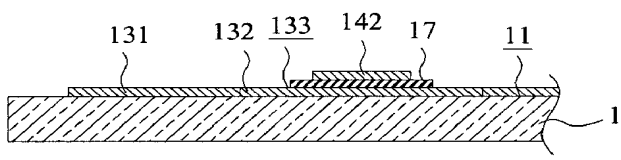


FIG.4

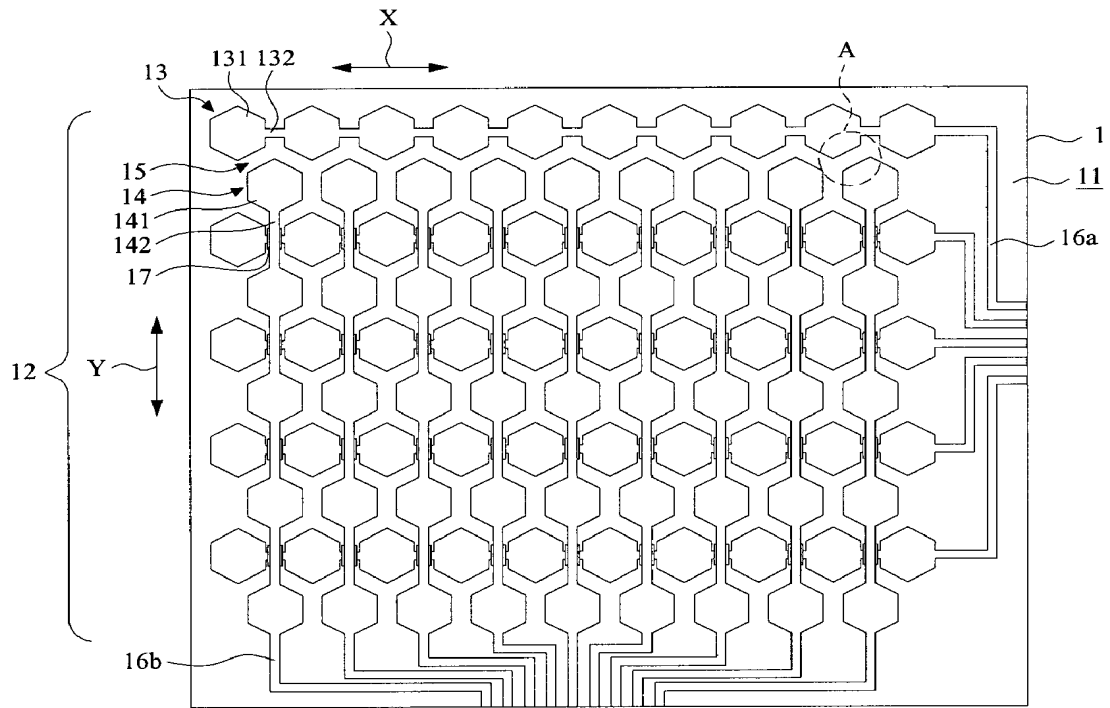


FIG. 5

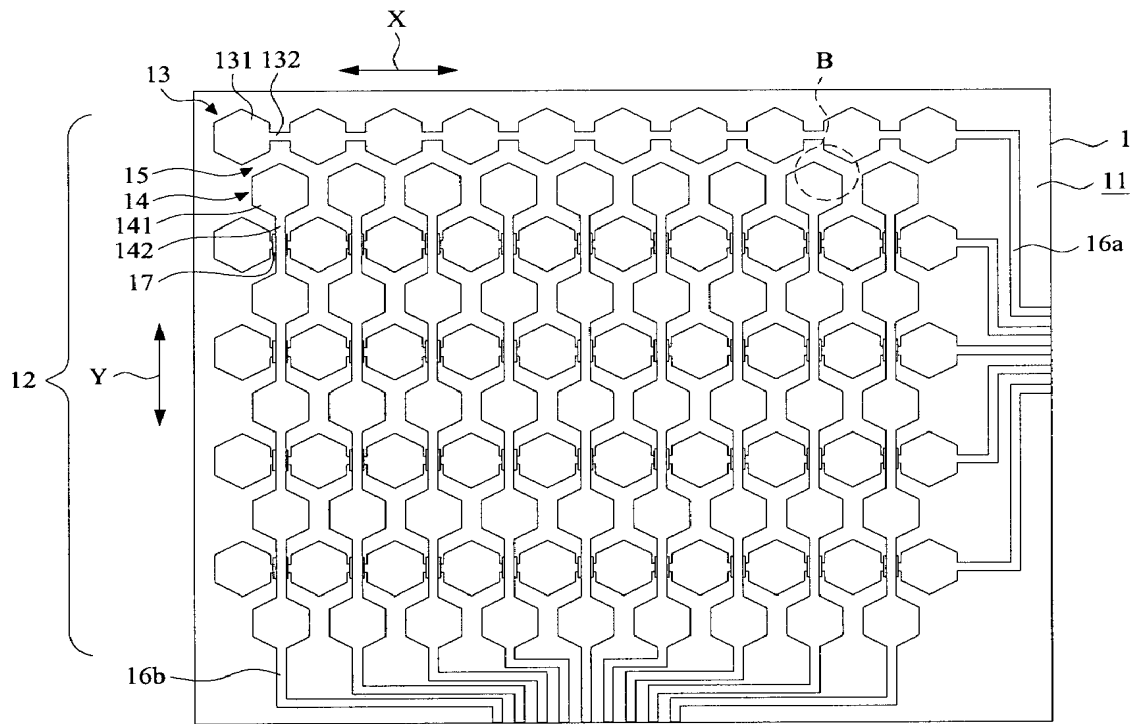


FIG. 6

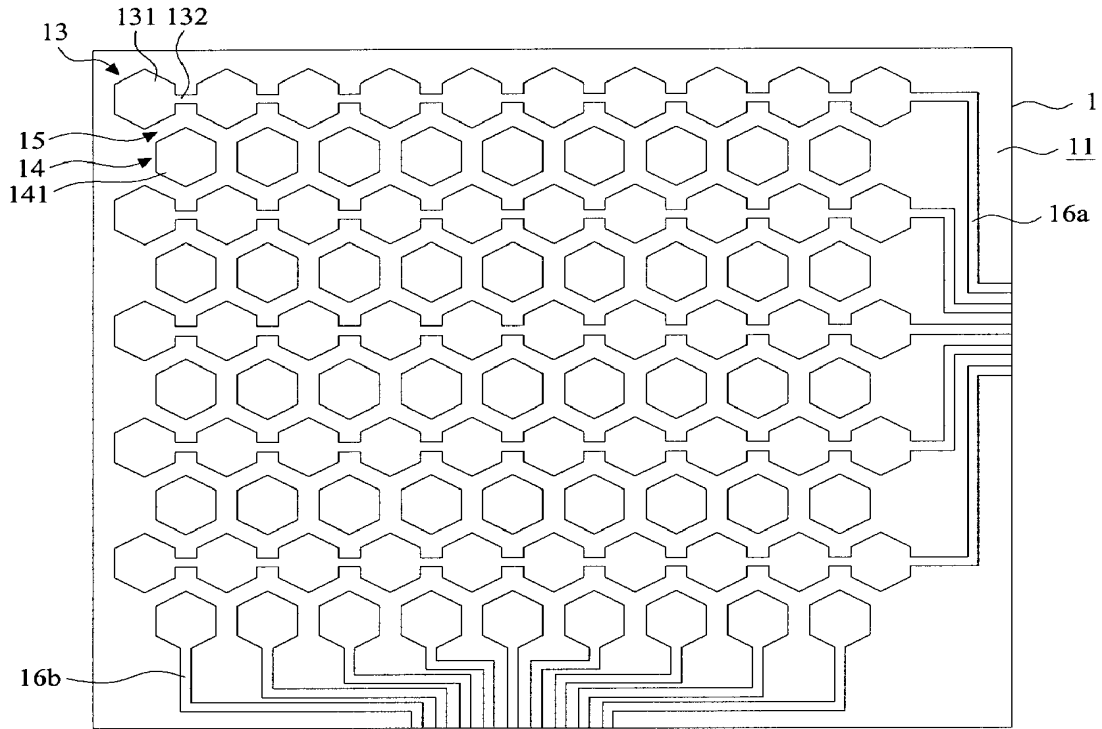


FIG. 7

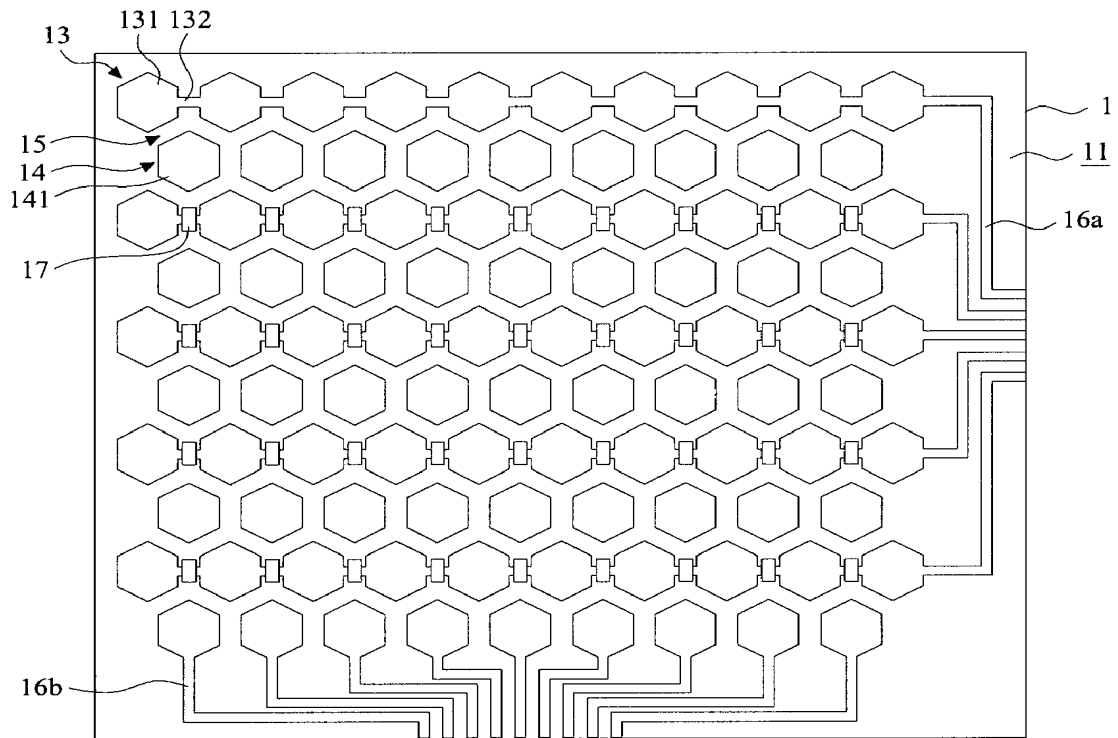


FIG. 8

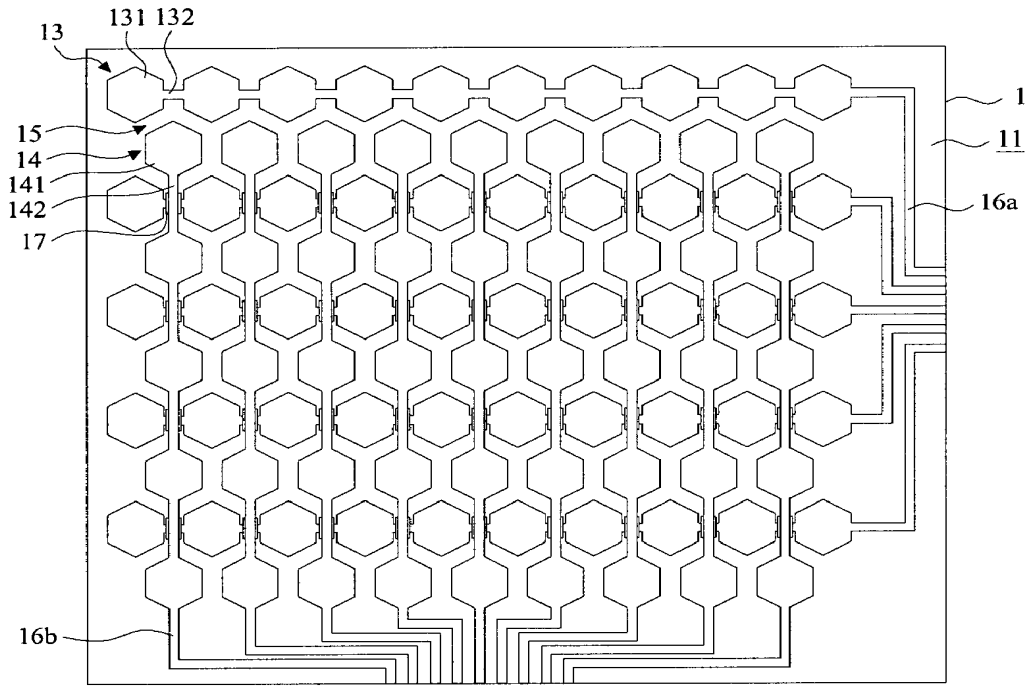


FIG. 9

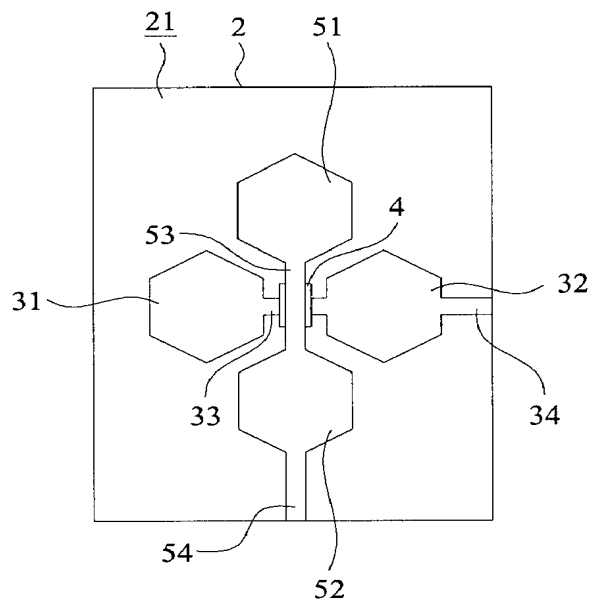


FIG. 10

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<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b>  <input checked="" type="checkbox"/> Declaration Submitted with Initial Filing    OR <input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	<b>Attorney Docket Number</b>	TVM-002
	<b>First Named Inventor</b>	Ching-Yang Chang
	<b>COMPLETE IF KNOWN</b>	
	<b>Application Number</b>	/
	<b>Filing Date</b>	
	<b>Group Art Unit</b>	
	<b>Examiner Name</b>	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Conductor Pattern Structure of Capacitive Touch Panel

the specification of which (Title of the invention)

is attached hereto  
 OR  
 was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
96115152	Taiwan, R.O.C.	April 27, 2007	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

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## DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

<input checked="" type="checkbox"/> Customer Number <span style="border: 1px solid black; padding: 2px;">003897</span> → <span style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">Place Customer Number Bar Code Label here</span> OR <input checked="" type="checkbox"/> Registered practitioner(s) name(s)/registration number listed below			
Name	Registration Number	Name	Registration Number
Thomas Schneck	24,518	David M. Schneck	43,094
Mark Protsik	31,788	Nissa M. Strottman	52,257
Gina McCarthy	42,986	Bradley W. Scheer	47,059
		Patrick T. King	28,231

Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to:  Customer Number or Bar Code Label 003897 OR  Correspondence address below

Name	Law Offices of Schneck & Schneck				
Address	P.O. Box 2-E				
Address					
City	San Jose	State	CA	ZIP	95109-0005
Country	USA	Telephone	408/297-9733	Fax	408/297-9748

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: Ching-Yang Chang  A petition has been filed for this unsigned inventor

Given Name (first and middle if any)	Family Name or Surname
Ching-Yang	Chang

Inventor's Signature	<i>CHANG CHIUNG YANG</i>	Date	<i>Nov 10, 2006</i>
Residence: City	Taipei City	State	Taiwan, R.O.C.
Post Office Address	2F-1, No. 5, Alley 22, Lane 513, Rueiguang Rd., Neihu, Taipei City, Taiwan, R.O.C.		
Post Office Address			
City	Taipei City	State	Taiwan, R.O.C.

Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

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<b>DECLARATION</b>	<b>ADDITIONAL INVENTOR(S) Supplemental Sheet</b> Page <u>1</u> of <u>1</u>
--------------------	-----------------------------------------------------------------------------------

<b>Name of Additional Joint Inventor, if any:</b>		<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])			Family Name or Surname				
Shun-Ta			Chien				
Inventor's Signature	<i>Chien Shun-Ta</i>				Date	05-10-2009	
Residence: City	Taipei City	State		Country	Taiwan, R.O.C.	Citizenship	
Post Office Address	2F-1, No. 5, Alley 22, Lane 513, Rueiguang Rd., Neihu, Taipei City, Taiwan, R.O.C.						
Post Office Address							
City	Taipei City	State		ZIP		Country	
<b>Name of Additional Joint Inventor, if any:</b>		<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])			Family Name or Surname				
Inventor's Signature					Date		
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		ZIP		Country	
<b>Name of Additional Joint Inventor, if any:</b>		<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])			Family Name or Surname				
Inventor's Signature					Date		
Residence: City		State		Country		Citizenship	
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# **CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL**

## **FIELD OF THE INVENTION**

**[0001]** The present invention relates to the field of touch panel devices, and in particular to a conductor pattern structure of a capacitive touch panel.

## **BACKGROUND OF THE INVENTION**

**[0002]** Touch panels have been of wide applications in the fields of household appliances, communications, and electronic information appliances. An example of the common applications of the touch panel is an input interface of a personal digital assistant (PDA), an electrical appliance, or a game machine, etc. The current trend of integration of a touch panel and a display panel allows a user to use his or her finger or a stylus to point a control icon shown on the panel in order to execute a desired function on a PDA, an electrical appliance or a game machine, etc. The touch panel is also applied in a public information inquiry system to provide an efficient operation system for the public.

**[0003]** A conventional touch panel comprises a substrate having a surface on which sensing zones are distributed for sensing a signal associated with the touch of a user's finger or stylus to effect input and control. The sensing zones are made of transparent conductive membranes, such as Indium Tin Oxide (ITO), whereby a user may touch the transparent conductive membrane corresponding to a specific location shown on the display to effect operation of the device.

**[0004]** The most commonly known types of touch panels include resistive panel, capacitive panel, infrared sensing panel, electromagnetic sensing panel, and sonic sensing panel. The capacitive touch panel employs a change in capacitance caused between a transparent electrode and the electrostatics of human body to induce an current based on which the touch location can be identified. The capacitive touch panel is advantageous in light transparency,

hardness, precision, response time, touch cycles, operation temperature, and initiation force and is thus most commonly used currently.

**[0005]** In order to detect the location where a finger or a stylus touches the touch panel, a variety of capacitive touch panel techniques are developed. An example is US Patent No. 6,970,160, which discloses a lattice touch-sensing system for detecting a position of a touch on a touch-sensitive surface. The lattice touch-sensing system may include two capacitive sensing layers, separated by an insulating material, where each layer consists of substantially parallel conducting elements, and the conducting elements of the two sensing layers are substantially orthogonal to each other. Each element may comprise a series of diamond shaped patches that are connected together with narrow conductive rectangular strips. Each conducting element of a given sensing layer is electrically connected at one or both ends to a lead line of a corresponding set of lead lines. A control circuit may also be included to provide an excitation signal to both sets of conducting elements through the corresponding sets of lead lines, to receive sensing signals generated by sensor elements when a touch on the surface occurs, and to determine a position of the touch based on the position of the affected bars in each layer.

**[0006]** US Patent No. 4,233,522 discloses a capacitive touch panel comprising an array of touch sensitive switch cells. Each switch cell includes a first and a second pair of series connected capacitors energized by a common signal source, the array of switch cells being arranged so that the first pair of capacitors are connected in first groups of switch cells, such as rows, to a corresponding first plurality of signal detectors, and the second pair of capacitors are connected in second groups of switch cells, such as columns, to a corresponding second plurality of signal detectors, the junctions of each pair of capacitors of a single switch cell being selectively coupled to ground by the body or other touch capacitive means for actuating a selected switch cell.

**[0007]** US Patent No. 4,733,222 discloses a capacitance variation sensitive touch sensing array system including an array of electrodes, an array of drive lines,

a drive signal generator, and an array of sense lines. Each electrode is a connected series of conductive tabs and forms either a row or a column of the electrode array. Each drive line is capacitively coupled to a plurality of the electrodes. The drive signal generator generates and applies alternating signal packets to the drive lines. The sense line is capacitively coupled to a plurality of the electrodes so that signals are derived from the electrodes when drive signals are applied to the drive lines. The number of electrodes is equal to the product of the number of drive lines and the number of sense lines. Based on values derived from signals on the sense lines, a microprocessor provides information associated with touch by an operator.

**[0008]** US Patent No. 5,880,411 discloses a method for recognizing a position made by a conductive object on a touch-sensor pad. Signals are sent to a control circuit of a host to identify the touch position. US Patent Nos. 6,414,671 and 5,374,787 disclose the same technique.

**[0009]** US Patent No. 7,030,860 discloses a transparent, capacitive sensing system particularly well suited for input to electronic devices. The capacitive sensor can further be used as an input device for a graphical user interface, especially if overlaid on top of a display device like an LCD screen to sense finger position and contact area over the display.

**[0010]** US Patent No. 5,459,463 discloses a device for locating an object situated close to a detection area and a transparent keyboard incorporating the device. The device comprises a first set of detection zones connected so as to form lines which extend parallel to each other and to a detection area, a second set of detection zones connected to each other so as to form columns which extend perpendicularly to the lines, a scanning device which applies an electric signal to the lines and columns, and means for determining the position of an object by means of the scanning device.

**[0011]** US Patent No. 6,498,590 discloses a multi-user touch system including a surface on which antennas are formed. A transmitter transmits uniquely

identifiable signals to each antenna. Receivers are capacitively coupled to different users, and the receivers are configured to receive the uniquely identifiable signals. A processor then associates a specific antenna with a particular user when multiple users simultaneously touch any of the antennas.

**[0012]** US Patent No. 5,847,690 discloses a unitary display and sensing device, which integrates liquid crystal display module elements of a liquid crystal display module for detecting input on a flat panel display screen.

**[0013]** All the prior art references described above provide teaching of detection touch of a user on a touch panel and all are comprised of structures of touch sensing elements. However, these known devices are all of a construction including two capacitive sensing layers spaced from each other with an insulation material to effect capacitive effect between the layers. This makes the structure of the panel very thick and is thus against the trend of miniaturization. Further, the conventional capacitive touch panel comprises a substrate on both surfaces of which two capacitive sensing layers are formed respectively. In this respect, through holes must be formed on the substrate to serve as vias and circuit layering must be adopted to properly connect conductor elements of the sensing layers. This complicates the manufacturing of the capacitive touch panel.

**[0014]** Thus, it is desired to have a capacitive touch panel that overcomes the above drawbacks of the conventional capacitive touch panels.

## **SUMMARY OF THE INVENTION**

**[0015]** Thus, an objective of the present invention is to provide a capacitive touch panel comprising a thin conductor pattern structure, which consists of a plurality of first-axis conductor assemblies and a plurality of second-axis conductor assemblies, each conductor assembly being comprised of a plurality of conductor cells interconnected by conduction lines, wherein the conduction lines extending in different axes are isolated from each other by an insulation layer.

**[0016]** Another objective of the present invention is to provide a capacitive touch panel comprising a conductor pattern structure consisting of first-axis conductor assemblies and second-axis conductor assemblies, both comprising conductors cells connected by conduction lines, the conductor cells and the conduction lines being formed on the same surface of a substrate by known processes for manufacturing general transparent conductor layer, whereby when a user touches the surface of the touch panel, the first-axis conductor assemblies and the second-axis conductor assemblies that are touched by the user induce capacitive effect between adjacent conductor cells thereof.

**[0017]** According to the present invention, a solution to overcome the above discussed drawbacks of the conventional capacitive touch panels resides in that a conductor pattern structure is formed on a surface of a substrate, comprising a plurality of first-axis conductor assemblies and a plurality of second-axis conductor assemblies that are extended in directions that are substantially perpendicular to each other and that comprise a plurality of equally-spaced first-axis conductor cells and equally-spaced second-axis conductor cells respectively, and first-axis conduction lines and second-axis conduction lines interconnecting the first-axis conductors along the first axis and the second-axis conductors along the second axis respectively, wherein an insulation layer is provided to cover a surface of each first-axis conduction line to isolate the first-axis conduction line from the associated second-axis conduction line.

**[0018]** According to the present invention, a plurality of first-axis conductor assemblies and a plurality of second-axis conductor assemblies, which constitute the conductor pattern structure of a capacitive touch panel, are formed on the same surface of a substrate, thereby simplifying the structure and reducing the thickness of the structure. When the conductor cells of the first-axis conductor assemblies and the conductor cells of the second-axis conductor assemblies that are adjacent to each other are touched by a user's finger, a capacitance variation signal is induced, in response to the area of the adjacent conductor cells on which the finger of the user is laid, and then applied to a control circuit to identify the position where the user's finger touches the panel. The first-axis conductor

assemblies and the second-axis conductor assemblies of the conductor pattern structure can be formed on only one surface of the substrate by the general circuit laying techniques. Thus, the present invention can be practiced in a simple process with high passing rate and low costs.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0019]** The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments thereof, with reference to the attached drawings, in which:

**[0020]** **Figure 1** is a plan view of a conductor pattern structure of a capacitive touch panel in accordance with a first embodiment of the present invention;

**[0021]** **Figure 2** is a perspective view of a portion of the conductor pattern structure of the capacitive touch panel of the present invention;

**[0022]** **Figure 3** is a cross-sectional view taken along line 3-3 of **Figure 2**;

**[0023]** **Figure 4** is a cross-sectional view taken along line 4-4 of **Figure 2**;

**[0024]** **Figure 5** illustrates a user's finger physically engaging a point on the capacitive touch panel in accordance with the present invention;

**[0025]** **Figure 6** illustrates the user's finger engaging a different point on the capacitive touch panel of the present invention;

**[0026]** **Figure 7** illustrates a schematic view of a surface of a substrate on which a plurality of first-axis conductor cells, first-axis conduction lines, signal transmission lines, and second-axis conductor cells are formed;

**[0027]** **Figure 8** illustrates a schematic view of the substrate surface on which an insulation layer is formed to cover the surface of each first-axis conduction line,

after the step of **Figure 7**;

**[0028]** **Figure 9** illustrates a schematic view of the substrate surface on which a second-axis conduction line is formed to connect between each pair of adjacent second-axis conductor cells of the same second-axis conductor assembly, after the step of **Figure 8**; and

**[0029]** **Figure 10** is a plan view of a conductor pattern structure of a capacitive touch panel in accordance with a second embodiment of the present invention.

### **DETAILED DESCRIPTION**

**[0030]** With reference to the drawings and in particular to **Figures 1** and **2**, of which **Figure 1** illustrates a plan view of a conductor pattern structure of a capacitive touch panel in accordance with a first embodiment of the present invention and **Figure 2** illustrates a perspective view of a portion of the conductor pattern structure of the capacitive touch panel, generally designated with reference numeral **12**, is formed on a surface **11** of a substrate **1**. The conductor pattern structure **12** comprises a plurality of conductor assemblies **13** extending along a first axis, which will be referred to as “first-axis conductor assemblies”, and a plurality of conductor assemblies **14** extending along a second axis, which will be referred to as “second-axis conductor assemblies”. Each of the first-axis conductor assemblies **13** is parallel to other first-axis conductor assemblies **13**, and each of the second-axis conductor assemblies **14** is parallel to other second-axis conductor assemblies **14**. The first-axis conductor assemblies **13** are substantially perpendicular to the second-axis conductor assemblies **14**. However, it is apparent that the first-axis conductor assemblies **13** and the second-axis conductor assemblies **14** can be arranged on the surface **11** of the substrate **1** at an included angle therebetween that is other than a right angle.

**[0031]** Each first-axis conductor assembly **13** is composed of a plurality of first-axis conductor cells **131** that are lined up along the first axis, which is

designated at “X” in the drawings, on the surface 11 of the substrate 1 in a substantially equally-spaced manner and a disposition zone 15 is delimited between adjacent first-axis conductor assemblies 13 and adjacent first-axis conductor cells 131.

[0032] A first-axis conduction line 132 connects between adjacent first-axis conductor cells 131 positioned along the first axis X so that the first-axis conductor cells 131 along the first axis X are electrically connected together to form a first-axis conductor assembly 13. In other words, the first-axis conductor cells 131 of the same first-axis conductor assembly 13 are connected together in cascade by the first-axis conduction lines 132. Each first-axis conductor assembly 13 is further connected to a signal transmission line 16a for transmitting a signal to a control circuit laid on a circuit board (both not shown).

[0033] Each of the conduction lines 132 has a surface 133 that is covered by an insulation covering layer 17, which is made of a material featuring electric insulation, and preferably a transparent insulation material, such as silicon dioxide. Each second-axis conductor assembly 14 is composed of a plurality of second-axis conductor cells 141 that are lined up along the second axis, which is designated at “Y” in the drawings, in a substantially equally-spaced manner on the surface 11 of the substrate 1. Each second-axis conductor cell 141 is set in the respective second-axis conductor cell disposition zone 15.

[0034] A second-axis conduction line 142 connects between adjacent second-axis conductor cells 141 positioned along the second axis Y and extends over and across a surface of each insulation layer 17 so that the second-axis conductor cells 141 of the same second-axis conductor assembly 14 are connected together. In other words, the second-axis conductor cells 141 of the same second-axis conductor assembly 14 are connected together in cascade by the second-axis conduction lines 142. Each second-axis conductor assembly 14 is further connected to a signal transmission line 16b for transmitting a signal to the control circuit.



**[0035]** Also referring to **Figure 3**, which shows a cross-sectional view taken along line **3-3** of **Figure 2**, and **Figure 4**, which shows a cross-sectional view taken along line **4-4** of **Figure 2**, the first-axis conductor cells **131**, the first-axis conduction lines **132**, the second-axis conductor cells **141**, and the second conduction lines **142** are made of transparent conductive material. The insulation layer **17** is interposed between the respective first-axis conduction line **132** and the second-axis conduction line **142** so that the second-axis conduction line **142** that connects adjacent second-axis conductor cells **141** of the second-axis conductor assembly **14** extends across the respectively first-axis conduction line **132** in a mutually-insulated manner.

**[0036]** The substrate **1** can be a glass substrate, and the first-axis conductor assemblies **13** and the second-axis conductor assemblies **14**, and the first-axis and second-axis conduction lines **132**, **142** are made of transparent conductive film, such as ITO conductive film. In the embodiment illustrated, the first-axis conductor cells **131** and the second-axis conductor cells **141** are of a shape of substantially hexagon geometry contour. It is apparent that the conductor cells **131**, **141** can be of shapes of other geometry contours to effect an optimum distribution of effective conductor surface.

**[0037]** **Figure 5** demonstrates a user's finger physically engaging a point on the capacitive touch panel in accordance with the present invention, and **Figure 6** demonstrates the user's finger engaging a different point on the capacitive touch panel of the present invention. When a user put his or her finger to touch a contact area (point), designated at "A", on the capacitive touch panel of the present invention, the first-axis conductor cell **131** of the first-axis conductor assembly **13** and the second-axis conductor cell **141** of the second-axis conductor assembly **14**, which are covered by the contact area **A**, induce a capacitor effect therebetween and a signal caused thereby is transmitted through the signal transmission lines **16a**, **16b** to the control circuit. The control circuit may then carry out computation to determine on which point on the surface **11** of the substrate **1** the contact area **A** is set.

**[0038]** When the user moves his or her finger to another contact area **B**, the first-axis conductor cell **131** of the first-axis conductor assembly **13** and the second-axis conductor cell **141** of the second-axis conductor assembly **14**, which are covered by the contact area **B**, induce a capacitor effect therebetween and a change occurs, which induces a signal that is transmitted through the signal transmission lines **16a**, **16b** to the control circuit. The control circuit may then carry out computation to determine on which point on the surface **11** of the substrate **1** the contact area **B** is set.

**[0039]** **Figures 7 and 8** are schematic plan views demonstrating manufacturing steps of the conductor pattern of the capacitive touch panel in accordance with the present invention, wherein **Figure 7** illustrates the schematic view of a surface of a substrate on which a plurality of first-axis conductor cells **131**, first-axis conduction lines **132**, signal transmission lines **16a**, **16b**, and second-axis conductor cells **141** are just formed, and **Figure 8** illustrates the schematic view of the substrate surface on which an insulation covering layer **17** is formed to cover the surface of each first-axis conduction line **132**, after the step of **Figure 7**. Further, **Figure 9** illustrates a schematic view of the substrate surface on which a second-axis conduction line **142** is formed to connect between each pair of adjacent second-axis conductor cells **141** of the same second-axis conductor assembly, after the step of **Figure 8**, to thereby complete the manufacturing of the conductor pattern structure of the touch panel in accordance with the present invention.

**[0040]** The manufacturing of the conductor pattern structure **12** can be carried out with any known techniques, such as etching, sputtering, and screen printing. Etching is taken as an example for manufacture of the conductor pattern structure as follows. First of all, a conductor film, of which an ITO transparent conductive film is an example, is formed on the surface **11** of a cleaned substrate **1**. Thereafter, screen printing is employed to carry out etching mask printing process.

**[0041]** After the etching mask printing process, etching is carried out on the surface **11**, followed by film stripping. Thus, the first-axis conductor cells **131** of

the first-axis conductor assemblies **13**, the first conduction lines **132**, and the second-axis conductor cells **141** of the second-axis conductor assemblies **14**, all being transparent and electrically conductive, are formed on the substrate surface **11**, as shown in **Figure 7**. At this point, all the first-axis conductor cells **131** of the same first-axis conductor assemblies **13** are electrically connected together and the first-axis conductor assemblies **13** are further connected to a plurality of signal transmission lines **16a**.

**[0042]** Thereafter, an insulation covering layer **17** is applied to cover the surface **133** of each first-axis conduction line **132**, as shown in **Figure 8**. Then, a mask is formed with the printing technique to define the positions of the second-axis conduction lines **142**, followed by application of a transparent conductive layer to form the second-axis conduction lines **142** whereby the adjacent second-axis conductor cells **141** along the second axis **Y** are each connected by the second-axis conduction lines **142** with each second-axis conduction line **142** extending over and across the surface of the respective insulation layer **17**, as shown in **Figure 9**. Once the step is done, all second-axis conductor cells **141** of the same second-axis conductor assemblies **14** are electrically connected together and the second-axis conductor assemblies **14** are connected to the signal transmission lines **16b**.

**[0043]** When the etching technique described above is taken to form the conductor cells and the conduction lines on the substrate surface, different pattern can be formed with etching areas defined by different etching masks to similarly form a conductor pattern structure. For example, in the first etching step, only the first-axis conductor cells **131** and the first-axis conduction lines **132** of the first-axis conductor assemblies **13** are formed on the substrate surface **11**, but not the second-axis conductor cells **141** of the second-axis conductor assemblies **14**. Thereafter, the same etching technique is taken again to form the second-axis conductor cells **141** and the second-axis conduction lines **142** on the substrate surface **11**, with the second conduction lines **142** extending over and across the surfaces of the associated insulation layers **17**.

**[0044]** In the embodiment discussed previously, the first-axis conductor cells and the second-axis conductor cells are each formed on the substrate in an array form to constitute the conductor pattern structure of the capacitive touch panel. Based on the same philosophy, a small number of conductor cells can also be used to construct a conductor pattern structure of the capacitive touch panel. This is illustrated in **Figure 10** as a second embodiment of the disclosure, wherein two adjacent first-axis conductor cells **31**, **32** are formed on a surface **21** of a substrate **2** and a signal transmission line **34** is connected to the conductor cell **32**. A first-axis conduction line **33** connects between the adjacent first-axis conductor cells **31**, **32**. An insulation layer **4** is formed on a surface of the first-axis conduction line **33**.

**[0045]** Along an axis that is different from the first-axis conductor cells **31**, **32**, two adjacent second-axis conductor cells **51**, **52** are arranged and a second-axis conduction lines **53** connects between the adjacent second-axis conductor cells **51**, **52** by extending over and across a surface of the insulation layer **4**. The conductor cell **52** is also connected to a signal transmission line **54**.

**[0046]** Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL			
First Named Inventor/Applicant Name:	Ching-Yang Chang			
<b>Filer:</b>	Thomas Schneck/Merle Garcia			
<b>Attorney Docket Number:</b>	TVM-002			
Filed as Small Entity				
<b>Utility Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
Utility filing Fee (Electronic filing)	4011	1	75	75
Utility Search Fee	2111	1	250	250
Utility Examination Fee	2311	1	100	100
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>425</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	2108527
<b>Application Number:</b>	11842747
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3897
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Customer Number:</b>	03897
<b>Filer:</b>	Thomas Schneck/Merle Garcia
<b>Filer Authorized By:</b>	Thomas Schneck
<b>Attorney Docket Number:</b>	TVM-002
<b>Receipt Date:</b>	21-AUG-2007
<b>Filing Date:</b>	
<b>Time Stamp:</b>	17:52:11
<b>Application Type:</b>	Utility under 35 USC 111(a)

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Deposit Account	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Abstract	TVM-002abstract.pdf	37398 3aea0708e811d2652fba50d46bbe9666a42e5e3a	no	1
<b>Warnings:</b>					
<b>Information:</b>					
2	Application Data Sheet	sb0014_fill.pdf	1646214 352c19a6d0fd34b9f73c374f37fe4d978a5c553f	no	4
<b>Warnings:</b>					
<b>Information:</b>					
3	Claims	TVM-002claims.pdf	187234 30e2f48781b383650a8abeffc08d18e810bdf335	no	3
<b>Warnings:</b>					
<b>Information:</b>					
4	Drawings	TVM-002drawings.pdf	290524 ffb24b7a48be5a921c548960294fe90dc154e810	no	5
<b>Warnings:</b>					
<b>Information:</b>					
5	Oath or Declaration filed	TVM-002declaration.pdf	235938 9aae11e519a8bb09c81919eefd60ecd3281fb6db	no	3
<b>Warnings:</b>					
<b>Information:</b>					
6	Specification	TVM-002description.pdf	1266074 74baa5acd708c53b1c1ae1da95e7d651eab00be5	no	12
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<b>Information:</b>					
7	Fee Worksheet (PTO-06)	fee-info.pdf	8396 c2b28d436f14f9760130a6e64682f0f7a5992098	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			3671778		



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**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PTO/SB/06 (12-04)

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**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

**11/842,747**

**APPLICATION AS FILED – PART I**

(Column 1) (Column 2)

**SMALL ENTITY**

**OTHER THAN SMALL ENTITY**

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		
TOTAL CLAIMS (37 CFR 1.16(i))	<b>10</b>	minus 20 =
INDEPENDENT CLAIMS (37 CFR 1.16(h))	<b>2</b>	minus 3 =
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

RATE (\$)	FEE (\$)
	<b>75</b>
	<b>250</b>
	<b>100</b>
X 25=	
X 100=	
N/A	
<b>TOTAL</b>	<b>425</b>

RATE (\$)	FEE (\$)
X 50=	
X 200=	
N/A	
<b>TOTAL</b>	

\* If the difference in column 1 is less than zero, enter "0" in column 2.

**APPLICATION AS AMENDED – PART II**

(Column 1) (Column 2) (Column 3)

**SMALL ENTITY**

**OTHER THAN SMALL ENTITY**

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
<b>TOTAL ADD'T FEE</b>	

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
<b>TOTAL ADD'T FEE</b>	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
<b>TOTAL ADD'T FEE</b>	

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
<b>TOTAL ADD'T FEE</b>	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY.DOCKET.NO, TOT CLAIMS, IND CLAIMS. Row 1: 11/842,747, 08/21/2007, 2629, 425, TVM-002, 10, 2

CONFIRMATION NO. 3897

FILING RECEIPT

3897
SCHNECK & SCHNECK
P.O. BOX 2-E
SAN JOSE, CA95109-0005

Date Mailed: 08/30/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Applicant(s)

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Assignment For Published Patent Application

TRENDON TOUCH TECHNOLOGY CORP., Taipei, TAIWAN

Power of Attorney: The patent practitioners associated with Customer Number 003897

Domestic Priority data as claimed by applicant

Foreign Applications

TAIWAN 96115152 04/27/2007

If Required, Foreign Filing License Granted: 08/30/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US11/842,747

Projected Publication Date: 10/30/2008

Non-Publication Request: No

Early Publication Request: No

\*\* SMALL ENTITY \*\*

Title

**Preliminary Class**

345

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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/842,747	08/21/2007	Ching-Yang Chang	TVM-002

**CONFIRMATION NO. 3897**
*08/30/07*
**NOTICE OF INFORMAL APPLICATION**

This application is considered to be informal since it does not comply with the regulations for the reason(s) indicated below. The period within to correct the informalities noted below and avoid abandonment is set in the accompanying Office action.

**Items Required To Avoid Processing Delays:**

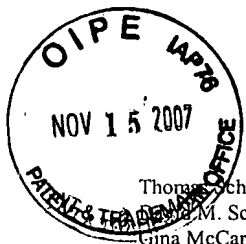
The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

**A new oath or declaration, identifying this application number, or, if appropriate, an application data sheet (37 CFR 1.76), is required. The oath or declaration does not comply with 37 CFR 1.63 in that it:**

- does not identify the citizenship of each inventor.

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Patents and Trademarks

November 13, 2007

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Re: Certified Copy of Priority Document  
U.S. Serial No.: 11/842,747  
Filed: August 21, 2007  
For: CONDUCTOR PATTERN STRUCTURE OF  
CAPACITIVE TOUCH PANEL  
Inventors: Ching-Yang Chang et al.  
Our ref: TVM-002

Dear Sir or Madam:

Transmitted herewith for the above-identified patent application is a certified copy of the priority document, Taiwan application no. 96115152, filed April 27, 2007.

Respectfully submitted,

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

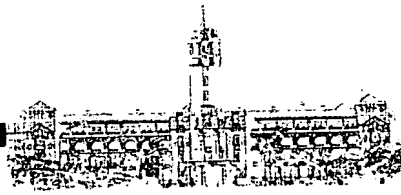
Signed: Merle P. Garcia  
Typed Name: Merle P. Garcia

Date: November 13, 2007

David Schneck  
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Encl: Certified copy of priority document  
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# 中華民國經濟部智慧財產局

INTELLECTUAL PROPERTY OFFICE  
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REPUBLIC OF CHINA

證明所附文件，係本局存檔中原申請案的副本，正確無訛，  
申請資料如下：

This is to certify that annexed is a true copy from the records of this  
Office of the application as originally filed which is identified hereunder:

請 日：西元 2007 年 04 月 27 日  
Application Date Apr 27, 2007

請 案 號：096115152  
Application No.

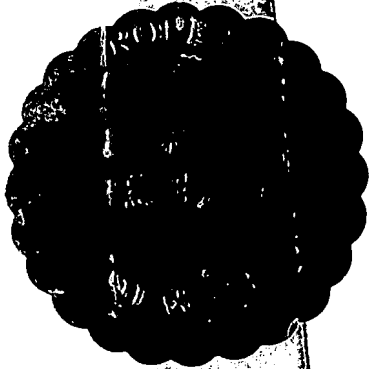
請 人：宸鴻光電科技股份有限公司  
Applicant(s)

局 長

Director General

蔡 練 生

西元 2007 年 05 月 07 日  
May 7, 2007





# 發明專利說明書

(本說明書格式、順序及粗體字，請勿任意更動，※記號部分請勿填寫)

※申請案號：

※申請日期：

※IPC 分類：

一、發明名稱：(中文/英文)

電容式觸控板之觸控圖型結構

二、申請人：(共 1 人)

姓名或名稱：(中文/英文)

宸鴻光電科技股份有限公司

代表人：(中文/英文)

盧鐘雄

住居所或營業所地址：(中文/英文)

114 台北市內湖區瑞光路 513 巷 22 弄 5 號 2 樓之 1

國籍：(中文/英文)

中華民國

三、發明人：(共 1 人)

姓名：(中文/英文)

張慶陽

國籍：(中文/英文)：

中華民國

#### 四、聲明事項：

主張專利法第二十二條第二項  第一款或  第二款  
規定之事實，其事實發生日期為： 年 月 日。

申請前已向下列國家（地區）申請專利：

【格式請依：受理國家（地區）、申請日、申請案號 順序註記】

有主張專利法第二十七條第一項國際優先權：

1.

2.

無主張專利法第二十七條第一項國際優先權：

主張專利法第二十九條第一項國內優先權：

【格式請依：申請日、申請案號 順序註記】

主張專利法第三十條生物材料：

須寄存生物材料者：

國內生物材料 【格式請依：寄存機構、日期、號碼 順序註記】

國外生物材料 【格式請依：寄存國家、機構、日期、號碼 順序註記】

不須寄存生物材料者：

所屬技術領域中具有通常知識者易於獲得時，不須寄存。

## 五、中文發明摘要：

一種電容式觸控板之觸控圖型結構，係在一基板之基板表面上配置有複數個第一軸向導電群組及複數個第二軸向導電群組，每一個第一軸向導電群組由複數個第一軸向導電單元所組成，並由複數個第一軸向導線予以連接，以將同一個第一軸向導電群組中之各個第一軸向導電單元予以連接。複數個絕緣覆層，一一地覆設於該各個第一軸向導線之表面。該每一個第二軸向導電群組亦由複數個第二軸向導電單元所組成。複數個第二軸向導線一一地連接於該第二軸向導電群組之各個相鄰之第二軸向導電單元之間，且該各個第二軸向導線係橫越過對應之第一軸向導線上之絕緣覆層之表面。

## 六、英文發明摘要：

## 七、指定代表圖：

(一)本案指定代表圖為：第 2 圖

(二)本代表圖之元件代表符號簡單說明：

1	基板
11	基板表面
13	第一軸向導電群組
131	第一軸向導電單元
132	第一軸向導線
133	導線表面
14	第二軸向導電群組
141	第二軸向導電單元
142	第二軸向導線
15	第二軸向導電單元配置區
17	絕緣覆層
X	第一軸向
Y	第二軸向

八、本案若有化學式時，請揭示最能顯示發明特徵的化學式：

## 九、發明說明：

### 【發明所屬之技術領域】

本發明係關於一種觸控板之結構設計，特別是關於一種電容式觸控板之觸控圖型結構。

### 【先前技術】

觸控面板 (Touch Panel) 已大量運用於家電、通訊、電子資訊等產品應用上。如目前廣泛商用之個人數位助理 (PDA)、各種家電設備、遊戲輸入介面等。藉由觸控板與顯示器之整合，可供使用者以手指或觸控筆依照顯示畫面上之功能選項點選輸入所欲執行之動作如個人數位助理 (PDA)、各種家電設備、遊戲輸入介面，並且被利用到大眾系統查詢工具等，以提供便民效果之作業系統。

習知之觸控面板係在一基板表面佈設感應區域，其感應區域係用以感應人體之手指或感應筆之信號來達到觸控的目的。該感應區域所使用之材料大都採用透明導電薄膜 (例如氧化銦錫 ITO)，使得使用者在操作時，藉由觸壓該透明導電薄膜對該顯示器上相對應畫面，達到觸控之功能。

目前所常採用之觸控原理概可分為電阻式、電容感應式、紅外線感應式、電磁感應式、音波感應式等不同的技術原理。其中該電容感應式觸控板之工作原理係利用排列之透明電極與人體之間的靜電結合所產生之電容變化，從所產生之誘導電流來檢測其觸控位置之座標。由於電容感應式觸控面板在透光度、硬度、準確率、反應時間、觸控

打點壽命、操作溫度、和起始力量各方面都具有較佳優勢，故目前已被大量採用。

為了要偵測出使用者以手指或感應筆觸碰於觸控面板上之位置，業者研發出各種不同之電容式感應觸碰感測技術。例如在美國專利第 6970160 號發明專利案中，揭露了一種格狀觸控感應系統，其可應用於偵測在一觸控感應面之觸控位置。該格狀觸控感應系統包括兩個電容感應層，其間以一中間隔絕材料分隔，以形成電容效應。每一電容感應層包括實質平行排列之導電元件。兩個電容感應層實質上彼此垂直。每一個導電元件包括一序列之菱形片，藉由狹窄之導電線連接在一起。每一電容感應層上之導電元件係電連接至應導線。一控制電路透過導線提供訊號至兩組導電元件，以在該表面被觸按時接收由感應元件所產生之感應訊號，及判斷在每一層之觸控位置。

美國專利第 4233522 號發明專利案中，揭露了一種電容式觸控板，其包括一陣列之觸控感應開關單元。每一個開關單元包括一第一對及第一第二對之串連電容，該電容係由同一訊號源所驅動。該陣列之開關單元之排列方法，使得第一對電容與第一組開關單元連接，例如列，以連接至一對應之第一複數個訊號偵測器。而第二對電容與第二組開關單元連接，例如欄，以連接至一對應之第二複數個訊號偵測器。每一對電容之接點係選擇性地接地或接到其他觸控電容裝置以驅動一選擇開關電池。

美國專利第 4733222 號發明專利案中，揭露了一種電

容變化敏感觸控感應陣列系統，其包括一陣列之電極、一陣列之驅動電線、一驅動訊號產生器及一陣列之感應電線。每一電極係由一串之導電線連接而成，形成陣列之列或欄。而每一驅動電線係電容連接至多個電極。該驅動訊號產生器會產生交替訊息封包至驅動電線。該感應線係電容連接至多個電極，使得當驅動訊號送到驅動電線時，可透過電極取得訊號。該電極的數目與驅動電線及感應電線的數目相同。依據感應電線產生訊號的值，微處理器提供操作者觸控的相關資訊。

美國專利第 5880411 號發明專利案中，揭露了一種辨識觸控面板觸控位置的方法，可辨識在觸控感應區之導電標的物。辨識訊號被送到主機控制電路以顯示這些觸控位置。美國專利第 6414671 號及第 5374787 號亦揭露了相似之結構。

美國專利第 7030860 號發明專利案中，揭露了一種透明的電容觸控感應系統，適合用於電子裝置之輸入。該電容感應器可用作一圖形使用界面之輸入裝置，特別係當覆蓋在如 LCD 螢幕之顯示裝置之頂面，以感應手指的位置及在顯示器的接觸範圍。

美國專利第 5459463 號發明專利案中，揭露了一種可將靠近偵測區之標的物定位之裝置及具有該裝置之透明鍵盤。該裝置包括第一組偵測區形成之偵測線，第二組偵測區形成之偵測欄，一將電子信號傳送至偵測線及偵測欄之掃描裝置及一可由掃描裝置判讀標的物位置之裝置。該偵

測線連接至感應區，且彼此平行排列；而偵測欄與偵測線垂直，間隔一小段距離。

美國專利第 6498590 號發明專利案中，揭露了一種多人使用觸控系統，其包括一個配置有天線的表面。一發射器傳送特殊可辨識訊號至每一個天線。接收器係電容連接至不同使用者，該接收器可接收該特殊可辨識訊號。當多個使用者同時觸按任何天線，一處理器會將一特定天線與一特定使用者聯結。

美國專利第 5847690 號發明專利案中，揭露了一種顯示及感應裝置，其整合了觸控感應及液晶顯示之液晶顯示模組，以偵測在一平面顯示螢幕之輸入。

### 【發明內容】

本發明所欲解決之技術問題

在各先前專利技術中，雖然皆揭露了可用來感測使用者觸碰觸控面板之功能，且該觸控面板亦皆佈設有觸控感測單元之結構，但該些先前專利技術大都是採用兩個電容感應層，其間以一隔絕材料予以分隔以形成電容效應之結構設計。在採行此類結構設計之觸控面板時，雖然都可以達到電容式觸控感應的功能，但整個觸控面板之結構厚度較厚，不利於輕薄之要求。再者，在實施該傳統的電容式觸控板結構時，其必須在基板之上下表面形成不同的電容感應層，再以例如基板貫孔、貫孔導電層、電路佈線之電路連接製程將各個相關導電單元予以連接，故在製程方面



較為繁雜。

緣此，本發明之主要目的即是提供一種電容式觸控板之薄形觸控圖型結構，該觸控圖型結構包括有複數個第一軸向導電群組及複數個第二軸向導電群組，每一個導電群組由複數個以導線連接之導電單元所組成，而在不同軸向之導線之間則以絕緣覆層予以隔離。

本發明之另一目的是提供一種以簡易製程即可完成之電容式觸控板觸控圖型結構，該觸控圖型結構之第一軸向導電群組及第二軸向導電群組中之各個導電單元及導線係以一般透明導電層之製程形成在基板的同一平面上。如此即可在使用者觸碰該觸控板之表面時，藉由被碰觸之第一軸向導電群組及複數個第二軸向導電群組之相鄰導電單元形成電容效應。

#### 本發明解決問題之技術手段

本發明為解決習知技術之問題所採用之技術手段係於一基板之頂面佈設有一觸控圖型結構，且該觸控圖型結構區分為相互垂直之一第一軸向導電群組及一第二軸向導電群組，並等距間隔設置複數個第一軸向導電單元、及複數個第二軸向導電單元，其複數個導電單元間係分別以第一軸向連接層、第二軸向連接層相連接。複數個絕緣覆層，一一地覆設於該各個第一軸向導線之表面，以使各個第一軸向導線與第二軸向導線予以隔離。

本發明對照先前技術之功效

經由本發明所採用之技術手段，使得觸控圖型結構中之複數個第一軸向導電群組及複數個第二軸向導電群組之各個導電單元皆佈設在基板之同一平面，而可達到結構簡化、減少結構厚度之效果，而藉由該第一軸向導電群組及複數個第二軸向導電群組之相鄰導電單元被使用者碰觸時，依據相鄰導電單元被碰觸之面積差異，即可形成電容變化信號送至控制電路，以偵測使用者手指碰觸之位置。而在製作該觸控圖型結構之第一軸向導電群組及第二軸向導電群組中之各個導電單元及導線時，僅需以簡易佈線製程在基板的單一表面施行即可完成所需之觸控板觸控圖型結構，故在產業利用時，具有製程簡易、良率高、製作成本低之優勢。

本發明所採用的具體實施例，將藉由以下之實施例及附呈圖式作進一步之說明。

### 【實施方式】

參閱第 1 圖所示，其係顯示本發明電容式觸控板之觸控圖型結構之第一實施例平面示意圖，第 2 圖係顯示本發明電容式觸控板之觸控圖型結構之局部立體圖。本發明係於該基板 1 之基板表面 11 上設置一觸控圖型結構 12。該觸控圖型結構 12 分別包括有一第一軸向導電群組 13、一第二軸向導電群組 14，且該第一軸向導電群組 13 係垂直於該第二軸向導電群組 14。第一軸向導電群組 13 與第二

軸向導電群組 14 間，除了圖式所示之垂直對應關係之外，亦可以其它非垂直之對應角度佈設在基板 1 之基板表面 11 上。

每一個第一軸向導電群組 13 由複數個第一軸向導電單元 131 所組成，各個第一軸向導電單元 131 係以第一軸向 X 等距間隔設置在該基板 1 之基板表面 11，且在相鄰之第一軸向導電群組 13 之間與相鄰之兩個第一軸向導電單元 131 之間之區域各定義出一第二軸向導電單元配置區 15。

該各個相鄰之第一軸向導電單元 131 間，係以複數個第一軸向導線 132 相連接，以將同一個第一軸向導電群組 13 中之各個第一軸向導電單元 131 予以電連接。該同一個第一軸向導電群組 13 中之各個第一軸向導電單元 131 經數個第一軸向導線 132 串聯連接後，經由一信號傳輸線 16a 將訊號傳送於一電路板(未示)之控制電路。

該各個第一軸向導線 132 之導線表面 133 各覆設有一絕緣覆層 17。該絕緣覆層 17 係選自於具有電絕緣特性之材料，且最好是透明之絕緣材料(例如二氧化矽等材料)。該每一個第二軸向導電群組 14 係由複數個第二軸向導電單元 141 所組成，各個第二軸向導電單元 141 係以第二軸向 Y 等距間隔設置在該基板 1 之基板表面 11，且各個第二軸向導電單元 141 係一一地配置在該第二軸向導電單元配置區 15。

該各個相鄰之第二軸向導電單元 141 之間係以一第二軸向導線 142 相連接，且該第二軸向導線 142 係橫越過該

絕緣覆層 17 之表面，以將同一個第二軸向導電群組 14 中之各個第二軸向導電單元 141 予以連接。該同一個第二軸向導電群組 14 中之各個第二軸向導電單元 141 經數個第二軸向導線 142 串聯連接後，亦經由信號傳輸線 16b 將訊號傳送於控制電路。

參閱第 3 圖所示，其係顯示第 2 圖中 3-3 斷面之剖視圖，第 4 圖係顯示第 2 圖中 4-4 斷面之剖視圖。該第一軸向導電單元 131、第一軸向導線 132、第二軸向導電單元 141、第二軸向導線 142 係為透明導電材料所製成。該第一軸向導線 132 與第二軸向導線 142 之間設置之絕緣覆層 17 可使各個第二軸向導電群組 14 中之各相鄰第二軸向導電單元 141 間之第二軸向導線 142 在跨越對應之第一軸向導線 132 時，可達到彼此絕緣之目的。

該基板 1 係可為一玻璃基板，而該觸控圖型結構 12 之第一軸向導電群組 13 與第二軸向導電群組 14 及第一、第二軸向導線 132、141 係為透明導電薄膜(例如氧化銦錫 ITO 導電層)。前述之實施例中，各個第一軸向導電單元 131 與第二軸向導電單元 141 之形狀係為六邊形之幾何輪廓形狀，當然亦可設計成其它之幾何輪廓形狀，以在該基板 1 之基板表面 11 上形成密佈之最佳化有效觸控表面。

參閱第 5 圖所示，其係顯示使用者之手指觸碰本發明電容式觸控板之其中一位置區域時之示意圖，第 6 圖係顯示使用者之手指觸碰本發明電容式觸控板之另一位置區域時之示意圖。如圖所示，當使用者以手指觸碰本發明電容

式觸控板之其中一觸碰區域 A 時，該觸碰區域 A 所對應含蓋的第一軸向導電群組 13 之第一軸向導電單元 131 與第二軸向導電群組 14 之第二軸向導電單元 141 之間會形成電容效應，並由信號傳輸線 16a、16b 將訊號傳送至控制電路，再由該控制電路計算判斷出該觸碰區域 A 係位在該基板 1 之基板表面 11 之何處位置。

而當使用者移動手指至另一觸碰區域 B 時，該觸碰區域 B 所對應含蓋的第一軸向導電群組 13 之第一軸向導電單元 131 與第二軸向導電群組 14 之第二軸向導電單元 141 之間會形成之電容效應會產生變化，經由信號傳輸線 16a、16b 將訊號傳送至控制電路後，即可由該控制電路計算判斷出該經過位移後之觸碰區域 B 係位在該基板 1 之基板表面 11 之何處位置。

參閱第 7 圖及第 8 圖所示，其係顯示在製作本發明電容式觸控板之觸控圖型結構時之平面示意圖。其中，第 7 圖係顯示在一基板之基板表面上形成有數個第一軸向導電單元、第一軸向導線、信號傳輸線、與第二軸向導電單元之平面示意圖；第 8 圖係顯示在第 7 圖製程之後，於各個第一軸向導線之導線表面各覆設一絕緣覆層之平面示意圖；第 9 圖係顯示在第 8 圖製程之後，於各個第二軸向導電群組之各個相鄰第二軸向導電單元之間以第二軸向導線予連接而完成本發明觸控板之觸控圖型結構之平面示意圖。

在形成觸控圖型結構 12 時，可以採用習知蝕刻、濺

鍍、或網印之技術。以蝕刻技術製作觸控圖型結構為例，首先在一經清洗過之基板 1 之基板表面 11 形成一層導電薄膜(本實施例為氧化銦錫 ITO 透明導電層)，然後使用網版印刷技術(Screen Printing)進行防蝕遮罩印刷(Etching Mask Printing)之製程。

完成防蝕遮罩印刷製程後，即對該基板表面 11 進行蝕刻，再進行剝膜(Stripping)，如此即可在基板表面 11 上形成具有透明導電特性之第一軸向導電群組 13 之各個第一軸向導電單元 131、第一軸向導線 132 與第二軸向導電群組 14 之各個第二軸向導電單元 141(如第 7 圖所示)。此時，同一個第一軸向導電群組 13 中之各個第一軸向導電單元 131 即形成電連接，並由數條信號傳輸線 16a 引出。

然後，在各個第一軸向導線 132 之導線表面 133 各覆設一絕緣覆層 17(如第 8 圖所示)。接著，以前述相同之印刷技術形成遮罩，以定義第二軸導線 142 的位置，再塗佈透明導電層以形成第二軸向導線 142，如此即將各個相鄰第二軸向導電單元 141 之間以第二軸向導線 142 予以連接，而各個第二軸向導線 142 係橫越過對應絕緣覆層 17 之表面(如第 9 圖所示)。完成之後，即可使得同一個第二軸向導電群組 14 中之各個第二軸向導電單元 141 形成電連接，並由數條信號傳輸線 16b 引出。

在採行前述之蝕刻技術在基板表面形成各個導電單元及導線時，亦可以經由不同的蝕刻遮罩定義之蝕刻區域來蝕刻出不同的圖型，同樣能達到相同之觸控圖型結構。例

如，在第一次的蝕刻製程時，只在基板表面 11 上形成第一軸向導電群組 13 之各個第一軸向導電單元 131 及第一軸向導線 132，而不形成第二軸向導電群組 14 之各個第二軸向導電單元 141。然後，在各個第一軸向導線 132 之導線表面 133 各覆設一絕緣覆層 17。接著，以相同之蝕刻技術在基板表面 11 上形成各個第二軸向導電單元 141 及各個第二軸向導線 142，而各個第二軸向導線 142 係橫越過對應絕緣覆層 17 之表面。

在前述之實施例中，其第一軸向導電單元及第二軸向導電單元係以陣列之型態形成在基板上而構成電容式觸控板之觸控圖型結構。基於此一創作精神，亦可在實際之應用中以簡化的數個導電單元組成一電容式觸控板之觸控圖型結構。例如在第 10 圖中，其係顯示本發明電容式觸控板之觸控圖型結構之第二實施例平面圖。在此一實施例中，其係在一基板 2 之基板表面 21 上形成有兩個相鄰之第一軸向導電單元 31、32，其中該導電單元 32 連接有一信號傳輸線 34，相鄰之第一軸向導電單元 31、32 之間以一第一軸向導線 33 予以連接，並在該第一軸向導線 33 之表面覆設有一絕緣覆層 4。

在該兩個相鄰之第一軸向導電單元 31、32 之另一軸向位置，設有兩個相鄰之第二軸向導電單元 51、52，而一第二軸向導線 53 係橫越過該絕緣覆層 4 之表面而連接於該相鄰之第二軸向導電單元 51、52 之間，其中該導電單元 52 連接有一信號傳輸線 54。

由以上之實施例可知，本發明所提供之電容式觸控板之觸控圖型結構確具產業上之利用價值，故本發明業已符合於專利之要件。惟以上之敘述僅為本發明之較佳實施例說明，凡精於此項技藝者當可依據上述之說明而作其它種種之改良，惟這些改變仍屬於本發明之發明精神及以下所界定之專利範圍中。

### 【圖式簡單說明】

第 1 圖係顯示本發明電容式觸控板之觸控圖型結構之第一實施例平面圖；

第 2 圖係顯示本發明電容式觸控板之觸控圖型結構之局部立體圖；

第 3 圖係顯示第 2 圖中 3-3 斷面之剖視圖；

第 4 圖係顯示第 2 圖中 4-4 斷面之剖視圖；

第 5 圖係顯示使用者之手指觸碰本發明電容式觸控板之其中一位置區域時之示意圖；

第 6 圖係顯示使用者之手指觸碰本發明電容式觸控板之另一位置區域時之示意圖；

第 7 圖係顯示在一基板之基板表面上形成有數個第一軸向導電單元、第一軸向導線、信號傳輸線、與第二軸向導電單元之平面示意圖；

第 8 圖係顯示在第 7 圖製程之後，於各個第一軸向導線之導線表面各覆設一絕緣覆層之平面示意圖；

第 9 圖係顯示在第 8 圖製程之後，於各個第二軸向導電群



組之各個相鄰第二軸向導電單元之間以第二軸向導線予連接而完成本發明觸控板之觸控圖型結構之平面示意圖；

第 10 圖係顯示本發明電容式觸控板之觸控圖型結構之第二實施例平面圖。

### 【主要元件符號說明】

1	基板
11	基板表面
12	觸控圖型結構
13	第一軸向導電群組
131	第一軸向導電單元
132	第一軸向導線
133	導線表面
14	第二軸向導電群組
141	第二軸向導電單元
142	第二軸向導線
15	第二軸向導電單元配置區
16a、16b	信號傳輸線
17	絕緣覆層
2	基板
21	基板表面
31、32	第一軸向導電單元
33	第一軸向導線

34	信號傳輸線
4	絕緣覆層
51、52	第二軸向導電單元
53	第二軸向導線
54	信號傳輸線
A	觸碰區域
B	觸碰區域
X	第一軸向
Y	第二軸向

## 十、申請專利範圍：

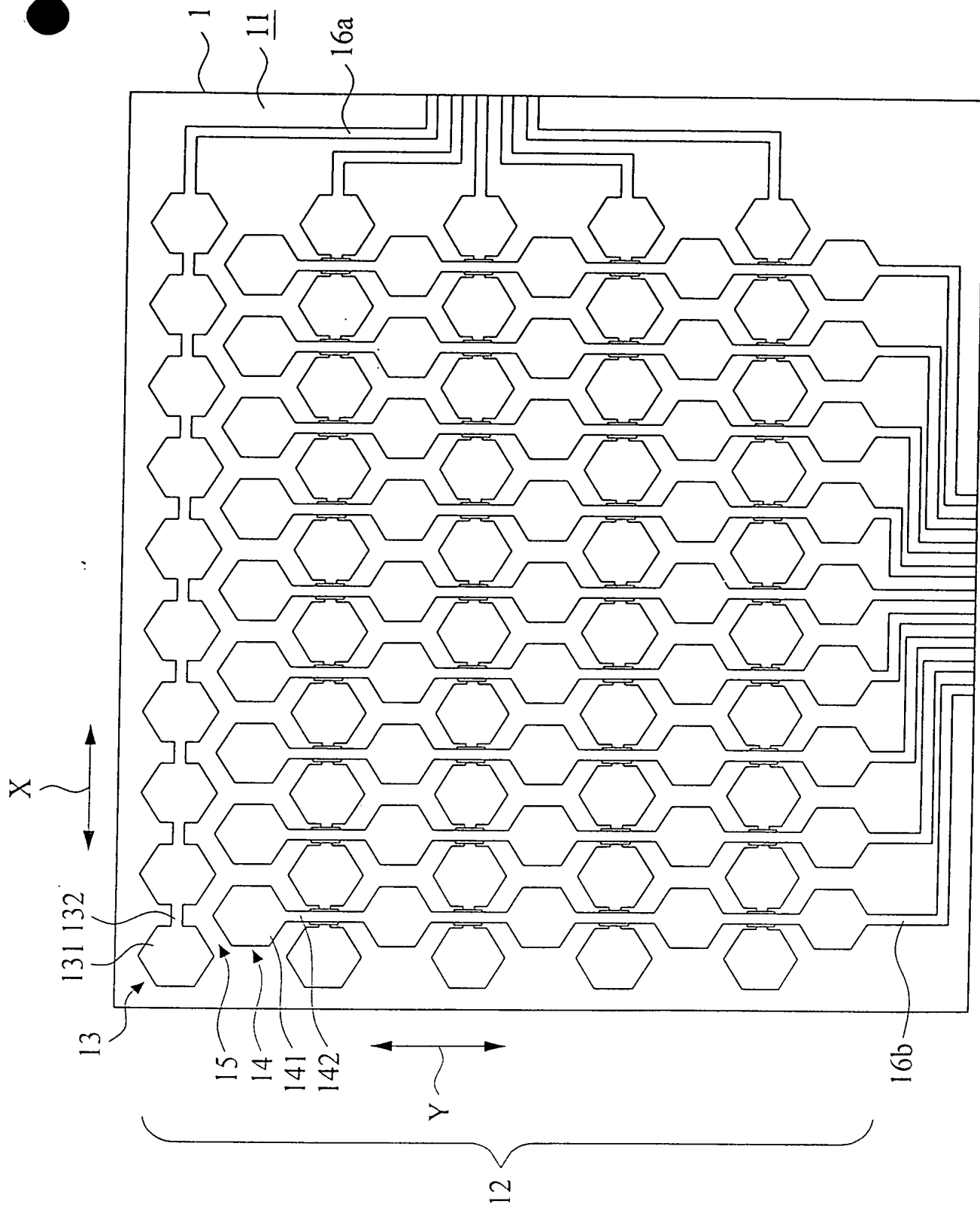
1. 一種電容式觸控板之觸控圖型結構，係在一基板之基板表面上形成一觸控圖型結構，該觸控圖型結構包括有：  
複數個第一軸向導電群組，每一個第一軸向導電群組由複數個第一軸向導電單元所組成，各個第一軸向導電單元係以第一軸向等距間隔設置在該基板之基板表面，且在相鄰之第一軸向導電群組之間與相鄰之第一軸向導電單元之間之區域各定義出一第二軸向導電單元配置區；  
複數個第一軸向導線，一一地連接於該第一軸向導電群組之各個相鄰之第一軸向導電單元之間，以將同一個第一軸向導電群組中之各個第一軸向導電單元予以連接；  
複數個絕緣覆層，一一地覆設於該各個第一軸向導線之表面；  
複數個第二軸向導電群組，每一個第二軸向導電群組由複數個第二軸向導電單元所組成，各個第二軸向導電單元係以第二軸向等距間隔設置在該基板之基板表面，且各個第二軸向導電單元係一一地配置在該第二軸向導電單元配置區；  
複數個第二軸向導線，一一地連接於該第二軸向導電群組之各個相鄰之第二軸向導電單元之間，以將同一個第二軸向導電群組中之各個第二軸向導電單元予以連

接，且該各個第二軸向導線係橫越過對應之第一軸向導線上之絕緣覆層之表面。

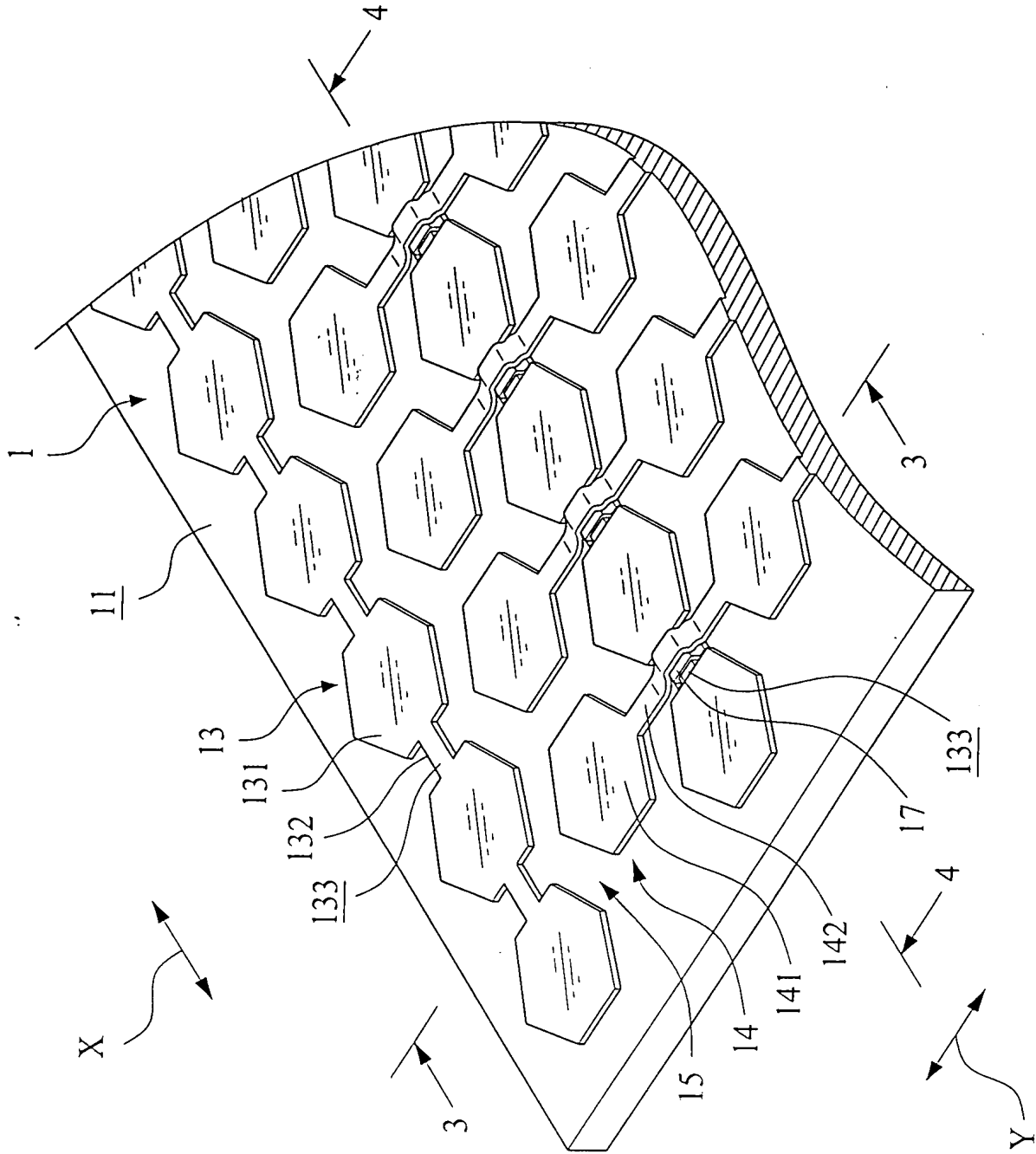
2. 如申請專利範圍第 1 項所述之電容式觸控板之觸控圖型結構，其中該各個第一軸向導電單元及第二軸向導電單元係以透明之導電材料所製成。
3. 如申請專利範圍第 1 項所述之電容式觸控板之觸控圖型結構，其中該各個第一軸向導線及第二軸向導線係以透明之導電材料所製成。
4. 如申請專利範圍第 1 項所述之電容式觸控板之觸控圖型結構，其中該絕緣覆層由透明的絕緣材料所製成。
5. 如申請專利範圍第 1 項所述之電容式觸控板之觸控圖型結構，其中該各個第一軸向導電單元及第二軸向導電單元係呈六邊形之幾何輪廓形狀。
6. 一種電容式觸控板之觸控圖型結構，係在一基板之基板表面上形成一觸控圖型結構，該觸控圖型結構係至少兩個相鄰之第一軸向導電單元及至少兩個相鄰之第二軸向導電單元組成，其中該相鄰之第一軸向導電單元之間以一第一軸向導線予以連接，其特徵在於該第一軸向導線之表面覆設有一絕緣覆層，而一第二軸向導線係橫越過

該絕緣覆層之表面而連接於該相鄰之第二軸向導電單元之間。

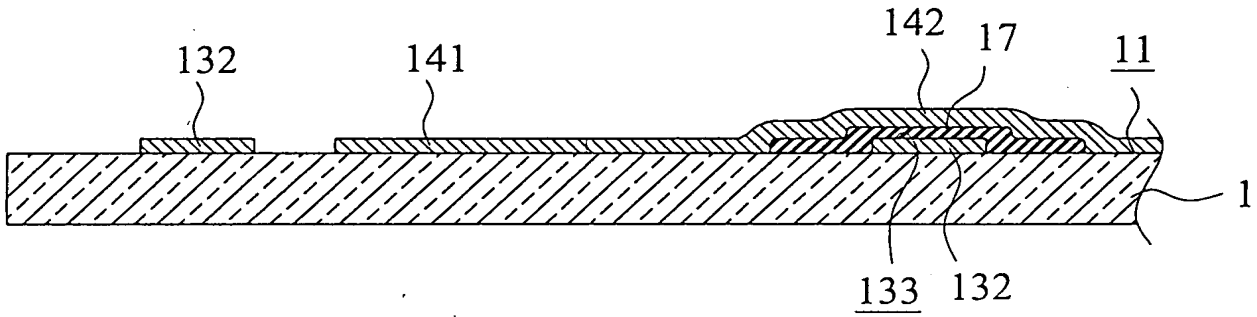
7. 如申請專利範圍第 6 項所述之電容式觸控板之觸控圖型結構，其中該第一軸向導電單元及第二軸向導電單元係以透明之導電材料所製成。
8. 如申請專利範圍第 6 項所述之電容式觸控板之觸控圖型結構，其中該第一軸向導線及第二軸向導線係以透明之導電材料所製成。
9. 如申請專利範圍第 6 項所述之電容式觸控板之觸控圖型結構，其中該絕緣覆層由透明的絕緣材料所製成。
10. 如申請專利範圍第 6 項所述之電容式觸控板之觸控圖型結構，其中該第一軸向導電單元及第二軸向導電單元係呈六邊形之幾何輪廓形狀。



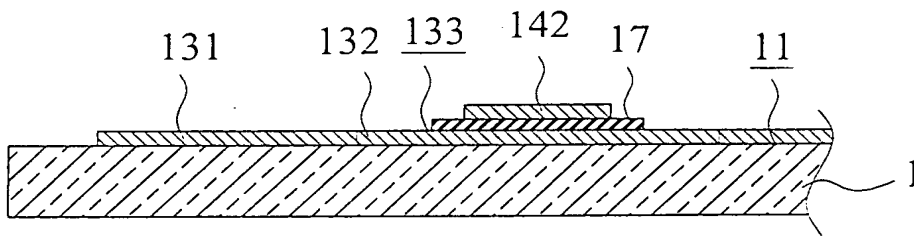
第1圖



第2圖

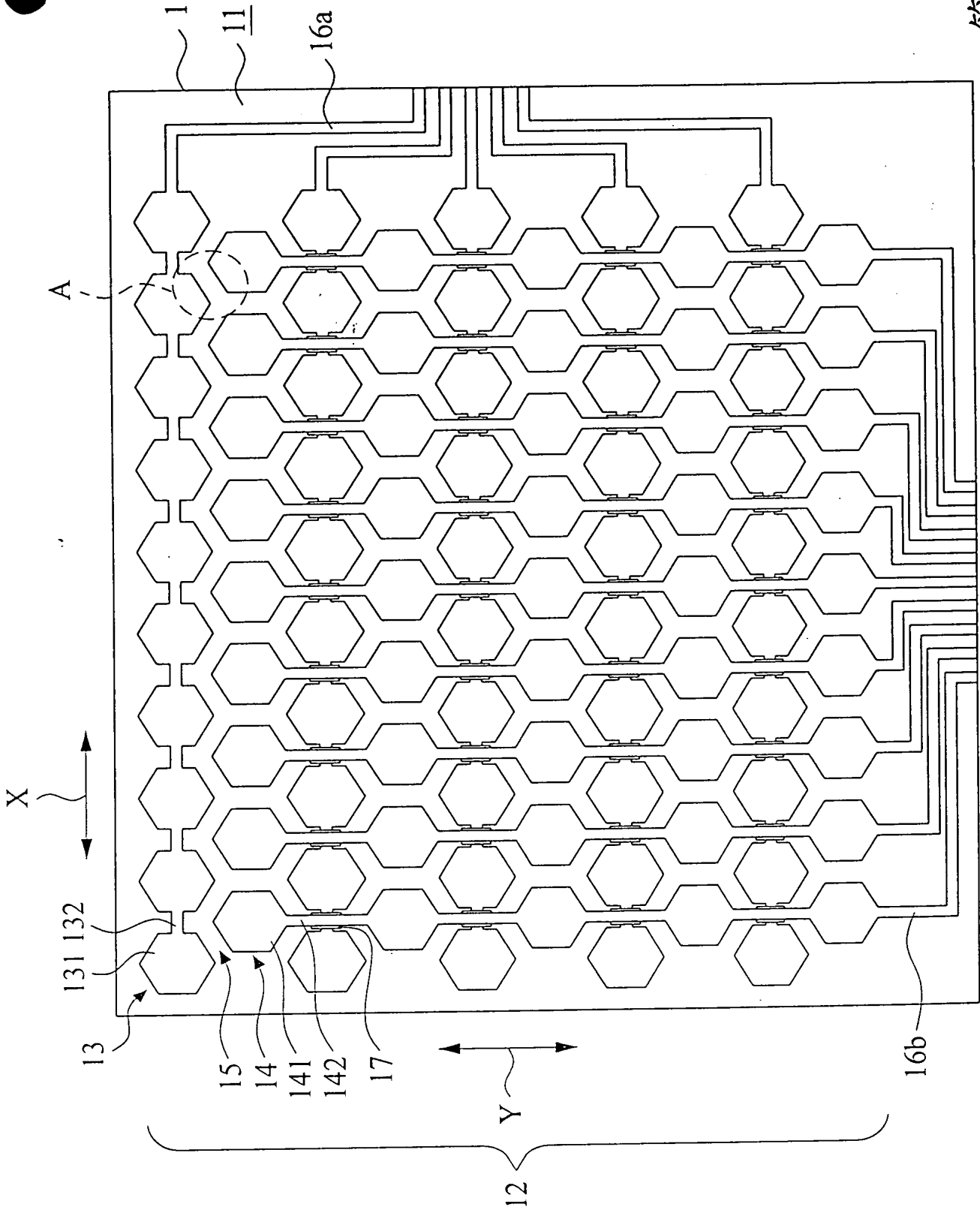


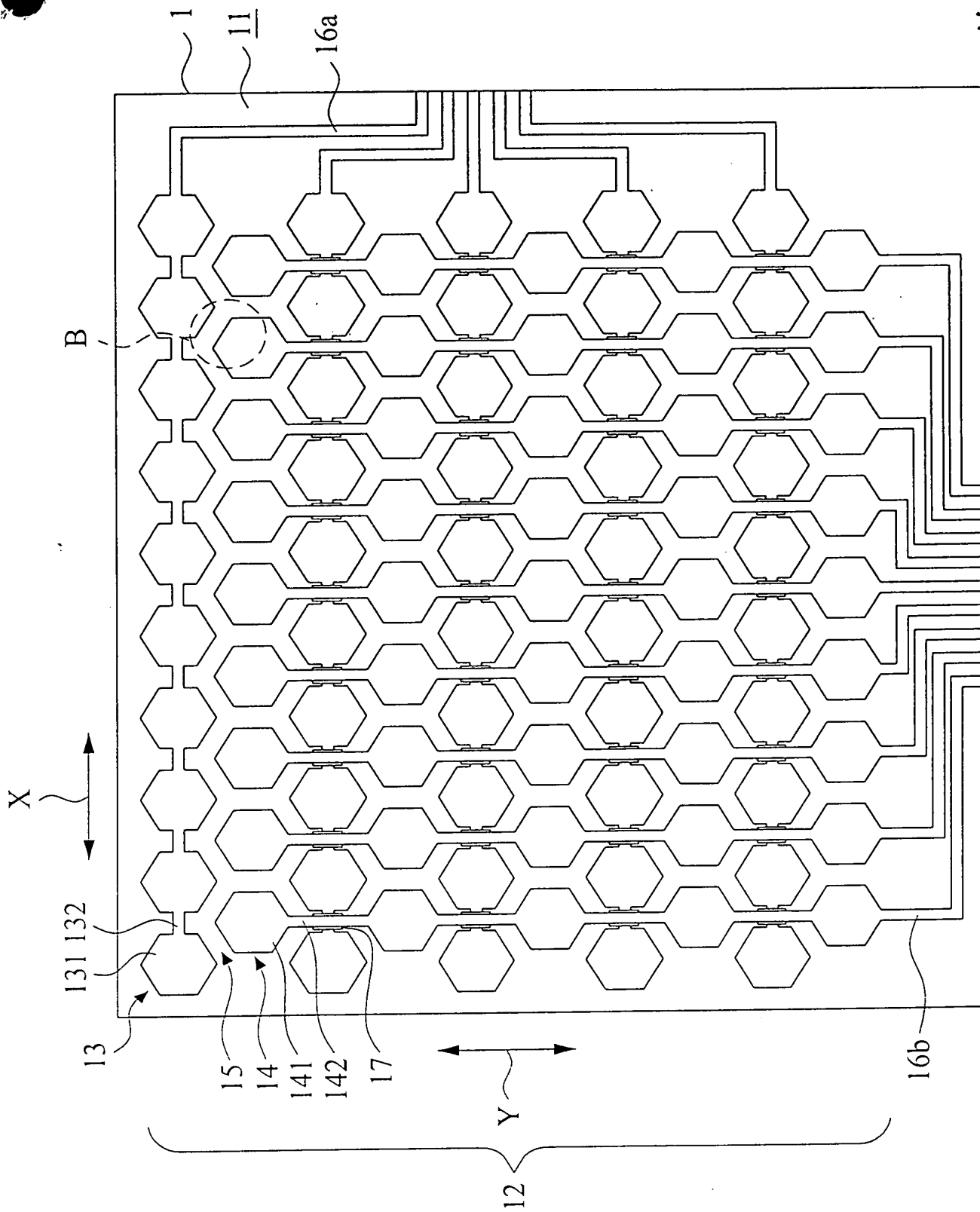
第3圖

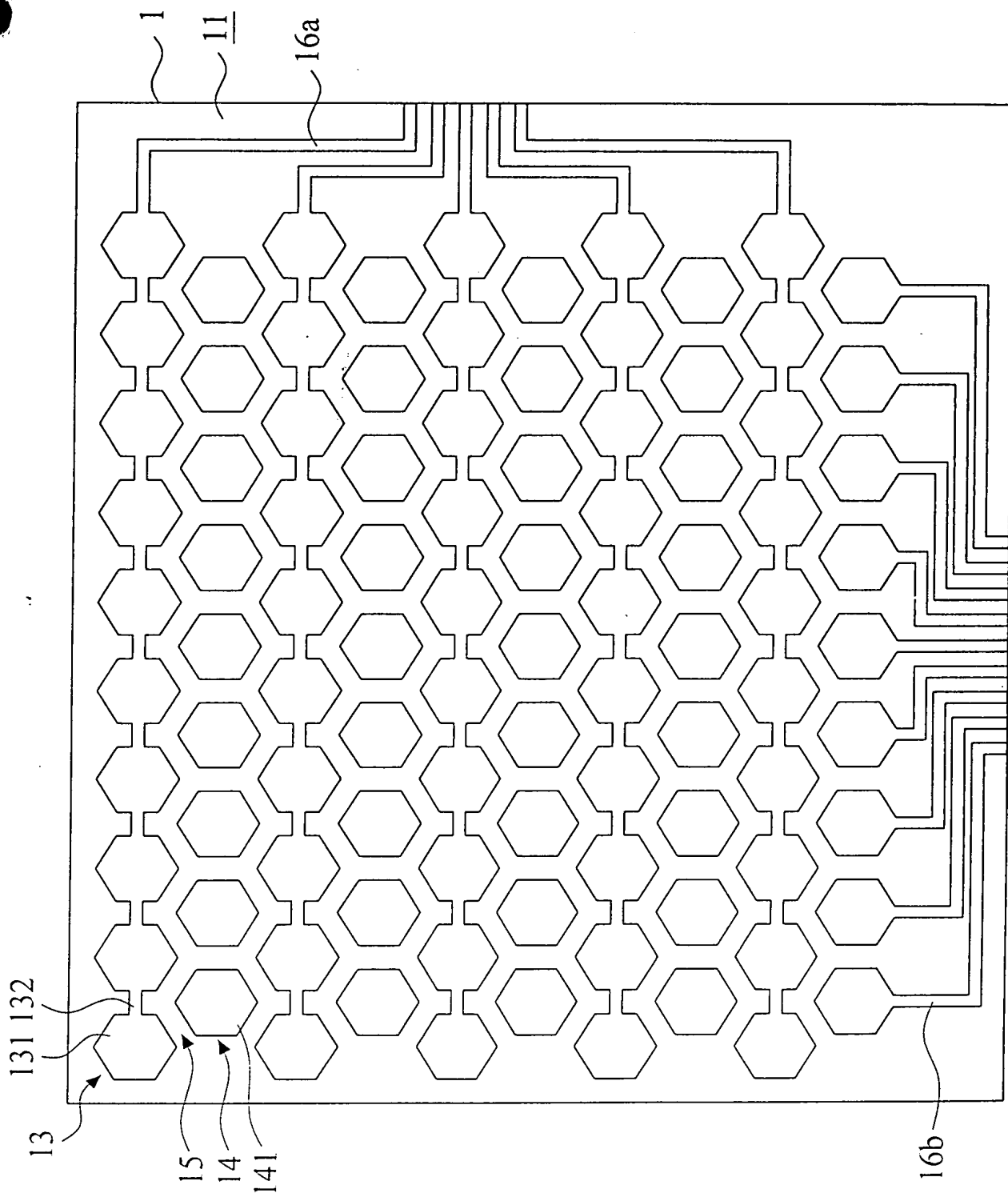


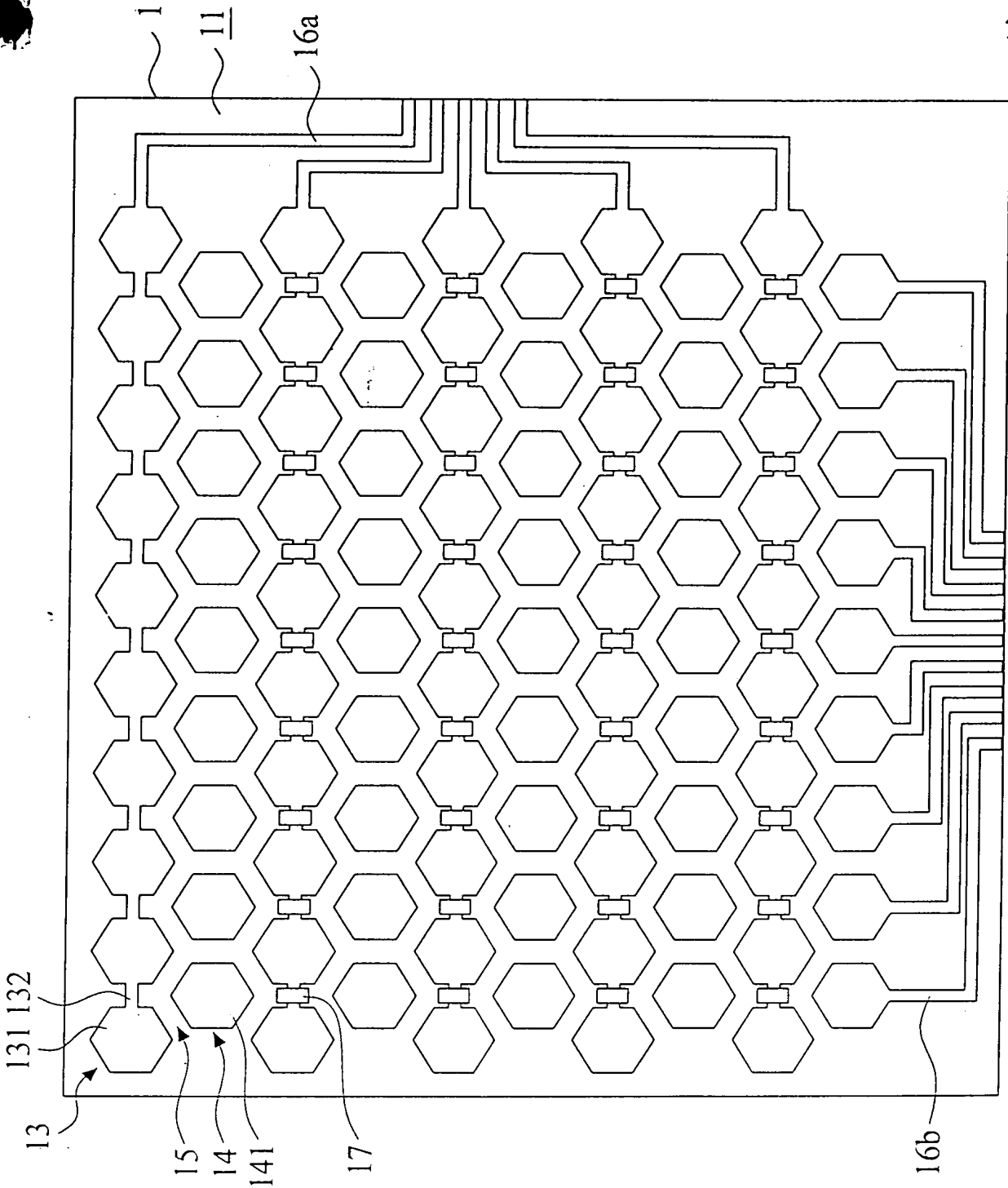
第4圖



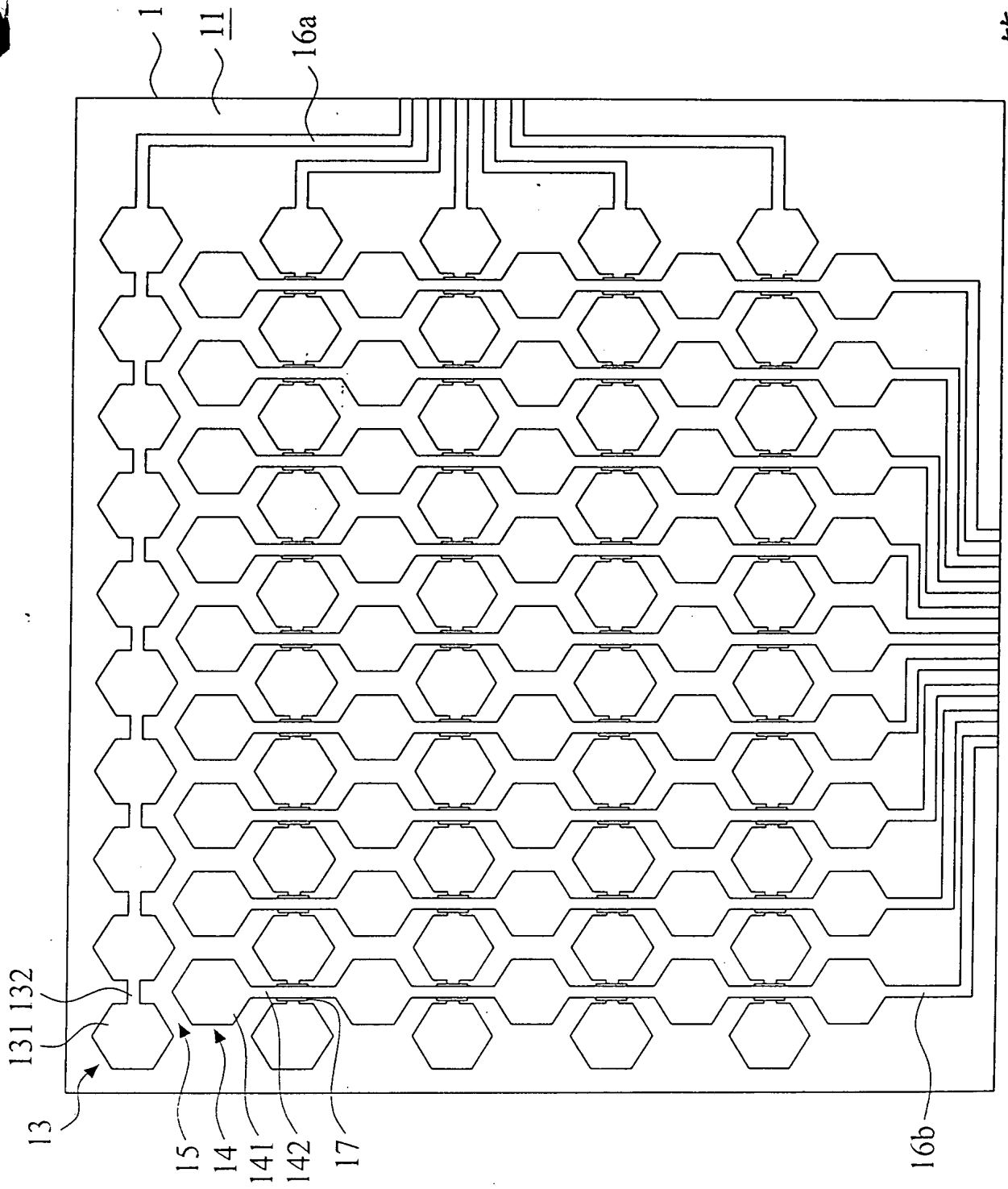




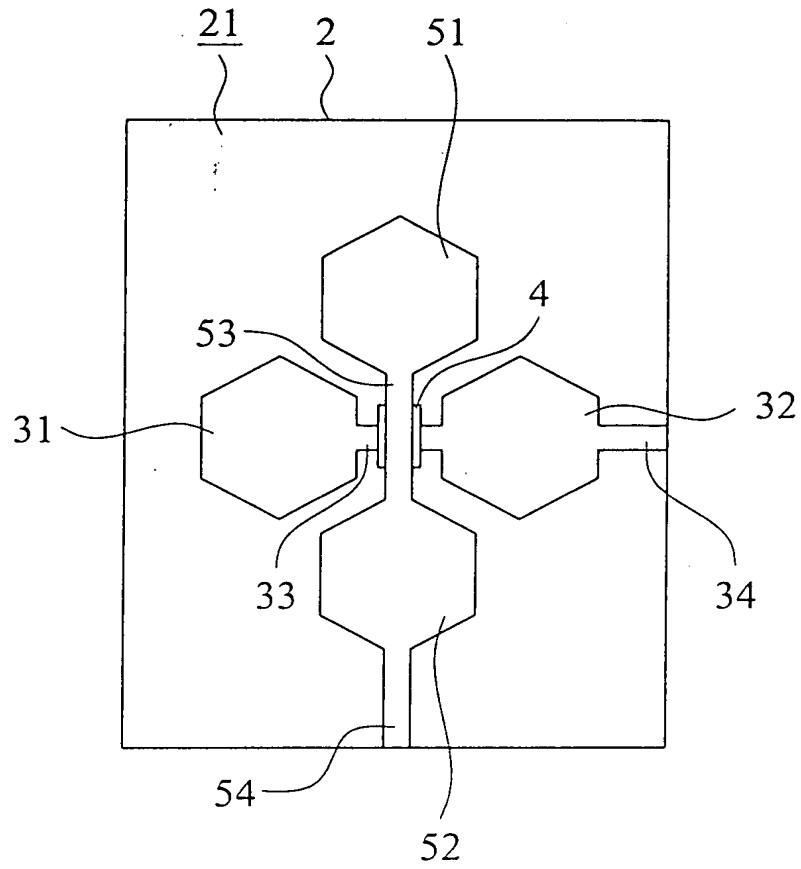




第8圖



第9圖



第10圖



1/FW

PTO/SB/122 (01-06)

Approved for use through 12/31/2008. OMB 0651-0035

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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## CHANGE OF CORRESPONDENCE ADDRESS *Application*

Address to:  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Application Number	11/842,747
Filing Date	21 AUGUST 2007
First Named Inventor	CHING-YANG CHANG
Art Unit	2629
Examiner Name	UNKNOWN
Attorney Docket Number	MR2863-351

Please change the Correspondence Address for the above-identified patent application to:

The address associated with Customer Number: 04586

OR

Firm or Individual Name Rosenberg, Klein & Lee

Address 3458 Ellicott Center Drive, Suite 101

City Ellicott City State MD Zip 21043

Country USA

Telephone 410-465-6678 Email \_\_\_\_\_

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

I am the:

- Applicant/Inventor
- Assignee of record of the entire interest. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).
- Attorney or agent of record. Registration Number 26,049
- Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number \_\_\_\_\_

Signature

Typed or Printed Name Morton J. Rosenberg

Date 4/3/2008 Telephone 410-465-6678

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below".

\*Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 37 CFR 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

15W

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Applicant : Ching-Yang Chang, Shun-Ta Chien  
Serial No : 11/842,747 : Art Unit : 2629  
Filed : August 21, 2007 : Examiner :  
Title : Conductor Pattern Structure of Capacitive Touch Panel

REVOCATION OF POWER OF ATTORNEY AND  
APPOINTMENT OF POWER OF ATTORNEY

The owner of the above-identified U.S. Patent Application, hereby revokes all Powers of Attorney previously given and hereby appoints the following Attorneys to transact all business in the U.S. Patent and Trademark Office connected therewith:

Morton J. Rosenberg, Esq., Reg. #26,049  
David I. Klein, Esq., Reg. #33,253  
Jun Y. Lee, Esq., Reg. #40,262

Rosenberg, Klein & Lee  
3458 Ellicott Center Drive-Suite 101  
Ellicott City, Maryland 21043

Send all correspondence to:

Rosenberg, Klein & Lee  
3458 Ellicott Center Drive-Suite 101  
Ellicott City, Maryland 21043

Direct all telephone calls to:

(410) 465-6678

Respectfully submitted,  
FOR: TPK Touch Solutions Inc.

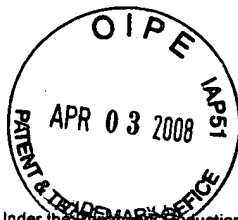
*Ta-Min Sun*

Name : Ta-Min Sun  
Title : President

Date: 2008.3.16

Assignment made on Reel 020426/Frame 0287





**STATEMENT UNDER 37 CFR 3.73(b)**

Applicant/Patent Owner: Ching-Yang Chang, Shun-Ta Chien

Application No./Patent No.: 11/842,747 Filed/Issue Date: August 21, 2007

Entitled: Surface Coating Film Structure on Heat Dissipation Metal and Manufacturing Method Thereof

TPK Touch Solutions Inc, a Corporation  
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

- 1.  the assignee of the entire right, title, and interest; or
- 2.  an assignee of less than the entire right, title and interest  
(The extent (by percentage) of its ownership interest is \_\_\_\_\_ %)

in the patent application/patent identified above by virtue of either:

A.  An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 020426, Frame 0287, or for which a copy thereof is attached.

OR

B.  A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: \_\_\_\_\_ To: \_\_\_\_\_  
The document was recorded in the United States Patent and Trademark Office at Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

2. From: \_\_\_\_\_ To: \_\_\_\_\_  
The document was recorded in the United States Patent and Trademark Office at Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

3. From: \_\_\_\_\_ To: \_\_\_\_\_  
The document was recorded in the United States Patent and Trademark Office at Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

Additional documents in the chain of title are listed on a supplemental sheet.

As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee:

Ta-Min Sun

Signature

2008.3.26

Date

Ta-Min Sun

Printed or Typed Name

886-2709-8779

Telephone Number

President

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/842,747	08/21/2007	Ching-Yang Chang	MR2863-351

**CONFIRMATION NO. 3897**

**POA ACCEPTANCE LETTER**

4586  
ROSENBERG, KLEIN & LEE  
3458 ELLICOTT CENTER DRIVE-SUITE 101  
ELLICOTT CITY, MD 21043



Date Mailed: 04/17/2008

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 04/03/2008.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/hchristian/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/842,747	08/21/2007	Ching-Yang Chang	TVM-002

**CONFIRMATION NO. 3897**

**POWER OF ATTORNEY NOTICE**

3897  
SCHNECK & SCHNECK  
P.O. BOX 2-E  
SAN JOSE, CA 95109-0005



Date Mailed: 04/17/2008

**NOTICE REGARDING CHANGE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 04/03/2008.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/hchristian/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 4 columns: APPLICATION NUMBER (11/842,747), FILING OR 371(C) DATE (08/21/2007), FIRST NAMED APPLICANT (Ching-Yang Chang), ATTY. DOCKET NO./TITLE (MR2863-351)

CONFIRMATION NO. 3897

PUBLICATION NOTICE

4586
ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043



Title: CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL

Publication No. US-2008-0264699-A1
Publication Date: 10/30/2008

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101





IFW

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**



Applicant: Ching-Yang Chang, et al. :

Serial No: 11/842,747 : Art Unit # 2629

Filed: 21 August 2007 : Examiner:

Title: CONDUCTOR PATTERN : R. Hjerpe  
 STRUCTURE OF CAPACITIVE  
 TOUCH PANEL :

**INFORMATION DISCLOSURE STATEMENT**

Honorable Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

The Applicants wish to make the following art references of record in the above-identified Patent Application pursuant to 37 C.F.R. §§ 1.97 and 1.98, and to the Duty of Disclosure set forth in 37 C.F.R. § 1.56

Although the information submitted herewith may be "material" to the Examiner's consideration of the subject Patent Application, this submission is not intended to constitute an admission that such information is "prior art" as to the claimed invention.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search was made or that no other material information, as defined in 37 C.F.R. § 1.56(b), exists.

I. The cited U.S. Patent references are:

<u>Ref. No.</u>	<u>Patent No.</u>	<u>Issue Date</u>	<u>Inventor(s)</u>
A	6,188,391	2/13/2001	Seely, et al.
B	6,137,427	10/24/2000	Binstead

II. The cited Non-Patent Literature reference is:

<u>Ref. No.</u>	<u>Description</u>
AA	A Communication from the European Patent Office dated 16 September 2008 regarding the corresponding foreign patent application EP07018556.

This Information Disclosure Statement is being filed more than three months subsequent to the filing date of the subject Patent Application, but before the mailing of a first Office Action.

A Form PTO/SB/08A and a Form PTO/SB/08B (Substitutes for Form 1449/PTO) are submitted along with this document. The U.S. references became known to the Applicants through a communication from a foreign Patent Office. It



MR2863-351  
Serial No.: 11/842,747

is requested that the Examiner consider the cited references and make them of record in the above-referenced Patent Application.

Respectfully submitted,  
FOR: ROSENBERG, KLEIN & LEE



Morton J. Rosenberg  
Registration No. 26,049

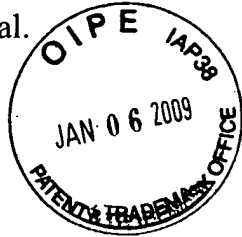
Dated: 11/18/08

Suite 101  
3458 Ellicott Center Drive  
Ellicott City, MD 21043  
(410) 465-6678  
**Customer No. 04586**

*Jsw*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	Ching-Yang Chang, et al.	:	
Serial No:	11/842,747	:	Art Unit # 2629
Filed:	21 August 2007	:	Examiner:
Title:	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL	:	R. Hjerpe



**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The Applicants wish to make the following art references of record in the above-identified Patent Application pursuant to 37 C.F.R. §§ 1.97 and 1.98, and to the Duty of Disclosure set forth in 37 C.F.R. § 1.56

Although the information submitted herewith may be "material" to the Examiner's consideration of the subject Patent Application, this submission is not intended to constitute an admission that such information is "prior art" as to the claimed invention.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search was made or that no other material information, as defined in 37 C.F.R. § 1.56(b), exists.

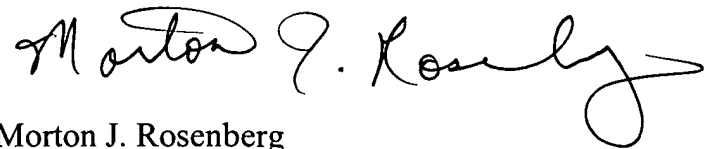
The cited U.S. Patent references are:

<u>Ref. No.</u>	<u>Patent/Publ. No.</u>	<u>Issue Date</u>	<u>Inventor(s)</u>
C	2006/0066581	3/30/2006	Lyon, et al.
D	6,970,160	11/29/2005	Mulligan, et al.
E	4,550,221	10/29/1985	Mabusth

This Information Disclosure Statement is being filed more than three months subsequent to the filing date of the subject Patent Application, but before the mailing of a first Office Action.

A Form PTO/SB/08A (Substitute for Form 1449/PTO) is submitted along with this document. It is requested that the Examiner consider the cited references and make them of record in the above-referenced Patent Application.

Respectfully submitted,  
FOR: ROSENBERG, KLEIN & LEE



Morton J. Rosenberg  
Registration No. 26,049

Dated: 1/5/2009

Suite 101  
3458 Ellicott Center Drive  
Ellicott City, MD 21043  
(410) 465-6678  
**Customer No. 04586**





IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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FW

JAN 30 2009

OFFICE OF PETITIONS

Inventor : Ching-Yang Chang, et al.

Serial No. : 11/842,747

: Art Unit #2629

Filed : 21 August 2007

: Examiner: Unknown

Title : CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL

REQUEST FOR CHANGE OF ENTITY STATUS TO LARGE ENTITY

Mail Stop FEE  
Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Applicant, by the undersigned attorney hereby requests that the entity status of the above-referenced patent application be changed to a "large entity". The patent application was inadvertently filed claiming "small entity" status. The owner of the above-referenced patent application is a foreign corporation and was not knowledgeable of USPTO Rules and Regulations regarding "small entity" and "large entity" ownership.

Attached to this Request for Change of Entity Status is a check in the amount of \$665.00 for the additional filing fee required for a large entity utility patent application.

It is requested that the U.S. Patent and Trademark Office amend its records to show the fact that the patent application status has been changed.

01/27/2009 DALLEN 00000021 11042747  
01 FC:1461 665.00 OP

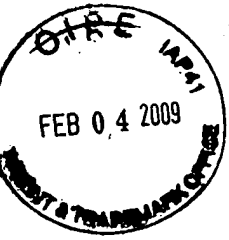
Respectfully submitted,  
FOR: ROSENBERG, KLEIN & LEE

Morton J. Rosenberg  
Registration No. 26,049

Dated: 20 Jan 2009

Suite 101  
3458 Ellicott Center Drive  
Ellicott City, MD 21043  
Tel: 410-465-6678

*JFW*



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	Ching-Yang Chang, et al.	:	
Serial No:	11/842,747	:	Art Unit # 2629
Filed:	21 August 2007	:	Examiner:
Title:	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL	:	R. Hjerpe

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The Applicants wish to make the following art references of record in the above-identified Patent Application pursuant to 37 C.F.R. §§ 1.97 and 1.98, and to the Duty of Disclosure set forth in 37 C.F.R. § 1.56

Although the information submitted herewith may be “material” to the Examiner’s consideration of the subject Patent Application, this submission is not intended to constitute an admission that such information is “prior art” as to the claimed invention.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search was made or that no other material information, as defined in 37 C.F.R. § 1.56(b), exists.

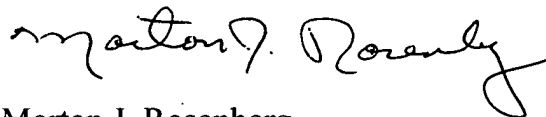
The cited U.S. Patent references are:

<u>Ref. No.</u>	<u>Patent/Publ. No.</u>	<u>Issue Date</u>	<u>Inventor(s)</u>
F	7,292,229	11/6/2007	Morag, et al.
G	6,005,555	12/21/1999	Katsurahira, et al.
H	5,381,160	1/10/1995	Landmeier

This Information Disclosure Statement is being filed more than three months subsequent to the filing date of the subject Patent Application, but before the mailing of a first Office Action.

A Form PTO/SB/08A (Substitute for Form 1449/PTO) is submitted along with this document. It is requested that the Examiner consider the cited references and make them of record in the above-referenced Patent Application.

Respectfully submitted,  
FOR: ROSENBERG, KLEIN & LEE



Morton J. Rosenberg  
Registration No. 26,049

Dated: 1/30/09

Suite 101  
3458 Ellicott Center Drive  
Ellicott City, MD 21043  
(410) 465-6678  
Customer No. 04586







ORRICK

**POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO**

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73 (b).

I hereby appoint:

Practitioners associated with Customer Number: **34313**

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 1.73(b).

I hereby authorize the U.S. attorneys and/or agents named hereinabove to accept and follow instructions from TPK TOUCH SOLUTIONS INC. as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and/or agents and me. In the event of a change in the person(s) from whom instructions may be taken I will so notify the U.S. attorneys and/or agents named herein.

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

The address associated with Customer Number: **34313**

Assignee Name and Address:

TPK TOUCH SOLUTIONS INC.

14F., NO. 136, SEC.3, REN-AI RD. DA-AN DISTRICT, TAIPEI CITY, TAIWAN 106

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed. The undersigned hereby authorizes and empowers the registered practitioners associated with Customer Number 34313 to sign statements under 37 CFR 3.73(b) on behalf of the undersigned.

**SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	2009. 6. 18.
Name	Sun, Ta-Min	Telephone	86-592-573-8999
Title	President		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 11/842747 Confirmation No.: 3897  
Applicant : Chang et al.  
Filing Date : 08/21/2007  
Title : Conductor Pattern Structure of Capacitive Touch Panel  
Group Art Unit :  
Examiner :  
Docket No. : 22271.4002  
Customer No. : 34313

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**CHANGE OF CORRESPONDENCE ADDRESS**

Sir:

Please change the Correspondence Address for the above-identified application to:

ORRICK, HERRINGTON & SUTCLIFFE, LLP  
4 Park Plaza, Suite 1600  
Irvine, CA 92614-2558  
Telephone: (949) 567-6700  
Facsimile: (949) 567-6710  
Attn: Robert M. Isackson

Customer Number: 34313

I am the:

- Applicant.
- Assignee of record of the entire interest.  
Certificate under 37 CFR 3.73(b) is enclosed.
- Attorney or agent of record. Registration No. 31110.

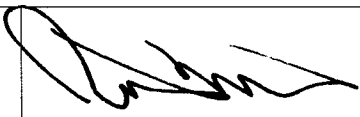
Respectfully submitted,  
ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: 29 Jun 2009

By: 

Robert M. Isackson  
Reg. No. 31110

ORRICK, HERRINGTON & SUTCLIFFE, LLP  
4 Park Plaza, Suite 1600  
Irvine, CA 92614-2558

<b>STATEMENT UNDER 37 CFR 3.73(b)</b>			
Applicant/Patent Owner	Chang et al.		
Application No./ Patent No.	11/842747	Filed/Issue Date	08/21/2007
Entitled	Conductor Pattern Structure of Capacitive Touch Panel		
Name of Assignee	TPK Touch Solutions Inc.		
Type of Assignee (corporation, partnership, university)	Corporation		
states that it is:			
1 <input checked="" type="checkbox"/> the assignee of the entire right, title and interest; or			
2 <input type="checkbox"/> an assignee of less than the entire right, title and interest. The extent (by percentage) of its ownership interest is _____ %			
in the patent application/patent identified above by virtue of either:			
A. <input type="checkbox"/> An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or a true copy of the original assignment is attached.			
or			
B. <input checked="" type="checkbox"/> A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:			
1. From: <u>Chang et al.</u> To: <u>Trendon Touch Technology Corp.</u> The document was recorded in the United States Patent and Trademark Office at Reel <u>020326</u> , Frame <u>0259</u> , or for which a copy thereof is attached			
2. From: <u>Trendon Touch Technology Corp.</u> To: <u>TPK Touch Solutions Inc.</u> The document was recorded in the United States Patent and Trademark Office at Reel <u>020426</u> , Frame <u>0287</u> , or for which a copy thereof is attached			
3. From: _____ To: _____ The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached			
[ ] Additional documents in the chain of title are listed on a supplemental sheet.			
<input type="checkbox"/> Copies of assignments or other documents in the chain of title are attached.			
The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee:			
Signature			
Date	29 June 2009	Typed Name	Robert M. Isackson
Telephone	212 505 5280	Title	Attorney, Reg. 31110

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	5615308
<b>Application Number:</b>	11842747
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3897
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Customer Number:</b>	04586
<b>Filer:</b>	Donald Erik Daybell/Angela Wendel
<b>Filer Authorized By:</b>	Donald Erik Daybell
<b>Attorney Docket Number:</b>	MR2863-351
<b>Receipt Date:</b>	30-JUN-2009
<b>Filing Date:</b>	21-AUG-2007
<b>Time Stamp:</b>	14:45:31
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	power_of_attorney.pdf	64727 f8be8a5c041d3f19536b9797123f9768102f edfb	no	1

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2	change_correspondence.pdf	66830	yes	2
		8644fc9bc3c4429976cc9768be3ff421b92893ae		

**Multipart Description/PDF files in .zip description**

Document Description	Start	End
Change of Address	1	1
Assignee showing of ownership per 37 CFR 3.73(b).	2	2

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/842,747	08/21/2007	Ching-Yang Chang	22271.4002

**CONFIRMATION NO. 3897**

**POA ACCEPTANCE LETTER**

34313  
ORRICK, HERRINGTON & SUTCLIFFE, LLP  
IP PROSECUTION DEPARTMENT  
4 PARK PLAZA  
SUITE 1600  
IRVINE, CA 92614-2558



Date Mailed: 07/07/2009

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 06/30/2009.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/tha/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/842,747	08/21/2007	Ching-Yang Chang	MR2863-351

**CONFIRMATION NO. 3897**

**POWER OF ATTORNEY NOTICE**

4586  
ROSENBERG, KLEIN & LEE  
3458 ELLICOTT CENTER DRIVE-SUITE 101  
ELLICOTT CITY, MD 21043



Date Mailed: 07/07/2009

**NOTICE REGARDING CHANGE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 06/30/2009.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/tha/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  <i>(use as many sheets as necessary)</i>				<i>Complete if Known</i>	
				Application Number	11/842,747
				Filing Date	August 21, 2007
				First Named Inventor	Ching-Yang Chang
				Art Unit	2629
				Examiner Name	Not Yet Assigned
Sheet	1	of	1	Attorney Docket Number	22271-4002
				Confirmation No.	3897

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publications of Cited Documents MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Figures Appear
		Number	Kind Code <sup>2</sup>			
	1	US2005/0030048	A1	Bolender	02/10/2005	
	2	US2009/0160682	A1	Bolender	06/25/2009	
	3	6,970,160	B2	Mulligan	11/29,2005	
	4	6,137,427		Binstead	10/24/2000	

FOREIGN PATENT DOCUMENTS								
Examiner Initials	Cite No. <sup>1</sup>	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publications of Cited Documents MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Figures Appear	English Abstract T <sup>6</sup>
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup>				
			JP 60-075927			4/30/1985		yes

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.			T <sup>2</sup>
	CA	Korean Office Action; issue date, May 18, 2009 for SN 10-2007-0133201			
	CB	EP Office Action dated 01-01-2009; SN 07018556.6			
	CC	File Wrapper for U.S. Patent Application Serial No. 10/279,828			

Examiner Signature	OHS West:260819279.1 22271-4002 RHH/RHH	Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup>Applicants unique citation designation number (optional). <sup>2</sup>See Kinds of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.



# COORDINATE INPUT DEVICE

Publication number: JP60075927 (A)

Publication date: 1985-04-30

Inventor(s): KURITA SHIYOUICHI +

Applicant(s): FUJITSU LTD +

Classification:

- international: G06F3/041; G06F3/03; G06K11/06; G06F3/041; G06F3/03; G06K11/06; (IPC1-7); G06F3/03; G06K11/06

- European:

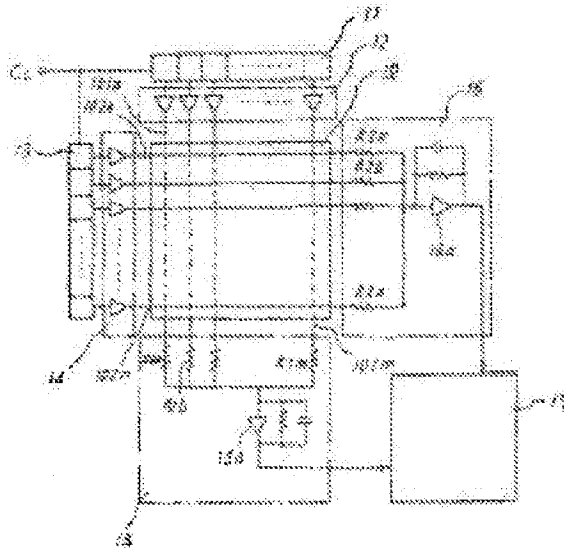
Application number: JP19830184013 19830930

Priority number(s): JP19830184013 19830930

## Abstract of JP 60075927 (A)

**PURPOSE:** To improve both the stability of detection and the image resolution by detecting the position of coordinates after scanning plural transparent conductor lines of a sensor panel and detecting the change of the output addition level.

**CONSTITUTION:** A sensor panel 10 is formed with X and Y transparent conductor lines 101 (101a-101m) and 102 (102a-102n) insulating and crossing to each other on a transparent substrate. Scanning circuits 11 and 13 consisting of shift registers and drive circuits 12 and 14 are provided at one side of both lines 101 and 102, respectively. Then the scanning is successively carried out with a clock pulse CL. While addition circuits 15 and 16 are set at the other side of the lines 101 and 102, respectively. The outputs of the circuits 15 and 16 are delivered to a position detecting circuit 17 for detection of the position of coordinates. In this case, the electrostatic capacity is applied to the conductor line at a position on the panel 10 where a finger, etc. has a touch. The applied drive signal is applied to the circuit 15 via each addition resistance to obtain X and Y coordinates of an intersecting point.



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㉔ 日本國特許庁(JP)

㉕ 特許出願公開

㉖ 公開特許公報(A)

昭60-75927

㉗ Int. Cl.<sup>1</sup>

識別記号

庁内整理番号

㉘ 公開 昭和60年(1985)4月30日

G 06 F 3/03

7060-5B

G 06 K 11/06

審査請求 未請求 発明の数 1 (全10頁)

㉙ 発明の名称 座標入力装置

㉚ 特 願 昭58-184013

㉛ 出 願 昭58(1983)9月30日

㉜ 発 明 者 栗 田 正 一 川崎市中原区上小田中1015番地 富士通株式会社内  
 ㉝ 出 願 人 富士通株式会社 川崎市中原区上小田中1015番地  
 ㉞ 代 理 人 弁理士 山谷 晴榮

明 細 書

1. 発明の名称 座標入力装置

2. 特許請求の範囲

(1) 基本上に複数のX側透明導電線路と複数のY側透明導電線路とを互いに絶縁して配設したセンサパネルと、該複数のX側透明導電線路を順次駆動走査するX側ドライブ回路と、該複数のY側透明導電線路を順次駆動走査するY側ドライブ回路と、該複数のX側透明導電線路の出力を加算するX側加算回路と、該複数のY側透明導電線路の出力を加算するY側加算回路と、該X側及びY側加算回路の出力レベル変化を検出し、該出力レベル変化の生じた時間位置により指示された座標位置を検出する位置検出回路とを有し、該センサパネルの所定位置を指示した時に生じる静電容量変化によって該出力レベル変化を生ぜしめて指示された座標位置を検出することを特徴とする座標入力装置。

(2) 前記センサパネルの前記X側透明導電線路と前記Y側透明導電線路とが、互いに交叉する位置の面積を他の面積より小と構成したことを特徴とする特許請求の範囲第(1)項記載の座標入力装置。

(3) 前記位置検出回路は、前記出力レベル変化を検出するために、前記透明導電線路の駆動走査に同期して前記加算回路の出力を遅延せしめ、遅延させた出力と該加算回路の出力との差分をとる様に構成したことを特徴とする特許請求の範囲第(1)項乃至第(2)項記載の座標入力装置。

(4) 前記位置検出回路は、前記出力レベル変化を検出するために、前記センサパネルの所定位置を指示しない状態の出力レベルを記憶し、前記加算回路の出力レベルと該記憶した出力レベルとの相対比較を行うことを特徴とする特許請求の範囲第(1)項乃至第(2)項記載の座標入力装置。

3. 発明の詳細な説明

(発明の技術分野)

本発明は、静電容量変化を利用して指定された座標位置を検出する座標入力装置に関し、特にディスプレイ装置の画面前面に設けられ、ディスプレイ装置に入力機能を付与するに好適な座標入力装置に関する。

(技術的背景)

近年のオフィスオートメーション(OA)の進展に伴い、各種の端末装置が盛んに利用されている。特にディスプレイ装置は人間の視覚に訴え直感的な理解が易いため、コンピュータと人間との有力なマンマシンインターフェイスとして、パーソナルコンピュータ、ワードプロセッサ、オンライン端末等各用途に使用されている。このようなディスプレイ装置は一般には出力装置として用いられているが、キーボードに代わる入力装置としても使われ、更に入出力装置を兼用させる場合もある。

(従来技術と問題点)

ディスプレイを入力手段として用いるには、従来ライトペン方式が主流を占めていた。即ち、ブ

ラウン管ディスプレイの電子ビームがライトペン位置のブラウン管表面の蛍光体を発光させた時に、ライトペンがこの光を検知し、その時間位置からライトペンのさした画面上の位置を検出するものである。コンピュータはこれにより、ライトペンがディスプレイ上のどの表示内容を描いたかを検出し、入力内容を判別する。しかし、係るライトペン方式はブラウン管ディスプレイの様な真空管ディスプレイにしか用いることができず、又特別なライトペンという道具を用いるので人間にとって興和感があった。このため、近年特別の座標入力装置をディスプレイ画面上に設けたタッチセンサ式ディスプレイが用いられている。係る従来の座標入力装置として第1図に示す光ビームマトリックス方式のものがある。これを説明すると、ディスプレイ面5の左方にn個の発光源DY1、DY2...DYnから成るY側発光部1を配置し、一方、ディスプレイ面5の右方にはこれに対応する様にn個の受光器RY1、RY2...RYnから成るY側受光部4を配置し、同様にディスプレイ面

5の上方にm個の発光源DX1、DX2...DXmから成るX側発光部2を配置し、ディスプレイ面5の下方にこれに対抗する様にm個の受光器RX1、RX2...RXmから成るX側受光部3を配置して構成する。そして発光源DX1、DX2...DXm、DY1、DY2...DYnを夫々時間的に順次駆動し、可視光線外の例えば赤外線ビームを発し、各発光源に対向して配置された受光器によって受光せしめる。この状態で人間が指で例えばディスプレイ面5上のP点を指すと、発光源DX3、DY7から光ビームは受光器RX3、RY7に到達しなくなり、これによるレベル変化を指示位置検出器6が検出し、このレベル変化の生じた時間位置から指で指されたディスプレイ面5上の座標位置を検出する。

この従来の光ビームマトリックス方式の座標入力装置は、原理的には簡単であるが、比較的大きな発光源及び受光器を多数必要とすることから装置自体が大きくなり、しかも集積化しにくいためディスプレイ装置が、突き出した感じを与え好ま

しくないという問題がある他に人の指でなく細い棒で指示し分解能を向上させようとしても、光ビームは広がるため隣接間の誤話が問題となり不可能であるという問題もあった。

(発明の目的)

本発明の目的は、装置自体をコンパクト化できしかも高い分解能を得ることができる座標入力装置を提供するにある。

(発明の構成)

本発明では、上述の目的の達成のため、基板上に複数のX側透明導電線路と複数のY側透明導電線路とを互いに絶縁して配置したセンサパネルと、該複数のX側透明導電線路を順次駆動走査するX側ドライブ回路と、該複数のY側透明導電線路を順次駆動走査するY側ドライブ回路と、該複数のX側透明導電線路の出力を加算するX側加算回路と、該複数のY側透明導電線路の出力を加算するY側加算回路と、該X側及びY側加算回路の出力レベル変化を検出し、該出力レベル変化の生じた時間位置により指示された座標位置を検出する位

置検出回路とを有し、該センサパネルの所定位置を指示した時に生じる静電容量変化によって該出力レベル変化を生ぜしめて指示された座標位置を検出することを特徴としている。

また、本発明の実施態様によれば、前記センサパネルの、前記X側透明導電線路と前記Y側透明導電線路とが、互いに交叉する位置の面積を他の面積より小と構成したことを特徴としている。更に本発明の他の実施態様によれば、前記位置検出回路は、前記出力レベル変化を検出するために、前記透明導電線路の駆動走査に同期して前記加算回路の出力を遅延せしめ、遅延させた出力と該加算回路の出力との差分をとる様に構成したことを特徴とし、本発明の別の実施態様によれば、前記位置検出回路は、前記出力レベル変化を検出するために、前記センサパネルの所定位置を指示しない状態の出力レベルを記憶し、前記加算回路の出力レベルと該記憶した出力レベルとの相対比較を行うことを特徴としている。

(発明の実施例)

り、X側走査回路11の走査に応じてX電極群に電圧を付与して駆動するもの、13はY側走査回路であり、ソフトレジスタで構成され、クロックパルスC1に応じてY電極群102a~102nを順次走査するもの、14はY側ドライブ回路であり、Y側走査回路13の走査に応じてY電極群に電圧を付与して駆動するものであり、これらX及びY側走査回路11、13およびX、Y側ドライブ回路12、14によってドライブ回路を構成する。15はX側加算回路であり、各X電極101a~101mに接続される加算抵抗R1a~R1mと、これら加算抵抗R1a~R1mの出力を加算するオペアンプ15aとで構成されるもの、16はY側加算回路であり、各Y電極102a~102nに接続される加算抵抗R2a~R2nと、これら加算抵抗R2a~R2nの出力を加算するオペアンプ16aとで構成される。17は位置検出回路であり、X及びY側加算回路15、16の出力から指示された座標位置を検出するものである。

以下、本発明を実施例により詳細に説明する。

第2図は本発明の実施例全体構成図であり、图中、10はセンサパネルであり、第3図のセンサパネル断面図に示す様にガラス等の透明基板100上にm本のX側透明導電線路(以下X電極と称す)101a~101mが互いに平行に配設され、更にX電極群101a~101mと交叉する様にn本のY側透明導電線路(以下Y電極と称す)102a~102nが互いに平行に配設されている。X電極群101a~101mとY電極群102a~102nとは互いに絶縁されて設けられている。このセンサパネル10は第3図に示す如くディスプレイ20の画面前面に装着されるが、前述の透明基板100を取り除き、ディスプレイの画面(例えばブラウン管部)に直接X電極群及びY電極群を設けてセンサパネル10とディスプレイを一体化してもよい。11はX側走査回路であり、ソフトレジスタで構成され、クロックパルスC1に応じてX電極群101a~101mを順次走査するもの、12はX側ドライブ回路であ

次に第2図実施例構成の動作について第4図の各部波形図に基づいて説明する。

クロックパルスC1がX及びY側走査回路11、13に入力されると、X側ドライブ回路12から各X電極101a~101mに各々駆動信号X1、X2...Xmが順次印加され、同時にY側ドライブ回路14から各Y電極102a~102nに各々駆動信号Y1、Y2...Ynが順次印加される。

センサパネル10に指等が触れていない状態ではX側加算回路15の出力X0は、オペアンプ15aがインバータとして働くため、実線の如く、駆動信号X1、X2...Xmの単純和の反転極性をもつ-Vで一定しており、同時にY側加算回路16の出力Y0も実線の如く、駆動信号Y1、Y2...Ynの単純和の反転極性をもつ-Vで一定している。

この状態で人の指等がセンサパネル10の所定の位置に触れると、その位置のX電極(例えば101k)とY電極(例えば102k)に指等が触れ、人体の持つ静電容量が付与される。このため、

X電極101k及びY電極102#に印加された駆動信号Xk、Y#は波形の立上りがなまった形で各加算抵抗R1k、R2#に任えられる。このため、加算回路15の出力X0はX電極101kの走査に対応する時間位置ixにおいて点線て示す如く波形波pxoが生じ、同様に加算回路16の出力Y0はY電極102#の走査に対応する時間位置iyにおいて点線て示す如く波形波pyoを生ずる。位置検出回路17は出力X0、Y0を所定のスライスレベルでスライスし、番線号pxo、pyoを取り出し、この番線号pxo、pyoが走査開始時点sからどの時間位置ixo、iyoにあるかを計数し、これによって検出された番線101k、102#の交点のX座標及びY座標を得る。従って、番線号pxo、pyoの時間位置ixo、iyoを測定することによってセンサパネル10上の指定位置を検出することができる。

第5図は第2図構成のセンサパネル10の詳細図であり、第5図(A)に示す如く透明基板

100上にX電極101とY電極102とが透明導電膜(例えばSnO2、In2O3)が1000Åオーダーのスパッタ等の方法によって形成される。第5図(B)の部分詳細図に示す如く、X電極101とY電極102との交叉位置においてはX電極101とY電極102との間にSiO2等から成る透明絶縁膜103が1000Åオーダーのスパッタ等の方法で形成される。これらの導電膜101、102及び絶縁膜103は基板100上に順次スパッタ等の方法で作成される。一方、基板100の表面には必要に応じてシールドアースを兼ねた透明導電膜104がSnO2、In2O3などの透明導電膜によって一面に形成される。

第6図は第2図構成のセンサパネル10の等価回路図である。ここでX電極101a~101mについて考えてみると、X電極101a~101mのアースとの間の静電容量をCg、X電極とY電極との間の静電結合容量をCk、各X電極101a~101mの線路抵抗rとそれに接続される加算抵抗Rの和をR'とすると、第6図の如く等

価回路図となる。尚Xとは駆動波形発生源を示す。

ここで、基板100のガラス板厚を1mm、X、Y電極、絶縁膜103の膜厚を1000Å、電極線巾を1mm、線路長を20cmとすると、 $Cg \approx 7 \text{ pF}$ 、 $Ck \approx 350 \text{ pF}$ 、 $r = 12 \text{ K}\Omega$ となる。各電極に供給される駆動信号(パルス)は同期性を持つが、人が指でさわる時の接触時間に対して十分短い周期である必要があり、この周期1ms<Tとする。ここで各電極の数m=n=300とすると、1つの電極を駆動している時間巾は3ms<tとなる。

一方、前述の値より $Ck \cdot r = 4.2 \mu\text{sec}$ 、 $Cg \cdot r = 84 \mu\text{sec}$ であるから、このままではカップリング容量Ckによる渡話が問題となる。即ち、X電極とY電極との間の結合容量Ckによって渡話が生じる。これを防ぐための電極構造を説明する。第7図は係る電極構造を示す図であり、同図(A)、(B)に示す如く、X電極101とY電極102の交叉部分の電極面積をW2の如く小さくする。例えば交叉部分の電極巾を0.1

mmとすれば、結合容量は3.5pFに低下し、渡話が生じにくくなる。一方電極巾を小さくすると、指等が電極に接触する確率が小さくなることから交叉部分以外の電極巾は第7図(A)の如く大きくとってある。第7図(B)の場合には更に接触確率を向上させるため電極で囲まれた領域にX電極101に対し三角形の接触用電極Aを、Y電極102に対し三角形の接触用電極Bを設けている。

一方、係るセンサパネル10をCAD(Computer Aided Design)等の細かな座標指定に用いるには人間の指では大きすぎる場合やセンサパネル10上を指で直接触れにくい場合がある。第8図は係る場合の指示入力方式の説明図である。

第8図(A)に示す如く手に細かい金属棒30を持ち金属棒30の先端でセンサパネル10の所望の電極に接触し、静電容量変化を生ぜしめる。この様にすればセンサパネル10上の所定位置を精度良く指定できる。この場合、第8図(B)の

如く金属棒30は固いため、センサパネル10の接触面は点Pの如く点接触となり、X電極101の付加電極Aのみに触れ、X、Y各電極101、102の付加電極A、Bの双方に同時触れないことがありうる。

第9図は係る場合を考慮して指示入力手段を改良した実施例である。第9図(A)に示す如く、金属棒31の先端に円柱状の凹みを設け、係る円柱状凹みを埋め込む形で導電性ゴム32を埋め込んだものである。導電性ゴムは比較的軟らかいので、金属棒31をセンサパネル10面上に押し付けると、第9図(B)の如く導電性ゴム32の底縁中までの真径の接触面積を得ることが出来、第8図(a)の問題は解消する。

第10図は第2図構成の位置検出回路の一実施例回路図であり、図ではX側検出回路のみ示してあるが、Y側も同一構成である。图中、170、171はオペアンプであり、蓄積コンデンサCsのバッファアンプの役目を果たすもの、SW1、SW2、SW3はスイッチであり、スイッチSW

1、SW3とスイッチSW2が相補的にスイッチ動作するものであり、オペアンプ170、171、スイッチSW1、SW2、SW3、蓄積コンデンサCsによって2段のアナログインフトレジスタを構成する。172は差動増幅器であり、スイッチSW1の出力 $X_0(I-T)$ と、スイッチSW3の出力 $X_0(I)$ との差分 $\Delta X(I)$ を取るもの。173は比較器であり、差動増幅器172の出力 $\Delta X(I)$ と基準値VREFとを比較し、出力 $\Delta X(I)$ がVREF以上の時に出力パルスを出すもの。174はアンドゲートであり、ストロブパルスSTROBEと出力パルスとの論理積をとるもの、175はフリップフロップであり、走査開始信号STでセットされ、アンドゲート174の出力 $P(x_0)$ でリセットされ、走査開始から出力 $P(x_0)$ の発生するまでの時間由 $x_0$ のゲート信号を出力するもの、176はアンドゲートであり、クロックパルスCkをゲート信号期間中出力するもの、177はカウンタであり、アンドゲート176からのクロックパルスCkを計数し、

X座標(時間:  $x_0$ に相当)を示すものである。

次に、第10図実施例構成の動作について第11図各部波形図に基いて説明する。

スイッチSW1には前述の加算回路15の出力 $X_0$ が印加される。スイッチSW1及びスイッチSW3はクロックCk1によってオン/オフ動作し、スイッチSW2はクロックCk1と位相の反対のクロックCk2によってオン/オフ動作するから、スイッチSW1、SW3とスイッチSW2は相補的に制御される。従って、オペアンプ170、スイッチSW2、オペアンプ171、スイッチSW3を通ることより、加算出力 $X_0$ は1クロック分遅延させられる。

従って、差動増幅器172には出力 $X_0(I)$ と $X_0(I-T)$ が入力され、差分 $\Delta X(I)$ が得られる。差分 $\Delta X(I)$ は比較器173で基準値VREFでスライスされ、出力パルスとなる。この出力パルスはアンドゲート174でストロブパルスSTROBEに同期化され、パルス $P(x_0)$ となる。一方、フリップフロップ175は走

査開始信号STでセットされ、アンドゲート176を開き、カウンタ177にクロックパルスCk(第4図)の計数を行なわしめる。前述のパルス $P(x_0)$ はフリップフロップ175をリセットし、アンドゲート176を閉じ、カウンタ177にクロックパルスの入力を停止する。これによりカウンタ177には走査開始からパルス $P(x_0)$ の発生までの時間 $x_0$ に相当する座標値が得られ、X座標の検出が可能となる。尚、Y側についても同様であり説明を省略する。人間の持つ静電容量は、条件にもよるが、1500PF~2000PFのオーダーであるから、人の指又は棒体を介してされることにより、接触位置の電極の時定数は、一時的に12KΩX(1000~2000PF) = 12μs~24μsのオーダーとなり、駆動パルス巾が3μsの場合、接触位置に交叉するX、Y電極の出力は殆んど零となる。

第12図は第2図構成の位置検出回路の他の実施例回路図であり、第10図実施例同様X側のみ示してあるが、Y側についても同様である。图中、

180はアナログ・デジタル変換器(以下ADコンバータと称す)であり、入力される加算出力XOのレベルをデジタル値DXOに変換するもの、181はメモリであり、センサパネル10に何も触れられていない状態における各X電極の出力レベルを格納するもの、182はメモリアドレス回路であり、クロックパルスCL(第4図)を計数し、走査された電極位置に対応するアドレスを発生するもの、183はリード/ライト制御回路であり、メモリ181のリード/ライトを制御するもの、184はデジタルコンパレータであり、メモリ181からのデジタル値とADコンバータ180からのデジタル値とを比較するもの、185はアンドゲートであり、コンパレータ184の出力とストロブパルスSTROBEの論理積をとるもの、186はアンドゲートであり、アンドゲート185の出力によってアドレス回路182の発生アドレス値を出力するもの、187はバッファであり、アンドゲート186からのアドレス値を格納するものである。SW4はスイッチであり、

ADコンバータ180とメモリ181又はコンパレータ185とを接続するものである。

次に第12図実施例構成の動作について第13図各部波形状により説明する。

先づスイッチSW4をメモリ181側に接続し、リード/ライト制御回路183からはメモリ181にライトモードを指示する。この状態でセンサパネル10に何も触れていない様にして、前述の各X電極101a~101mの走査を開始する。これにより、加算回路15から加算出力XOが発生し、ADコンバータ180でその出力レベルがデジタル値DXOに変換され、スイッチSW4を介しメモリ181に入力する。メモリアドレス回路182は走査回路11(第2図)を走査せしめるクロックパルスCLと同一のクロックパルスC<sub>1</sub>を計数し、メモリ181に番込みアドレスを与えるので、結局メモリ181には各X電極101a~101mを実際に走査駆動した時の出力レベルが各X電極101a~101mに対応に格納される。この様にしてメモリ181にセンサパネル1

0が触れられていない時の各電極の出力レベルを基準値として読込んでおく。次に実際に座標入力する時は、スイッチSW4がコンパレータ184側に接続され、一方リード/ライト制御回路183はメモリ181にリードモードを指示する。この状態で加算回路15からの加算出力XOがADコンバータ180に入力すると、そのレベルがデジタル値に変換され、コンパレータ184に入力する。一方メモリアドレス回路182は走査回路11の走査と同期しているので、走査されたX電極に対応する前述の基準値をメモリ181から検出し、コンパレータ184に与える。コンパレータ184は両入力を比較し、相違していれば出力パルスDPを発生する。第13図では、メモリ181からDXO(kT)が基準値として検出され、一方加算出力はDXO(k+mT)であることを示し、△Dだけ差が生じていることを示している。この出力パルスDPはアンドゲート185でストロブパルスSTROBEで同期化され、検出パルスPlx<sub>0</sub>を出力する。一方、前述のメモ

リアドレス回路182は走査回路11の走査と同期しているので、その時のX電極、即ちX座標はメモリアドレス回路182のアドレスであるから、アンドゲート186を検出パルスPlx<sub>0</sub>で開き、メモリアドレス回路182のアドレスをバッファ187にセットする。この様にして検出パルスPlx<sub>0</sub>の時間間隔tx<sub>0</sub>に相当するX座標を得ることができる。尚、Y座標についても同様であり説明を省略する。この様に構成することによって、各電極の接触前後におけるレベルを直接比較せしめ各電極による出力レベルのバラツキの影響を少なくすることができ、検出の安定度を向上させる他に、微小の静電容量変化も検出でき、高感度の検出を可能とする。

ADコンバータとして6ビット程度の並列形ADコンバータを用いても理論上は2%のレベル差を容易に検出出来る。

(発明の効果)

以上説明した様に、本発明によれば、基板上に複数のX側透明導電線路と複数のY側透明導電線

路とを互いに絶縁して配線したセンサパネルと、各々該複数の X 側及び Y 側透明導電線路を順次駆動走査する X 側及び Y 側ドライブ回路と、各々該複数の X 側及び Y 側透明導電線路の出力を加算する X 側及び Y 側加算回路と、該 X 側及び Y 側加算回路の出力レベル変化を検出し、該出力レベル変化の生じた時間位置により指示された座標位置を検出する位置検出回路とを有し、該センサパネルの所定位置を指示した時に生じる静電容量変化によって該出力レベル変化を生ぜしめて指示された座標位置を検出する様にしてしているので、装置自体をコンパクトに構成することが可能となり、特にディスプレイ装置に装着する際にディスプレイ装置の形状を損なうことなく、しかも表示内容が見にくくなることを防止しうるという効果を奏し、ディスプレイと一体化し、座標入力装置の存在を感ぜさせないで、入力操作を付与しうる。しかも集積化し易いので回路構成も小型化しうるという効果も奏する。更に、分解能の向上も容易なため CAD システムの様な高精度の座標入力が可能と

なるという効果を奏する他にパネル自体はスパッタ等の蓄産に適した薄膜成膜技術で可能なため、安価にしかも容易に構成しうるという効果も奏する。

#### 4. 図面の簡単な説明

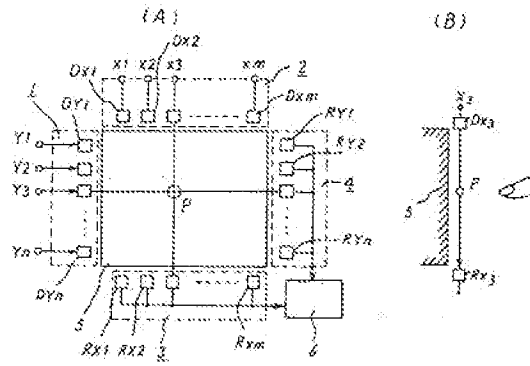
第 1 図は従来の座標入力装置構成図、第 2 図は本発明の一実施例全体構成図、第 3 図は第 2 図構成のセンサパネルの断面図、第 4 図は第 2 図構成の各部波形状図、第 5 図は第 2 図構成のセンサパネルの詳細構成図、第 6 図は第 2 図構成のセンサパネルの等価回路図、第 7 図は第 2 図構成のセンサパネルの電極構成の一実施例を説明する図、第 8 図は本発明に用いられる指示入力方式の一実施例説明図、第 9 図は本発明に用いられる指示入力方式の他の実施例説明図、第 10 図は第 2 図構成の位置検出回路の一実施例回路図、第 11 図は第 10 図構成の各部波形状図、第 12 図は第 2 図構成の位置検出回路の他の実施例回路図、第 13 図は第 12 図構成の各部波形状図である。

図中、10…センサパネル、11…X 側走査回路、12…X 側駆動回路、13…Y 側走査回路、14…Y 側駆動回路、15…X 側加算回路、16…Y 側加算回路、17…位置検出回路、101a～101m…X 側透明導電線路、102a～102n…Y 側透明導電線路。

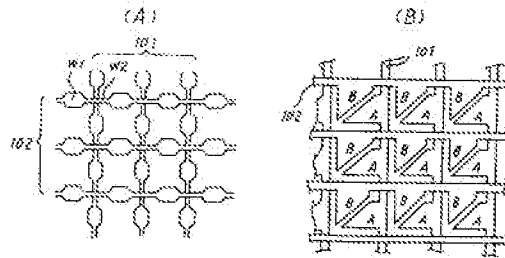
特許出願人 富士通株式会社  
代理人弁護士 山谷 晴 榮



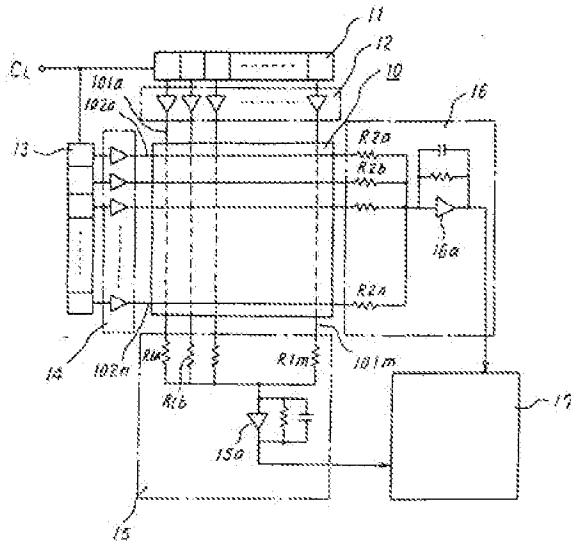
第 1 圖



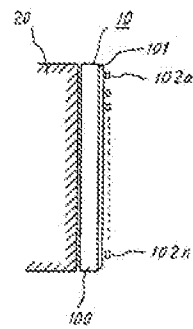
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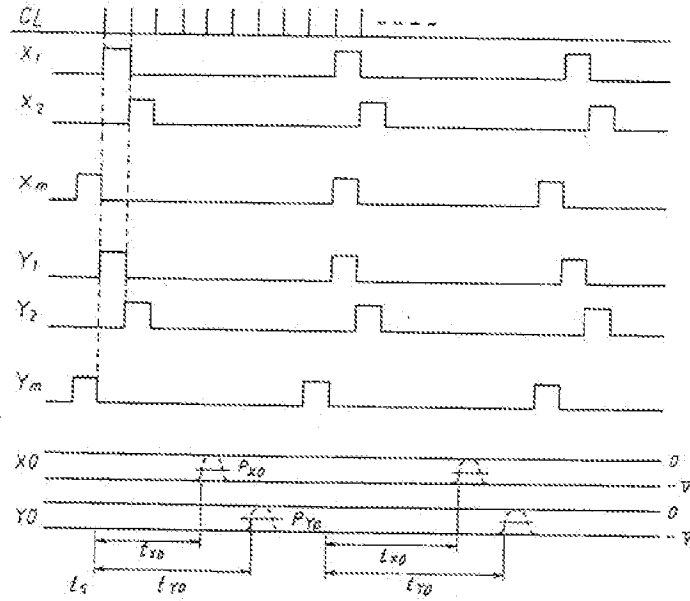
第 2 圖



第 3 圖

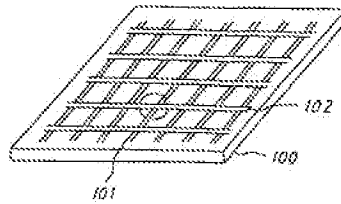


第 4 圖

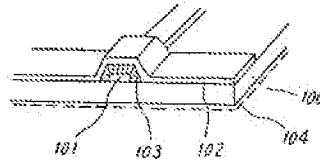


第 5 圖

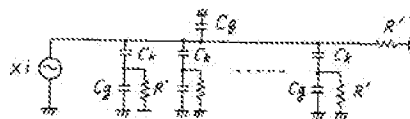
(A)



(B)

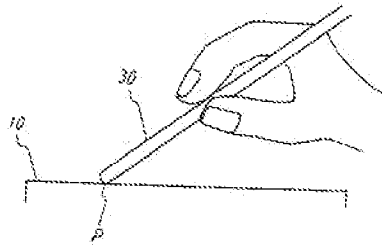


第 6 圖

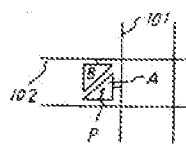


第 8 圖

(A)

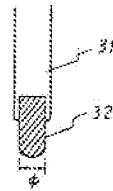


(B)

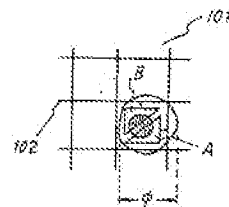


第 9 圖

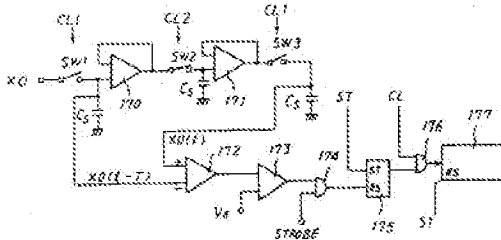
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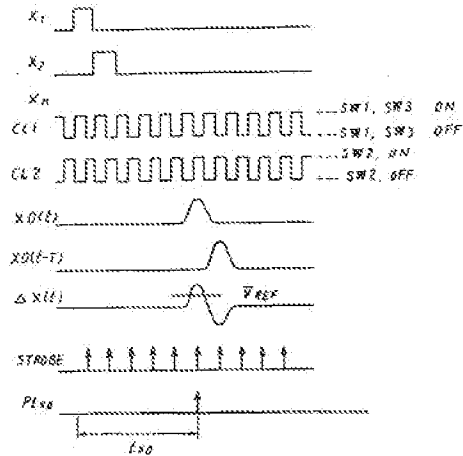
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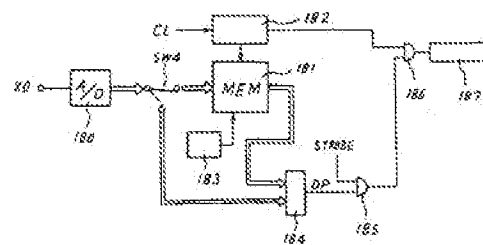
第 10 圖



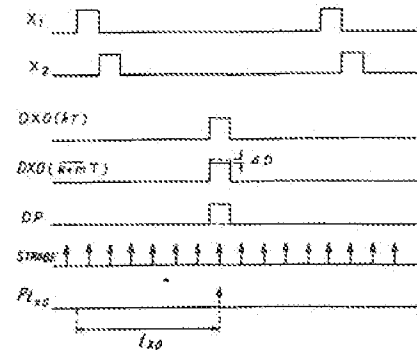
第 11 圖



第 12 圖



第 13 圖



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	6925775
<b>Application Number:</b>	11842747
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3897
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Customer Number:</b>	34313
<b>Filer:</b>	Jeffrey A. Miller/Rita Hernandez
<b>Filer Authorized By:</b>	Jeffrey A. Miller
<b>Attorney Docket Number:</b>	22271.4002
<b>Receipt Date:</b>	01-FEB-2010
<b>Filing Date:</b>	21-AUG-2007
<b>Time Stamp:</b>	19:12:15
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		4002_IDS_02_01_10.pdf	977497 <small>7ea24d0239ace6c0378195ef1230095ad940f355</small>	yes	4

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Transmittal Letter			1	3	
Information Disclosure Statement (IDS) Filed (SB/08)			4	4	
<b>Warnings:</b>					
<b>Information:</b>					
2	Foreign Reference	JP60075927.pdf	2402684	no	11
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<b>Warnings:</b>					
<b>Information:</b>					
			<b>Total Files Size (in bytes):</b>	28571231	

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 11/842,747 Confirmation No. 3897  
Applicant : Ching-Yang Chang, et al.  
Filing Date : August 21, 2007  
Title : Conductor Pattern Structure of Capacitive Touch Panel  
Group Art Unit : 2629  
Examiner : Not Yet Assigned  
Docket No. : 22271-4002  
Customer No. : 34313

Mail Stop: Patent Application  
Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

**INFORMATION DISCLOSURE STATEMENT**

Sir:

In accordance with 37 CFR §§ 1.97 and 1.98, the items identified in this Information Disclosure Statement ("IDS") are brought to the attention of the Office. The items are listed on the attached form PTO-1449 and copies are enclosed for the convenience of the Examiner.

The items identified in this IDS may or may not be "material" pursuant to 37 CFR § 1.56. The submission thereof by Applicant is not to be construed as an admission that any such patent, publication or other information referred to therein is material or considered to be material (37 CFR § 1.97(h)), or even qualifies as "prior art" under 35 USC § 102 with respect to this invention unless specifically designated by Applicant as such.

Applicant : Ching-Yang Chang, et al.  
Appl. No. : 11/842,747  
Examiner : Not Yet Assigned  
Docket No. : 22271-4002

**INFORMATION DISCLOSURE STATEMENT FILING PROVISION:**

This IDS is believed to be timely in that it is being submitted under 37 CFR § 1.97(b), that is (1) within three months of the filing date of the application, which is not a continued prosecution application filed under § 1.53(d); or (2) within three months of entry of the national stage as set forth in 37 CFR § 1.491; or (3) before the mailing of a first Office action on the merits; or (4) before the mailing of a first Office action after filing a request for continued examination under § 1.114. Thus, no fee is required.

However, if the undersigned is in error in this regard, Applicant respectfully requests that the Office consider this IDS as filed under 37 CFR § 1.97(c), if applicable, and charge the fee due under 37 CFR § 1.17(p) to the deposit account referenced below.

However, if the undersigned is in error in this regard, Applicant respectfully requests that the Office consider this IDS as filed under 37 CFR § 1.97(c), if applicable, and a statement under 37 CFR § 1.97(e) is included below, thus no fee is required.

This IDS is being submitted under 37 CFR § 1.97(c), that is after mailing of a first Office action on the merits, but before a Final Action under 37 CFR § 1.113 or a Notice of Allowance under 37 CFR § 1.311.

The fee due under 37 CFR § 1.17(p) is submitted herewith.

A statement under 37 CFR § 1.97(e) is included below, thus no fee is required. In the event that this IDS is not received before a Final Action or a Notice of Allowance, then Applicant respectfully requests that the Office consider the filing of these papers to be submitted under 37 CFR § 1.97(d) and charge the fee due under 37 CFR § 1.17(p) to the deposit account below.

This IDS is being submitted under 37 CFR § 1.97(d), that is after a Final Action under 37 CFR § 1.113 or a Notice of Allowance under 37 CFR § 1.311, but before payment of the issue fee. A statement under 37 CFR § 1.97(e) is included below. The fee due under 37 CFR § 1.17(p) is submitted herewith.



Applicant : Ching-Yang Chang, et al.  
Appl. No. : 11/842,747  
Examiner : Not Yet Assigned  
Docket No. : 22271-4002

STATEMENT UNDER 37 CFR § 1.97(e):

- Each item contained in this IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.
- No item contained in this IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing this statement after making reasonable inquiry, no item of information contained in this IDS was known to any individual designated in 37 CFR § 1.56(c) more than three months prior to the filing of this IDS.

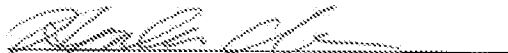
PAYMENT AND/OR AUTHORIZATION TO CHARGE FEES:

- A check in the amount of \_\_\_ is enclosed for the above fee(s).
- Please charge \$ \_\_\_\_\_ to Deposit Account No. 15-0665 for the above fee(s).
- The Commissioner is authorized to charge any fees required by the filing of these papers, and to credit any overpayment to Orrick, Herrington & Sutcliffe's Deposit Account No. 15-0665.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: February 1, 2010

By:   
Hanbum Cho  
Reg. No. 58,993

ORRICK, HERRINGTON & SUTCLIFFE LLP  
4 Park Plaza, Suite 1600  
Irvine, CA 92614  
650/614-7660 Telephone  
650/614-7401 Facsimile



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
11/842,747 08/21/2007 Ching-Yang Chang 22271.4002 3897

34313 7590 06/25/2010
ORRICK, HERRINGTON & SUTCLIFFE, LLP
IP PROSECUTION DEPARTMENT
4 PARK PLAZA
SUITE 1600
IRVINE, CA 92614-2558

EXAMINER

HICKS, CHARLES V

ART UNIT PAPER NUMBER

2629

MAIL DATE DELIVERY MODE

06/25/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 11/842,747	<b>Applicant(s)</b> CHANG ET AL.	
	<b>Examiner</b> CHARLES HICKS	<b>Art Unit</b> 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 21 August 2007.
- 2a)  This action is **FINAL**.
- 2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-10 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-10 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 21 August 2007 is/are: a)  accepted or b)  objected to by the Examiner.
  - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some \*    c)  None of:
  - 1.  Certified copies of the priority documents have been received.
  - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 11/19/2008; 01/06/2009; 02/04/2009; 02/01/2010.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Seely et al. (US 6,188,391).

In reference to claim 1, Seely teaches a conductor pattern structure of a capacitive touch panel, which is adapted to form on a surface of a substrate (Seely, Abstract),

the touch-control pattern structure comprising: a plurality of first-axis conductor assemblies, each first-axis conductor assembly comprising a plurality of first-axis conductor cells arranged on the substrate surface along a first axis in a substantially equally-spaced manner (Seely, col. 3, ll. 8-15),

a disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells (Seely, Fig. 1C; col. 3, ll. 16-34);

a plurality of first-axis conduction lines respectively connecting between adjacent ones of the first-axis conductor cells of each first-axis conductor assembly so that the

Art Unit: 2629

first-axis conductor cells of each respective first-axis conductor assembly are electrically connected together (Seely, col. 3, ll. 8-15);

a plurality of insulation layers each covering a surface of each first-axis conduction line (Seely, col. 6, ll. 43-54);

a plurality of second-axis conductor assemblies, each second-axis conductor assembly comprising a plurality of second-axis conductor cells arranged on the substrate surface along a second axis in a substantially equally-spaced manner (Seely, col. 3, ll. 8-15),

each second-axis conductor cell being set in each disposition zone (Seely, Fig. 1C; col. 3, ll. 16-34);

and a plurality of second-axis conduction lines respectively connecting between adjacent ones of the second-axis conductor cells of each second-axis conductor assembly so that the second-axis conductor cells of each respective second-axis conductor assembly are electrically connected together (Seely, col. 3, ll. 8-15),

the second-axis conduction line being extended across a surface of the insulation layer of the respective first-axis conduction line (Seely, col. 6, ll. 43-54).

In reference to claim 6, Seely teaches a conductor pattern structure of a capacitive touch panel adapted to form on a surface of a substrate (Seely, Abstract),

the touch-control pattern structure comprising: at least two adjacent first-axis conductor cells (Seely, Fig. 8A; col. 3, ll. 8-15),

Art Unit: 2629

and at least two adjacent second-axis conductor cells (Seely, Fig. 8A; col. 3, ll. 8-15),

wherein the adjacent first-axis conductor cells are connected by a first-axis conduction line provided there between (Seely, col. 3, ll. 8-15),

characterized in that an insulation layer is formed on a surface of the first-axis conduction line (Seely, col. 6, ll. 43-54),

and a second-axis conduction line extends across a surface of the insulation layer to connect between the adjacent second-axis conductor cells (Seely, col. 3, ll. 8-15).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 2629

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-4 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seely et al. (US 6,188,391) in view of Hsu et al. (US 7,030,860).

Claim 2 is rejected as being dependent on rejected claim 1 as discussed above and further, Seely however fails to expressly teach wherein the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.

Hsu discloses a capacitive touch sensing system, analogous in art with that of Seely, wherein first-axis conductor cells and second-axis conductor cells consist of a transparent conductive material (Hsu, col. 2, ll. 60-62).

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the touch sensor cells of Seely, wherein the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material, as taught by Hsu.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to enable the user of the capacitive touch sensor input device to visualize an underlying surface, such as a display (Hsu, Abstract).

Art Unit: 2629

Claim 3 is rejected as being dependent on rejected claim 1 as discussed above and further, Seely however fails to expressly teach wherein the first-axis conduction lines and the second-axis conduction lines consist of a transparent conductive material.

Hsu discloses a capacitive touch sensing system, analogous in art with that of Seely, first-axis conduction lines and second-axis conduction lines consist of a transparent conductive material (Hsu, col. 4, ll. 36-52).

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the conductive lines of Seely, wherein the first-axis conduction lines and the second-axis conduction lines consist of a transparent conductive material, as taught by Hsu.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to enable the user of the capacitive touch sensor input device to visualize an underlying surface, such as a display (Hsu, Abstract).

Claim 4 is rejected as being dependent on rejected claim 1 as discussed above and further, Seely however fails to expressly teach wherein the insulation layer consists of a transparent insulation material.

Hsu discloses a capacitive touch sensing system, analogous in art with that of Seely, wherein an insulation layer consists of a transparent insulation material (Hsu, col. 4, ll. 36-52).



Art Unit: 2629

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the insulation layer of Seely, wherein the insulation layer consists of a transparent insulation material, as taught by Hsu.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to enable the user of the capacitive touch sensor input device to visualize an underlying surface, such as a display (Hsu, Abstract).

Claim 7 is rejected as being dependent on rejected claim 6 as discussed above and further, Seely however fails to expressly teach wherein the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.

Hsu discloses a capacitive touch sensing system, analogous in art with that of Seely, wherein first-axis conductor cells and second-axis conductor cells consist of a transparent conductive material (Hsu, col. 2, ll. 60-62).

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the touch sensor cells of Seely, wherein the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material, as taught by Hsu.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to enable the user of the capacitive touch sensor input device to visualize an underlying surface, such as a display (Hsu, Abstract).

Art Unit: 2629

Claim 8 is rejected as being dependent on rejected claim 6 as discussed above and further, Seely however fails to expressly teach wherein the first-axis conduction line and the second-axis conduction line consist of a transparent conductive material.

Hsu discloses a capacitive touch sensing system, analogous in art with that of Seely, first-axis conduction line and second-axis conduction line consist of a transparent conductive material (Hsu, col. 4, ll. 36-52).

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the conductive lines of Seely, wherein the first-axis conduction line and the second-axis conduction line consist of a transparent conductive material, as taught by Hsu.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to enable the user of the capacitive touch sensor input device to visualize an underlying surface, such as a display (Hsu, Abstract).

Claim 9 is rejected as being dependent on rejected claim 6 as discussed above and further, Seely however fails to expressly teach wherein the insulation layer consists of a transparent insulation material.

Hsu discloses a capacitive touch sensing system, analogous in art with that of Seely, wherein an insulation layer consists of a transparent insulation material (Hsu, col. 4, ll. 36-52).

Art Unit: 2629

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the insulation layer of Seely, wherein the insulation layer consists of a transparent insulation material, as taught by Hsu.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been to enable the user of the capacitive touch sensor input device to visualize an underlying surface, such as a display (Hsu, Abstract).

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seely et al. (US 6,188,391) in view of Mulligan et al. (US 2004/0119701).

Claim 5 is rejected as being dependent on rejected claim 1 as discussed above and further, Seely however fails to teach wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.

Mulligan discloses a touch sensing system, analogous in art with that of Seely, wherein first-axis conductor cells and second-axis conductor cells have a contour of hexagonal shape (Mulligan, pg. 4, par. 38).

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the cells of Seely, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape, as taught by Mulligan.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been simple substitution of one known element, hexagonal shaped

Art Unit: 2629

sensor cells, for another to obtain predictable results, namely, a capacitive touch sensor input device (Mulligan, pg. 4, par. 38).

Claim 10 is rejected as being dependent on rejected claim 6 as discussed above and further, Seely however fails to teach wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.

Mulligan discloses a touch sensing system, analogous in art with that of Seely, wherein first-axis conductor cells and second-axis conductor cells have a contour of hexagonal shape (Mulligan, pg. 4, par. 38).

At the time the invention was made, it would have been obvious to one having ordinary skill in the art to substitute the cells of Seely, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape, as taught by Mulligan.

As one of ordinary skill in the art would appreciate, the suggestion/motivation for doing so would have been simple substitution of one known element, hexagonal shaped sensor cells, for another to obtain predictable results, namely, a capacitive touch sensor input device (Mulligan, pg. 4, par. 38).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHARLES HICKS whose telephone number is 571-270-7535. The examiner can normally be reached on Monday-Thursday from 7:30 to 4:00.

Art Unit: 2629

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz, can be reached on 571-272-3638). The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sumati Lefkowitz/  
Supervisory Patent Examiner, Art Unit 2629

<b>Notice of References Cited</b>	Application/Control No. 11/842,747	Applicant(s)/Patent Under Reexamination CHANG ET AL.	
	Examiner CHARLES HICKS	Art Unit 2629	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-6,188,391	02-2001	Seely et al.	345/173
*	B US-7,030,860	04-2006	Hsu et al.	345/173
*	C US-2004/0119701	06-2004	Mulligan et al.	345/173
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			


**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
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**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Index of Claims</b>  	<b>Application/Control No.</b> 11842747	<b>Applicant(s)/Patent Under Reexamination</b> CHANG ET AL.
	<b>Examiner</b> CHARLES HICKS	<b>Art Unit</b> 2629

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	06/07/2010							
	1	✓							
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	5	✓							
	6	✓							
	7	✓							
	8	✓							
	9	✓							
	10	✓							

<b>Search Notes</b>  	<b>Application/Control No.</b>  11842747	<b>Applicant(s)/Patent Under Reexamination</b>  CHANG ET AL.
	<b>Examiner</b>  CHARLES HICKS	<b>Art Unit</b>  2629

SEARCHED			
Class	Subclass	Date	Examiner
345	173-184	06/07/2010	CH
178	18.01-18.08	06/07/2010	CH
341	33-34	06/07/2010	CH

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor search	06/07/2010	CH
East search	06/07/2010	CH

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>	<b>Complete if Known</b>	
	Application Number	11/842,747
	Filing Date	8/21/2007
	First Named Inventor	Ching-Yang Chang, et al.
	Art Unit	2629
	Examiner Name	R. Hjerpe
Sheet 1 of 1	Attorney Docket Number	MR2863-351

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	F	US- 7,292,229	11/6/2007	Morag, et al.	
	G	US- 6,005,555	12/21/1999	Katsurahira, et al.	
	H	US- 5,381,160	1/10/1995	Landmeier	
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		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				

Examiner Signature	/Charles Hicks/	Date Considered	06/07/2010
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## EAST Search History

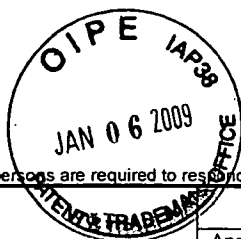
## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"6188391".pn. or "6137427".pn.	US-PGPUB; USPAT	ADJ	ON	2010/06/07 12:35
L2	1095	(345/173-184.ccls. or 178/18.01-18.06.ccls. or 341/33-34.ccls.) and capacitive touch	US-PGPUB; USPAT	ADJ	ON	2010/06/07 12:42
L3	1	"6188391".pn. and capacit\$5	US-PGPUB; USPAT	ADJ	ON	2010/06/07 12:43
L8	1	"6188391".pn. and (touch) and substrate	US-PGPUB; USPAT	ADJ	ON	2010/06/07 12:49
L9	1	"6188391".pn. and (horizontal or vertical)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 12:52
L10	1	"6188391".pn. and (horizontal or vertical) and insulat\$5	US-PGPUB; USPAT	ADJ	ON	2010/06/07 12:59
L11	0	"6188391".pn. and transparent	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:15
L12	1	("6188391".pn. or "6137427".pn.) and transparent	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:15
L13	16	l2 and (transparent same capacitive same cell)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:17
L14	8	l2 and (transparent same capacitive same cell) and (transparent same insulat\$5)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:17
L15	1	"7030860".pn. and (transparent same sensor)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:25
L16	1	"7030860".pn. and (transparent)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:30

L17	38	I2 and ((cell or sensor) same hexagon\$4)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:41
L18	38	I17 and (capacitive same touch)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 13:42
S1	1	"20080264699"	US-PGPUB; USPAT	ADJ	ON	2010/06/07 10:55
S2	2	((CHING-YANG) near2 (CHANG)).INV.	US-PGPUB; USPAT	ADJ	ON	2010/06/07 10:55
S3	8	((SHUN-TA) near2 (CHIEN)).INV.	US-PGPUB; USPAT	ADJ	ON	2010/06/07 10:56
S5	3	(S2 or S3) and capacitive touch	US-PGPUB; USPAT	ADJ	ON	2010/06/07 10:56
S6	1051	(345/173-184.ccls. or 178/18.01-18.06.ccls.) and capacitive touch	US-PGPUB; USPAT	ADJ	ON	2010/06/07 11:16
S7	270	S6 and (second or y) axis	US-PGPUB; USPAT	ADJ	ON	2010/06/07 11:17
S8	3	S6 and ((second or y) axis same cell)	US-PGPUB; USPAT	ADJ	ON	2010/06/07 11:18

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

**Complete if Known**

Application Number	11/842,747
Filing Date	8/21/2007
First Named Inventor	Ching-Yang Chang, et al.
Art Unit	2629
Examiner Name	R. Hjerpe
Attorney Docket Number	MR2863-351

**U. S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	C	US- 2006/0066581	3/30/2006	Lyon, et al.	
	D	US- 6,970,160	11/29/2005	Mulligan, et al.	
	E	US- 4,550,221	10/29/1984	Mabusth	
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**FOREIGN PATENT DOCUMENTS**

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		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				

Examiner Signature	/Charles Hicks/	Date Considered	06/07/2010
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)				<i>Complete if Known</i>	
				Application Number	11/842,747
				Filing Date	August 21, 2007
				First Named Inventor	Ching-Yang Chang
				Art Unit	2629
				Examiner Name	Not Yet Assigned
Sheet	1	of	1	Attorney Docket Number	22271-4002
				Confirmation No.	3897

U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publications of Cited Documents MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Figures Appear
		Number	Kind Code <sup>2</sup>			
	1	US2005/0030048	A1	Bolender	02/10/2005	
	2	US2009/0160682	A1	Bolender	06/25/2009	
	3	6,970,160	B2	Mulligan	11/29,2005	
	4	6,137,427		Binstead	10/24/2000	

FOREIGN PATENT DOCUMENTS								
Examiner Initials	Cite No. <sup>1</sup>	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publications of Cited Documents MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Figures Appear	English Abstract T <sup>6</sup>
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup>				
			JP 60-075927			4/30/1985		yes

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.			T <sup>2</sup>
	CA	Korean Office Action; issue date, May 18, 2009 for SN 10-2007-0133201			
	CB	EP Office Action dated 01-01-2009; SN 07018556.6			
	CC	File Wrapper for U.S. Patent Application Serial No. 10/279,828			

Examiner Signature	OHS West:260819279.1 22271-4002 RHH/RHH	/Charles Hicks/	Date Considered	06/07/2010
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<p>Substitute for form 1449/PTO</p> <h2 style="text-align: center;">INFORMATION DISCLOSURE STATEMENT BY APPLICANT</h2> <p style="text-align: center;"><i>(Use as many sheets as necessary)</i></p> <p>Sheet <u>1</u> of <u>2</u></p>	<p style="text-align: center;"><b>Complete if Known</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Application Number</td><td>11/842,747</td></tr> <tr><td>Filing Date</td><td>8/21/2007</td></tr> <tr><td>First Named Inventor</td><td>Ching-Yang Chang, et al.</td></tr> <tr><td>Art Unit</td><td>2629</td></tr> <tr><td>Examiner Name</td><td>R. Hjerpe</td></tr> <tr><td>Attorney Docket Number</td><td>MR2863-351</td></tr> </table>	Application Number	11/842,747	Filing Date	8/21/2007	First Named Inventor	Ching-Yang Chang, et al.	Art Unit	2629	Examiner Name	R. Hjerpe	Attorney Docket Number	MR2863-351
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		Number-Kind Code <sup>2</sup> (if known)			
	A	US- 6,188,391	2/13/2001	Seely, et al.	
	B	US- 6,137,427	10/24/2000	Binstead	
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				Filing Date	8/21/2007
				First Named Inventor	Ching-Yang Chang, et al.
				Art Unit	2629
				Examiner Name	R. Hjerpe
				Attorney Docket Number	MR2863-351
Sheet	2	of	2		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	AA	A Communication from the European Patent Office dated 16 September 2008 regarding the corresponding foreign patent application EP07018556.	

Examiner Signature	/Charles Hicks/	Date Considered	06/07/2010
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 This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 120 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

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BIB DATA SHEET

CONFIRMATION NO. 3897

<b>SERIAL NUMBER</b> 11/842,747	<b>FILING or 371(c) DATE</b> 08/21/2007	<b>CLASS</b> 345	<b>GROUP ART UNIT</b> 2629	<b>ATTORNEY DOCKET NO.</b> 22271.4002	
<b>APPLICANTS</b> Ching-Yang Chang, Taipei, TAIWAN; Shun-Ta Chien, Taipei, TAIWAN;					
<b>** CONTINUING DATA *****</b>					
<b>** FOREIGN APPLICATIONS *****</b> TAIWAN 96115152 04/27/2007					
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 08/30/2007					
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Verified and Acknowledged <u>/CHARLES V HICKS/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> TAIWAN	<b>SHEETS DRAWINGS</b> 5	<b>TOTAL CLAIMS</b> 10	<b>INDEPENDENT CLAIMS</b> 2
<b>ADDRESS</b> ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558 UNITED STATES					
<b>TITLE</b> CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL					
<b>FILING FEE RECEIVED</b> 425	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Appl. No. : 11/842,747 Confirmation No.: 3897  
Applicants : Ching-Yang Chang, *et al.*  
Filing Date : August 21, 2007  
Title : Conductor Pattern Structure Of Capacitive Touch Panel  
Group Art Unit : 2629  
Examiner : Hicks, Charles V.  
Docket No. : 22271-4002  
Customer No. : 34313

Via: USPTO EFS Web  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**AMENDMENT AND RESPONSE**

Dear Sir:

This paper is responsive to the Office Action mailed on June 25, 2010. Please amend the above-identified application as follows:

**Amendments to the Claims** are reflected in the listing of claims that begin on page 2 of this paper.

**Remarks/Arguments** begin on page 9 of this paper.

### REMARKS

Claims 1-10 are pending.

Claims 1 and 6 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,188,391 to Seely, *et al.* ("Seely").

Claims 2-4 and 7-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Seely in view of U.S. Patent No. 7,030,860 to Hsu, *et al.* ("Hsu").

Claims 5 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Seely in view of U.S. Patent Appl. No. 2004/0119701 by Mulligan, *et al.* ("Mulligan").

Claims 1-3 and 6-8 have been amended.

Claims 11-45 have been added.

Applicant respectfully requests entry of this amendment and reconsideration of the application in view of the foregoing amendments and the following.

### CLAIM REJECTIONS

#### **I. Rejections Under 35 U.S.C. § 102(b)**

The Examiner rejected claims 1 and 6 under 35 U.S.C. §102(b) as being anticipated by Seely. 06/25/10 Office Action, p. 2. Applicant respectfully traverses the Examiner's rejection of claims 1 and 6 for the following reasons.

Seely discloses a capacitive touchpad realized using a two-layer printed circuit board as a substrate. Seely, col. 2, lines 14-18. The first layer formed on the printed circuit board is a single composite layer for horizontal and vertical sensor electrode traces, and the second layer formed on the underneath the printed circuit board includes the controller chip, sensor circuitry and/or related circuitry. Seely, col. 2, lines 18-24. According to Comprehensive Dictionary of

Electrical Engineering, printed circuit board is a substrate made from insulating material that has one or more sandwiched metallic conductor layers applied that are etched to form interconnecting traces useful for interconnecting components. Comprehensive Dictionary of Electrical Engineering, 2<sup>nd</sup> ed., p. 544, attached herewith for the Examiner's convenient reference as **Appendix A**. This is evidenced by Seely's own disclosure that the printed circuit board 62 is covered with copper 101 to form the horizontal traces and diamonds 68 (conductor cells) (See Seely, FIG. 8A; col. 6, line 65 – col. 7, line 2).

From the foregoing, Seely's printed circuit board used as a substrate for constructing its touchpad as well as the electrode traces and diamonds that are formed on the printed circuit board are made of a non-transparent material (e.g., copper).

Claims 1 and 6 as amended now recite "**first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material**." Therefore, Applicant respectfully submits that the Examiner's rejections of claims 1 and 6 under 35 U.S.C. §102(b) have been overcome and should be withdrawn.

## II. Rejections Under 35 U.S.C. § 103(a)

### A. Claims 2-4 and 7-9

The Examiner rejected claims 2-4 and 7-9 under 35 U.S.C. §103(a) as being unpatentable over Seely in view of Hsu. 06/25/10 Office Action, p. 4. Regarding claim 2, the Examiner stated that Seely fails to expressly teach but Hsu does teach the first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material. 06/25/10 Office Action, p. 5.

Claims 1 and 6 have been amended to recite the feature of original claims 2 and 7.

Therefore, the Examiner's rejection affecting claims 2 and 7 is applied to the amended claims 1 and 6. Applicant respectfully traverses this ground of rejection for the following reasons.

As discussed above in section (I), Seely discloses non-transparent printed circuit board including non-transparent copper electrode traces. Seely, Figs. 8A, 8B, and 9; col. 6, line 65 -- col. 7, line 2. Therefore, Seely does not teach or suggest the feature of independent claims 1 and 6 (and the claims respectively depending therefrom) that "**first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.**"

The secondary reference relied upon by the examiner, Hsu, discloses a transparent capacitive sensing system. Hsu, Abstract. To achieve transparency of the visible portion of the sensor array, Hsu's horizontal traces 64 and vertical traces 70 are made of a transparent material. Hsu, Figs. 5A-5B; col. 6, line 40, lines 44-48. To even further improve transparency, Hsu enlarges the vertical traces (diamonds 72) to the size of the spaces between X traces 66 so that sensor 36 appears to have a single uniform layer of transparent conductive material. Hsu, Fig. 5C; col. 7, lines 10-13. Hsu further notes that only non-visible portions of the sensor can be optionally be drawn with an opaque conductor such as silver ink and conductive carbon ink for better handling properties and lower resistance. Hsu, col. 4, lines 31-35.

In contrast, the primary reference Seely teaches away from this critical transparency requirement of Hsu's capacitive sensing system. As shown in Figs. 8A, 8B, and 9, Seely's printed circuit board 62 and the electrode traces 68 and 69 that are apparently on the visible portions of Seely's touchpad are made of copper that is not transparent. Seely, col. 2, lines 55-61, col. 6, line 65- col. 7, line 8.

The Federal Circuit Court of Appeals has made clear that, in the context of obviousness, if a proposed modification would render the prior art invention being modified **unsatisfactory for its intended purpose**, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP § 2143.01(V). Here, the Examiner's suggestion to modify Seely's touchpad by using Hsu's transparent conductive material yields unsatisfactory result for its intended use of Seely's touchpad that is made of inexpensive, easy to apply printed circuit board screening processes. Seely, col. 1, lines 6-9, col. 5, lines 60-61, col. 6, lines 4-8, lines 16-24, lines 55-59.

Furthermore, Seely's inventors would have known of the general use of transparent material for electrode traces and interconnections at the time the Seely application was filed in July 1998, but instead decided to use a less expensive fabrication processes using non-transparent metallic layer and carbon ink for the intended benefits as discussed above. See Seely, col. 1, lines 7-9.

The Examiner is further noted that:

a patent [claim] composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

*KSR Int'l. Co. v. Teleflex, Inc.*, 550 U.S. at 418 (2007).

The Examiner has not provided a cogent reason to replace Seely's non-transparent metallic traces or carbon ink traces with Hsu's transparent conductive materials, nor has the Examiner established that a person of ordinary skill in the art would reasonably expect to obtain

the benefits of Seely's inexpensive printed circuit and carbon ink patterning processes at the cost of reduced conductivity and loss of transparency by replacing the carbon ink traces with Hsu's conductive materials. See Seely, col. 6, lines 18-25.

For these reasons, Applicant respectfully submits that there is no suggestion or motivation to combine Seely and Hsu to teach or suggest that **“first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material,”** as previously submitted claims 2 and 7, and now independent claims 1 and 6, recite. Moreover, it is only by having first considered Applicant's specification and claims that the Examiner was able to use hindsight to reconstruct the prior art and formulate the present rejection, which is improper in light of the applicable authorities. MPEP § 2145 (X)(A). Applicant respectfully submits that previously presented claims 2-4 and 7-9 (and now claims 1-4, 6-9) are patentable under 35 U.S.C. §103(a) over Seely in view of Hsu.

Hsu further discloses a conventional four-layer design including respective substrates 62 for X-axis traces 64 and substrates 68 for Y-axis traces 70 separated by an insulator 74. Hsu, Figure 5D; col. 7, lines 29-33. In this four-layer design, X-axis traces are formed on the substrate 62 while the Y-axis traces are formed on the different substrate 68. Hsu, col. 7, lines 4-6. Consequently, the X-axis sensor traces and Y-axis sensor traces are formed on different substrates. Hsu, Figures 5D, 6-9.

Hsu further disclose an insulator layer 74 that separates X conductive traces 64 from Y conductive traces 70. Hsu, FIG. 5D; col. 7, lines 29-33. Hsu's system requires electrical shielding by the insulator 74 to isolate sensor traces from electrical noise. Hsu, col. 7, lines 48-49. If Hsu's four-layer design were modified to arrange layers of first-axis traces and second-axis traces on the same surface of the substrate, as claim 1 recites, insulator layer 74 that

separates X conductive traces 64 and Y conductive traces 70 needs to be removed. This is highly undesirable according to Hsu because the intended purpose of insulator layer 70 is to isolate sensor traces from electrical noise. *Id.*

In contrast, Seely places the X and Y electrodes (68 and 69) on the same substrate without requiring an insulator therebetween. Instead of an insulator between X and Y traces, Seely uses solder mask pattern to insulate the horizontal wires or traces 69 underneath the vertically-running carbon ink traces. Seely, FIG. 7; col. 6, lines 43-54. The solder mask pattern allows to place the X and Y electrodes on the same substrate. *Id.*

However, the elimination of Hsu's insulator layer to place the X and Y traces on the same substrates as Seely requires would make the Hsu's four-layer design unsatisfactory because the intended purpose of electrical separation between the underlying X and Y traces would be destroyed. Similarly, Hsu's X interconnects cannot be placed on the same substrate as Y traces. Because the proposed modification would render the prior art invention being modified **unsatisfactory for its intended purpose**, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP § 2143.01 (V).

For these additional reasons, Applicant respectfully submits that Seely and Hsu cannot be combined without the benefit of an improper hindsight reconstruction to teach or suggest the claimed features of rejected claims 2 and 7 (now claims 1 and 6). MPEP § 2145 (X)(A). Therefore, Applicant respectfully submits that claims 1 and 6 and claims 2-4 and 7-9 that depend from claims 1 and 6 are patentable under 35 U.S.C. §103(a) over Seely in view of Hsu.

**B. Claims 3 and 8**

Regarding claims 3 and 8, the Examiner stated that Seely fails to expressly teach but Hsu does teach the first-axis conduction lines and the second-axis conduction lines consisting of a transparent conductive material. 06/25/10 Office Action, pp. 6, 8. Applicant respectfully traverses this ground of rejection for the following reasons.

Seely discloses that the horizontally-aligned electrodes are connected together by wires (horizontal interconnections) that run the entire width of the pad. Seely, col. 4, lines 63-66. The floating electrodes interspersed between the horizontal electrodes form the vertical array by connecting them without interference with the horizontal interconnection. Seely, col. 5, lines 48-56. For these vertical interconnections, Seely uses a screen-printed layer of carbon ink loaded with graphite. Seely, col. 5, lines 56-59; col. 6, lines 19-21. It is well known in the art that such carbon ink loaded with graphite is not transparent. For example, Seely discloses Electrador 5500 series carbon conductor paste made by the Electra Polymer and Chemicals, America Corp. of Orange, California, as a material for such screen-printed layer of ink. Seely, col. 5, line 65 – col. 6, line 3. As disclosed in the Material Safety Data Sheet (“Data Sheet” hereinafter), the Electrador 5500 series carbon conductor paste is black in color, and thus not transparent. Data Sheet, p. 1, section 3. Data Sheet is attached herewith as **Appendix B** for the Examiner’s convenient reference.

In contrast, claims 3 and 8 recite “**the second-axis conduction lines consist of a transparent conductive material**.” As discussed, Seely’s layer of carbon ink for connecting vertical electrode traces is not transparent, therefore Seely does not teach or suggest this feature of claims 3 and 8.

Seely further discloses that:

screen-printed carbon ink is a standard, inexpensive process step used in high-volume [printed] circuit board manufacturing. Carbon



ink is the most commonly-used variety of conductive ink, though any alternate type of conductive ink or paste such as silver ink would serve equally well for the purposes herein disclosed. Conductive inks compatible with printed circuit board screening processes can be obtained from a variety of vendors ...

Seely, col. 5, lines 60-67.

A lower-cost alternative to gold-plating is screen-printed carbon ink. Typically, exposed metal traces are "painted" with a selectively-applied (screen-printed) layer of ink loaded with graphite.

Seely, col. 6, lines 16-17.

From the foregoing, Seely uses the carbon ink patterning for connecting vertical traces due to its lower manufacturing cost and ease of the process even if there are other manufacturing processes that provide better quality of interconnection such as resistance to oxidation and corrosion as well as better conductivity. This is evidenced by Seely's own disclosure that states:

[t]he ink is somewhat conductive, so affords electrical connection. The ink is non-metallic, so it resists oxidation and corrosion. For example, carbon-ink printing is commonly used to form inexpensive arrays of switch contacts on printed circuit boards used in TV remote controls.

Seely, col. 6, lines 18-25.

Seely further discloses that:

Carbon and other types of conductive links are also widely used in the PC board industry to provide a supplemental layer of interconnections, thus eliminating need for jumpers and other supplemental interconnect devices. This is the same purpose for which the conductive ink is used in the present invention.

Seely, col. 6, lines 26-31, emphasis added.

Based on this, the Examiner incorrectly suggests that Hsu's transparent conductive material can be used for Seely's carbon ink traces. 06/25/10 Office Action, pp. 6-8. In fact,

Seely suggests the opposite and use of conductive carbon ink for the purpose of eliminating other types of interconnections including Hsu's vertical interconnect. See above.

The Examiner is further noted that:

a patent [claim] composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

*KSR Int'l. Co. v. Teleflex, Inc.*, 550 U.S. at 418 (2007).

In rejecting claims 2 and 7 (now claims 1 and 6) and claims 3 and 8, the Examiner has not provided a cogent reason to replace Seely's non-transparent metallic traces or carbon ink traces with Hsu's transparent conductive materials, nor has the Examiner established that a person of ordinary skill in the art would reasonably expect to obtain the benefits of Seely's inexpensive printed circuit and carbon ink patterning processes at the cost of reduced conductivity and loss of transparency by replacing the carbon ink traces with Hsu's conductive materials. See Seely, col. 6, lines 18-25.

For these additional reasons, Applicant respectfully submits that Seely and Hsu cannot be combined without the benefit of an improper hindsight reconstruction to teach or suggest the claimed features of rejected claims 3 and 8. Therefore, Applicant respectfully submits that claims 3 and 8 are patentable under 35 U.S.C. §103(a) over Seely in view of Hsu.

**C. Claims 5 and 10**

The Examiner rejected claims 5 and 10 under 35 U.S.C. §103(a) as being unpatentable over Seely in view of Mulligan. 06/25/10 Office Action, p. 9.

For the reasons set forth regarding claims 1 and 6, and the dependency therefrom, claims 5 and 10 are also patentable under 35 U.S.C. §103(a) over Seely.

Mulligan does not cure the above-noted deficiencies of Seely. Similar to Hsu's four-layer design, Mulligan's touch-sensitive screen separates the first sensor layer 240 from the second sensor layer 260 by an intermediate dielectric layer 250. Mulligan, Figure 2; par. [0024]. In a different embodiment, Mulligan also discloses separate sensor layers 501 and 502. Mulligan, Figure 5, par. [0038].

From the foregoing, Seely and Mulligan cannot be combined to teach or suggest the features of claims 5 and 10. Therefore, Applicant respectfully submits that claims 5 and 10 are patentable under 35 U.S.C. §103(a) over Seely in view of Mulligan.

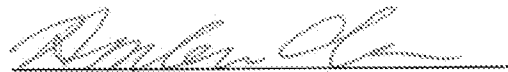
#### CONCLUSION

Applicant respectfully submits that it has made a patentable contribution to the art. Reconsideration of this application in view of the foregoing remarks and withdrawal of the Examiner's rejections are respectfully requested.

The Examiner is invited to call Applicant's undersigned representative if doing so would expedite prosecution.

Date: September 20, 2010

Respectfully submitted,



Hanbum Cho  
Registration No: 58,993  
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Customer Number: 34313

22271-4002/260951304.7

# Appendix A

**SECOND EDITION**  

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**COMPREHENSIVE**  

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**DICTIONARY**  

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**OF**  
**ELECTRICAL**  
**ENGINEERING**

EDITOR-IN-CHIEF  
Phillip A. Laplante



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## principal point

**principal point** the point at which the optical axis of the lens in a camera meets the image plane; also, the corresponding point in the image.

**principle of locality** See locality. See also sequential locality.

**principle of superposition** in a linear electrical network, the voltage or current in any element resulting from several sources acting together is the sum of the voltages or currents from each source acting alone.

**printed circuit board (PCB)** a substrate made from insulating material that has one or more sandwiched metallic conductor layers applied that are etched to form interconnecting traces useful for interconnecting components.

**printer** an output device for printing results on paper.

**prior statistics** the statistics of a random quantity (scalar, vector, process etc.) before any experimental or measured knowledge of the quantity is incorporated. See posterior statistics.

**prioritization coding** a coding scheme whereby the position of the symbol in the data stream indicates its weight.

**priority encoder** an encoder with the additional property that if several inputs are asserted simultaneously, the output number indicates the numerically highest input that is asserted.

**prism | air | metal (PAM) system** the two-interface model of an ATR (attenuated total reflection) system comprised of prism | air | metal. Commonly known as PAM system.

**prismatic joint** a joint characterized by a translation that is the relative displacement between

two successive links. This translation is sometimes called the joint offset.

**private key cryptography** also known as secret key cryptography. In such a cryptographic system, the secret encryption key is only known to the transmitter and the receiver for whom the message is intended. The secret key is used both for the encryption of the plaintext and for the decryption of the ciphertext. See also public key cryptography.

**privileged instruction** an instruction that can be executed only when the CPU is in privileged mode.

**privileged mode** a mode of execution of machine instructions in the CPU in which certain special instructions can be executed or data accessed that would otherwise be prohibited. See also user mode.

**PRMA** See packet reservation multiple access.

**probabilistic metric space** a generalization of the notion of metric spaces onto the uncertain systems by replacing a metric on a given set  $S$  by a distance distribution function  $F$ , and a triangle inequality by a generalized inequality defined by triangle function  $\tau$ . A distance distribution functions between two elements  $p, q \in S$  is defined as a real function  $F_{pq}$  whose value  $F_{pq}(x)$  for any real number  $x$  is interpreted as the probability, the membership function, or the grade of membership (depending on the type of the uncertainty model) that the distance between  $p$  and  $q$  is less than  $x$ . The simplest distance distribution function is given by the unit step (Heaviside) function  $\mathbf{1}$  as follows:

$$F_{pq}(x) = \mathbf{1}(x - d(p, q))$$

where  $d$  is a standard metric. Then a probabilistic metric space reduces to the standard metric space. More precisely, a probabilistic metric space (PMS) is defined as a triple  $(S, F, \tau)$  endowed

with the following  $\mu$

$$F_{pq}(x) = \mathbf{1} \\ F_{pq} \geq$$

for all  $p, q, r \in S$ . function and the trim model of uncertainty of the standard oper

**probabilistic neural network** loosely to networks probabilistic behavior to a type of network classification based upon estimation of probab

**probability density function** describing the comes of an experi discrete outcomes, (ative frequency hist continuous outcome relative frequency h bin widths are reduc beneath a PDF mus

(2) the derivative function (when the mally, for a random  $A$ , the probability de

$$\Pr(x \in A)$$

See also cumulative

**procedure** a self-signed to be re-exec main program or anc instruction, return in

**procedure call** in cution of a machine-execution of the prog following the locat

# Appendix B



# MATERIAL SAFETY DATA SHEET

Electra Polymers & Chemicals Ltd  
Roughway Mill, Dunks Green,  
Tonbridge, Kent.  
Tel +44 01732 811 118 : Fax +44 01732 811 119

## SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: ELECTRA<sup>®</sup> D'OR 5500 CARBON CONDUCTOR PASTE  
CHEMICAL FAMILY: PIGMENTED SOLUTION OF RESIN IN ORGANIC SOLVENT  
FORMULA: N/A  
NFPA RATING: HEALTH = 2 FLAMMABILITY = 1 REACTIVITY = 1 OTHER = NONE

## SECTION 2 HAZARDOUS INGREDIENTS

Electra Polymers & Chemicals have identified the following chemical(s) as hazardous:

INGREDIENT	WT%	TLV
Phenolic resin	<40%	NE
Carbitol	<30%	NE
Graphite	<20%	10mg/m <sup>3</sup>
Carbon black	<7%	3.5mg/m <sup>3</sup>
Methanol	<8%	200ppm

## SECTION 3 PHYSICAL DATA

SPECIFIC GRAVITY: >1	FORM: paste
FREEZING POINT: n/a	pH: N/A
SOLUBILITY IN WATER: Partial	FLASH POINT: >160 deg F (PMCC)
COLOR: Black	VAPOR PRESSURE: <5 mm Hg @ 68 deg F

NOTE:

## SECTION 4 FIRE & EXPLOSION DATA

FLASH POINT: >160 deg F

EXTINGUISHING MEDIA: Use dry chemical, foam or CO<sub>2</sub> extinguishers. Wear self contained breathing apparatus and proper protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Thermal degradation products may be formed which are toxic. Closed containers may rupture violently.

# MATERIAL SAFETY DATA SHEET

Electra Polymers & Chemicals Ltd  
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Tel +44 01732 811 118 : Fax +44 01732 811 119

## SECTION 5 FIRST AID DATA

- EYES:** Irrigate thoroughly with large quantities of water. Seek immediate medical attention.
- SKIN:** Remove all contaminated clothing. Wash immediately with soap and water. Where irritation develops, seek medical advice. Contaminated clothing should be dry cleaned before reuse.
- INGESTION:** Obtain medical advice immediately. It is not recommended that vomiting be induced except on medical advice.
- INHALATION:** Remove from exposure. Keep warm and at rest. Where respiratory distress occurs, give oxygen and obtain medical attention immediately.

## SECTION 6 HEALTH EFFECTS DATA

- EYES:** May cause irritation if product gets into eyes
- SKIN:** May cause irritation and defatting of the skin leading to possible dermatitis. May cause skin sensitization and/or allergic skin reactions. Solvents may be absorbed through unbroken skin.
- INGESTION:** May cause irritation to mouth nose and digestive tract. Methanol can cause blindness and, in extreme cases, death.
- INHALATION:** Heating can generate vapors that may cause irritation of nose, throat and air passages, nausea and headaches. Inhalation risk at room temperature is low owing to the low volatility of the solvents in this product.

## SECTION 7 PERSONAL PROTECTIVE DATA

- RESPIRATORY PROTECTION:** Wear a correctly fitted, NIOSH approved, respirator or industrial type canister mask in enclosed areas with poor or no ventilation, or where TLV levels are likely to be exceeded.
- VENTILATION:** Good general ventilation is recommended. Local exhaust ventilation is recommended where vapours are likely to be released.
- PROTECTIVE EQUIPMENT:** Wear goggles, gloves, and suitable protective clothing if splashing is likely.

# MATERIAL SAFETY DATA SHEET

Electra Polymers & Chemicals Ltd  
Roughway Mill, Dunks Green,  
Tonbridge. Kent.  
Tel +44 01732 811 118 : Fax +44 01732 811 119

## SECTION 8 TOXICOLOGY DATA

**TOXICITY STUDIES:** Toxicity studies have not been carried out on this material. Toxicity information available for the products listed in section 2 is given below.

**ACUTE ORAL TOXICITY:** N/A  
**ACUTE DERMAL TOXICITY:** N/A  
**ACUTE RESPIRATORY TOXICITY:** N/A  
**TOXICITY HAZARD REVIEW (THR):** N/A

## SECTION 9 REACTIVITY DATA

**INCOMPATIBILITY:** Avoid peroxides and strong oxidizing agents, acids and bases.  
**HAZARD DECOMPOSITION PRODUCTS:** Thermal degradation products may be formed which are acidic, acrid or toxic.  
**STABILITY:** Stable  
**CONDITIONS TO AVOID:** Storage in open containers, heat and naked flames.  
**HAZARDOUS POLYMERIZATION:** Negligible

## SECTION 10 SPILL AND DISPOSAL DATA

**SPILL CONTROL AND RECOVERY:** Extinguish all sources of ignition. Try to prevent spills entering drains or water courses. Absorb spills in earth, sand or other absorbent material and wash area with soapy water.  
**DISPOSAL:** Dispose of in accordance with Federal, State and local regulations.

## SECTION 11 GENERAL STORAGE DATA

Material should be stored in the original containers in a cool, dry place. Avoid subjecting containers to temperatures below 5 deg C because of the risk of splitting.

Rev No: 4

Dated: 06/2006

Replaces Issue Dated: 03/2003

Page 3/4

# MATERIAL SAFETY DATA SHEET

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Tonbridge, Kent.  
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## SECTION 12 TRANSPORTATION DATA

DOT PROPER SHIPPING NAME: Non regulated  
HAZARD CLASS: n/a  
UN/NA #: n/a  
IMO/IATA: n/a  
HAZARD CLASS: n/a

## SECTION 13 REGULATORY DATA

**TOXIC SUBSTANCES CONTROL ACT (TSCA):** The chemical ingredients in this product are listed on the TSCA inventory.

**MASSACHUSETTS TOXIC SUBSTANCES LIST:** This product does not contain ingredients listed on the Massachusetts Toxic Substances List, besides the substances listed on the HAZARDOUS INGREDIENTS Section.

**CALIFORNIA PROPOSITION 65** This contains chemicals listed as being known to the State of California to cause cancer or birth defects or other reproductive harm, under the California Safe Drinking Water & Toxic Enforcement Act of 1986 (Proposition 65).

**Title III of SARA** This product contains ingredients listed under Title III of SARA (the Superfund Amendments and Reauthorization Act of 1986).

## SECTION 14 USER NOTIFICATION

To the best of our knowledge the information contained herein is correct. All chemicals present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist. Final determination of suitability of the chemical is the sole responsibility of the user. Users of any chemical should satisfy themselves that the conditions and methods of use assure that the chemical is used safely. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER NATURE ARE MADE HERE UNDER WITH RESPECT TO THE INFORMATION CONTAINED HEREIN OR THE CHEMICAL TO WHICH THE INFORMATION REFERS.

Rev No: 4

Dated: 06/2006

Replaces Issue Dated: 03/2003

Page 4/4

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	11842747
<b>Filing Date:</b>	21-Aug-2007
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Filer:</b>	Sanjeet Kumar Dutta/Susan Principe
<b>Attorney Docket Number:</b>	22271.4002

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Claims in excess of 20	2202	25	26	650
Independent claims in excess of 3	2201	1	110	110

### Miscellaneous-Filing:

**Petition:**

**Patent-Appeals-and-Interference:**

**Post-Allowance-and-Post-Issuance:**

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>760</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	8456972
<b>Application Number:</b>	11842747
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3897
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Customer Number:</b>	34313
<b>Filer:</b>	Sanjeet Kumar Dutta/Susan Principe
<b>Filer Authorized By:</b>	Sanjeet Kumar Dutta
<b>Attorney Docket Number:</b>	22271.4002
<b>Receipt Date:</b>	20-SEP-2010
<b>Filing Date:</b>	21-AUG-2007
<b>Time Stamp:</b>	18:06:11
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$760
RAM confirmation Number	5016
Deposit Account	150665
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

<b>File Listing:</b>					
<b>Document Number</b>	<b>Document Description</b>	<b>File Name</b>	<b>File Size(Bytes)/ Message Digest</b>	<b>Multi Part /.zip</b>	<b>Pages (if appl.)</b>
1		4002_Amend_9_20_2010.pdf	4953052 5b7a80b5c739b4490485eb6c7a3fe24e8eef1031	yes	30
<b>Multipart Description/PDF files in .zip description</b>					
<b>Document Description</b>			<b>Start</b>	<b>End</b>	
Miscellaneous Incoming Letter			1	2	
Amendment/Req. Reconsideration-After Non-Final Reject			3	30	
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (PTO-875)	fee-info.pdf	31751 dd6b9152819c40eccc6615169f720d3f8305b5a3c	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			4984803		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p>					



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 11/842,747 Confirmation No.: 3897  
Applicants : Ching-Yang Chang, *et al.*  
Filing Date : August 21, 2007  
Title : Conductor Pattern Structure Of Capacitive Touch Panel  
Group Art Unit : 2629  
Examiner : Hicks, Charles V.  
Docket No. : 22271-4002  
Customer No. : 34313

Commissioner For Patents  
Mail Stop Missing Parts  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir/Madam:

In response to the Office Action dated June 25, 2010, transmitted herewith is an Amendment and Response for the above-identified application.

**ADDITIONAL PAPERS ENCLOSED:**

Information Disclosure Statement

The fees for claims (37 CFR § 1.16(b)-(d)) have been calculated as shown below

**FEES FOR CLAIMS:**

- Applicant claims small entity status pursuant to 37 CFR 1.27.  
 Charge Orrick, Herrington & Sutcliffe LLP's Deposit Account No. **15-0665** in the amount of **\$760.00** to cover any fees as shown below:

1 Additional Independent Claim @ \$110 per claim	110.00
25 Additional Dependent Claims @ \$26 per claim	<u>650.00</u>
Total	\$760.00

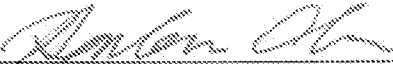
Applicant : Ching-Yang Chang  
Appl. No. : 11/842,747  
Examiner : Hicks, Charles V.  
Docket No. : 22271-4002

The Commissioner is authorized to charge Orrick, Herrington & Sutcliffe LLP's Deposit Account No. **15-0665** for any fees required under 37 CFR §§ 1.16 and 1.17 that are not covered, in whole or in part, by a check enclosed herewith and to credit any overpayments to said Deposit Account **15-0665**.

Respectfully submitted,

Orrick, Herrington & Sutcliffe LLP

Dated: September 20, 2010

By:   
Hanbum Cho  
Reg. No. 58,993

Four Park Plaza, Suite 1600  
Irvine, CA 92614-2558  
(650) 614-7647  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 11/842,747 Confirmation No.: 3897  
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Total	\$760.00

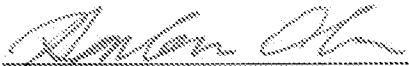
Applicant : Ching-Yang Chang  
Appl. No. : 11/842,747  
Examiner : Hicks, Charles V.  
Docket No. : 22271-4002

The Commissioner is authorized to charge Orrick, Herrington & Sutcliffe LLP's Deposit Account No. **15-0665** for any fees required under 37 CFR §§ 1.16 and 1.17 that are not covered, in whole or in part, by a check enclosed herewith and to credit any overpayments to said Deposit Account **15-0665**.

Respectfully submitted,

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(650) 614-7647  
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## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A conductor pattern structure of a capacitive touch panel, ~~which is adapted to be formed~~ on a surface of a substrate, the ~~touch control~~ conductor pattern structure comprising:
  - a plurality of first-axis conductor assemblies, each first-axis conductor assembly comprising a plurality of first-axis conductor cells arranged on the ~~substrate surface~~ of the substrate along a first axis in a substantially equally-spaced manner, a disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells;
  - a plurality of first-axis conduction lines respectively connecting between adjacent ones of the first-axis conductor cells of each first-axis conductor assembly so that the first-axis conductor cells of each respective first-axis conductor assembly are electrically connected together;
  - a plurality of insulation layers each covering a surface of each first-axis conduction line;
  - a plurality of second-axis conductor assemblies, each second-axis conductor assembly comprising a plurality of second-axis conductor cells arranged on the ~~substrate surface~~ of the substrate along a second axis in a substantially equally-spaced manner, each second-axis conductor cell being set in each disposition zone; ~~and~~
  - a plurality of second-axis conduction lines respectively connecting between adjacent ones of the second-axis conductor cells of each second-axis conductor assembly so that

the second-axis conductor cells of each respective second-axis conductor assembly are electrically connected together, the second-axis conduction line being extended across a surface of the insulation layer of the respective first-axis conduction line,

wherein first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.

2. (Currently amended) The conductor pattern structure as claimed in claim 1, wherein the ~~first-axis conductor cells and the second-axis conductor cells~~ conduction lines consist of a transparent conductive material.
3. (Currently amended) The conductor pattern structure as claimed in claim 1, wherein ~~the first-axis conduction lines and~~ the second-axis conduction lines consist of a transparent conductive material.
4. (Original) The conductor pattern structure as claimed in claim 1, wherein the insulation layer consists of a transparent insulation material.
5. (Original) The conductor pattern structure as claimed in claim 1, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
6. (Currently amended) A conductor pattern structure of a capacitive touch panel ~~adapted to~~ formed on a surface of a substrate, the ~~touch-control~~ conductor pattern structure comprising:  
at least two adjacent first-axis conductor cells; and  
at least two adjacent second-axis conductor cells,  
wherein the adjacent first-axis conductor cells are connected by a first-axis conduction line provided therebetween, ~~characterized in that~~

wherein an insulation layer is formed on a surface of the first-axis conduction line and a second-axis conduction line extends across a surface of the insulation layer to connect between the adjacent second-axis conductor cells, and wherein first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.

7. (Currently amended) The conductor pattern structure as claimed in claim 6, wherein the ~~first-axis conductor cells and the second-axis conductor cells~~ conduction lines consist of a transparent conductive material.
8. (Currently amended) The conductor pattern structure as claimed in claim 6, wherein ~~the first-axis conduction line and~~ the second-axis conduction lines consist of a transparent conductive material.
9. (Original) The conductor pattern structure as claimed in claim 6, wherein the insulation layer consists of a transparent insulation material.
10. (Original) The conductor pattern structure as claimed in claim 6, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
11. (New) The conductor pattern structure as claimed in claim 1 further comprises a plurality of signal transmission lines formed on the surface of the substrate, each signal transmission line respectively connecting each first-axis conductor assembly and each second-axis conductor assembly.
12. (New) The conductor pattern structure as claimed in claim 11, wherein the first-axis conduction lines consist of a transparent conductive material.
13. (New) The conductor pattern structure as claimed in claim 11, wherein the second-axis conduction lines consist of a transparent conductive material.

14. (New) The conductor pattern structure as claimed in claim 11, wherein the insulation layer consists of a transparent insulation material.
15. (New) The conductor pattern structure as claimed in claim 11, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
16. (New) The conductor pattern structure as claimed in claim 11, wherein the transparent conductive material is Indium Tin Oxide (ITO).
17. (New) The conductor pattern structure as claimed in claim 11, wherein a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells is measured to detect a position of touch.
18. (New) The conductor pattern structure as claimed in claim 17, wherein the first-axis conduction lines consist of a transparent conductive material.
19. (New) The conductor pattern structure as claimed in claim 17, wherein the second-axis conduction lines consist of a transparent conductive material.
20. (New) The conductor pattern structure as claimed in claim 17, wherein the insulation layer consists of a transparent insulation material.
21. (New) The conductor pattern structure as claimed in claim 17, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
22. (New) The conductor pattern structure as claimed in claim 17, wherein each second-axis conduction line terminates on the edge of each second-axis conductor cell to the adjacent second-axis conductor cells.
23. (New) The conductor pattern structure as claimed in claim 17, wherein the transparent conductive material is Indium Tin Oxide (ITO).



24. (New) The conductor pattern structure as claimed in claim 1, wherein each second-axis conduction line terminates on the edge of each second-axis conductor cell to the adjacent second-axis conductor cells.
25. (New) The conductor pattern structure as claimed in claim 1, wherein a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells is measured to detect a position of touch.
26. (New) The conductor pattern structure as claimed in claim 25, wherein the first-axis conduction lines consist of a transparent conductive material.
27. (New) The conductor pattern structure as claimed in claim 25, wherein the second-axis conduction lines consist of a transparent conductive material.
28. (New) The conductor pattern structure as claimed in claim 25, wherein the insulation layer consists of a transparent insulation material.
29. (New) The conductor pattern structure as claimed in claim 25, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
30. (New) The conductor pattern structure as claimed in claim 25, wherein the transparent conductive material is Indium Tin Oxide (ITO).
31. (New) The conductor pattern structure as claimed in claim 1, wherein the transparent conductive material is Indium Tin Oxide (ITO).
32. (New) A method of constructing a conductor pattern structure of a capacitive touch panel, the method comprising:  
  
forming a plurality of first-axis conductor cells on a surface of a substrate arranged along  
  
a first axis in a substantially equally-spaced manner,

forming a plurality of second-axis conductor cells on the surface of the substrate arranged along a second axis in a substantially equally-spaced manner;  
electrically connecting adjacent ones of the first-axis conductor cells along the first-axis using a plurality of first-axis conduction lines to form a plurality of first-axis conductor assemblies, wherein each second-axis conductor cell is set in each disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells;  
forming a plurality of insulation layers covering a surface of each first-axis conduction line; and  
electrically connecting adjacent ones of the second-axis conductor cells along the second-axis using a plurality of second-axis conduction lines to form a plurality of second-axis conductor assemblies, each of the first-axis conductor cells and the second-axis conductor cells consisting of a transparent conductive material.

33. (New) The method of claim 32, wherein the first-axis conductor cells, the second-axis conductor cells and the first-axis conduction lines are formed simultaneously.
34. (New) The method of claim 32 further comprising forming a plurality of signal transmission lines on the surface of the substrate, each signal transmission line respectively connecting each first-axis conductor assembly and each second-axis conductor assembly.
35. (New) The method of claim 32 further comprising measuring a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells to detect a position of touch.

36. (New) The method of claim 32, wherein the first-axis conduction lines consist of a transparent conductive material.
37. (New) The method of claim 32, wherein the second-axis conduction lines consist of a transparent conductive material.
38. (New) The method of claim 32, wherein the insulation layer consists of a transparent insulation material.
39. (New) The method of claim 32, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
40. (New) The method of claim 32, wherein each second-axis conduction line terminates on the edge of each second-axis conductor cell to the adjacent second-axis conductor cells.
41. (New) The method of claim 32, wherein the transparent conductive material is Indium Tin Oxide (ITO).
42. (New) A method of constructing a conductor pattern structure of a capacitive touch panel, the method comprising:
  - forming a plurality of first-axis conductor cells on a surface of a substrate arranged along a first axis in a substantially equally-spaced manner, wherein each first-axis conductor cell is separated by each disposition zone between adjacent ones of the first-axis conductor cells;
  - electrically connecting adjacent ones of the first-axis conductor cells along the first-axis using a plurality of first-axis conduction lines to form a plurality of first-axis conductor assemblies;
  - forming a plurality of insulation layers covering a surface of each first-axis conduction line;

forming a plurality of second-axis conductor cells in each disposition zone between adjacent ones of the first-axis conductor cells on the surface of the substrate arranged along a second axis in a substantially equally-spaced manner; and electrically connecting adjacent ones of the second-axis conductor cells along the second-axis using a plurality of second-axis conduction lines to form a plurality of second-axis conductor assemblies, each of the first-axis conductor cells and the second-axis conductor cells consisting of a transparent conductive material.

43. (New) The method of claim 42 further comprising forming a plurality of signal transmission lines on the surface of the substrate, each signal transmission line respectively connecting each first-axis conductor assembly and each second-axis conductor assembly.
44. (New) The method of claim 42 further comprising measuring a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells to detect a position of touch.
45. (New) The method of claim 42, wherein the transparent conductive material is Indium Tin Oxide (ITO).

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11/842,747</b>	Filing Date <b>08/21/2007</b>	<input type="checkbox"/> To be Mailed
-----------------------------------------------------------------------------------	---------------------------------------------------	----------------------------------	---------------------------------------

APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	SMALL ENTITY <input checked="" type="checkbox"/>		OR	SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		OR	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =			X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	SMALL ENTITY	
AMENDMENT	09/20/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 45	Minus ** 20	= 25	X \$26 =	650	OR	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	* 4	Minus *** 3	= 1	X \$110 =	110	OR	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>						OR	
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR	
					TOTAL ADD'L FEE	<b>760</b>	OR	TOTAL ADD'L FEE

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	X \$ =		OR	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =		OR	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>						OR	
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:  
/DORIS ISAAC/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 11/842,747 Confirmation No.: 3897  
Applicants : Ching-Yang Chang, *et al.*  
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Title : Conductor Pattern Structure Of Capacitive Touch Panel  
Group Art Unit : 2629  
Examiner : Hicks, Charles V.  
Docket No. : 22271-4002  
Customer No. : 34313

Via: USPTO EFS Web  
Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL LETTER

Dear Sir:

On September 20, 2010, Applicant electronically filed an Amendment for the above-identified application containing additional claims. Applicant was a large entity at the time of filing the Amendment, however, claim fees were paid at the small entity rate. Applicant respectfully requests that the United States Patent and Trademark Office corrects Applicant's filing status and charges large entity claim fees as follows:

Large Entity Fees Due the US PTO for Amendment filed Sept. 20, 2010:

<u>1</u> Independent Claim for Large Entity @ \$220 per claim	<u>\$220.00</u>
<u>25</u> Dependent Claims for Large Entity @ \$52 per claim	<u>\$1,300.00</u>
<b>Total Due for Large Entity</b>	<b>\$1,520.00</b>
Less: Fees Paid Sept. 20, 2010 -- Small Entity	<u>(\$760.00)</u>

**Add'l Fees Due to US PTO for Amendment - Large Entity** \$760.00

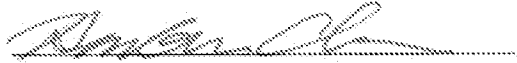
Applicant respectfully requests that the United States Patent and Trademark Office charge \$760.00 to said Deposit Account **15-0665** for additional fees due to change in entity status from small to large.

The Commissioner is authorized to charge Orrick, Herrington & Sutcliffe LLP's Deposit Account No. **15-0665** for any fees required under 37 CFR §§ 1.16 and 1.17 that are not covered, in whole or in part, by a check enclosed herewith and to credit any overpayments to said Deposit Account **15-0665**.

Respectfully submitted,

Orrick, Herrington & Sutcliffe LLP

Dated: September 28, 2010

By:   
Hanbum Cho  
Reg. No. 58,993

**MAILING ADDRESS:**  
Orrick, Herrington & Sutcliffe LLP  
IP Prosecution Department  
4 Park Plaza, Suite 1600  
Irvine, CA 92614-2558  
Customer Number: 34313

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	8517722
<b>Application Number:</b>	11842747
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3897
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Customer Number:</b>	34313
<b>Filer:</b>	Sanjeet Kumar Dutta/Susan Principe
<b>Filer Authorized By:</b>	Sanjeet Kumar Dutta
<b>Attorney Docket Number:</b>	22271.4002
<b>Receipt Date:</b>	28-SEP-2010
<b>Filing Date:</b>	21-AUG-2007
<b>Time Stamp:</b>	17:15:17
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	4002SmtolgEntityFees_9_28_2010.pdf	259314 <small>59951883d6f8867a6e22877bcd2046cc40ec64a7</small>	no	2

### Warnings:

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/842,747	08/21/2007	Ching-Yang Chang	22271.4002	3897
34313	7590	10/08/2010	EXAMINER	
ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558			HICKS, CHARLES V	
			ART UNIT	PAPER NUMBER
			2629	
			MAIL DATE	DELIVERY MODE
			10/08/2010	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 11/842,747 Confirmation No.: 3897  
Applicants : Ching-Yang Chang, *et al.*  
Filing Date : August 21, 2007  
Title : Conductor Pattern Structure Of Capacitive Touch Panel  
Group Art Unit : 2629  
Examiner : Hicks, Charles V.  
Docket No. : 22271-4002  
Customer No. : 34313

Via: USPTO EFS Web  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

SUPPLEMENTAL AMENDMENT

Dear Sir:

This paper is responsive to the Interview with the Examiner on October 6, 2010. Please amend the above-identified application as follows:

**Amendments to the Claims** are reflected in the listing of claims that begin on page 2 of this paper.

**Remarks/Arguments** begin on page 10 of this paper.

### REMARKS

Claims 1-45 are pending.

Claims 1 and 6 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,188,391 to Seely, *et al.* ("Seely").

Claims 2-4 and 7-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Seely in view of U.S. Patent No. 7,030,860 to Hsu, *et al.* ("Hsu").

Claims 5 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Seely in view of U.S. Patent Appl. No. 2004/0119701 by Mulligan, *et al.* ("Mulligan").

Claims 11-45 had been added in the response filed on September 20, 2010.

Claims 1, 6, 32, and 42 have been amended.

Applicant respectfully requests entry of this amendment and reconsideration of the application in view of the foregoing amendments and the following.

### INTERVIEW SUMMARY

Applicant's representatives, Robert M. Isackson (Reg. No. 31,110) and Hanbum Cho (Reg. No. 58,993), and Applicant, Dr. Alp Bayramoglu (CTO of Assignee, Reg. No., 66,305) sincerely appreciate Examiners Alexander S. Beck and Charles V. Hicks for their time on October 6, 2010 for a personal interview to discuss the patentability of the pending claims over Seely, Hsu, and Mulligan. During the interview, Applicant and Applicant's representatives (hereinafter "Applicant"), and the Examiners discussed the fundamental differences between the instant application and the cited references, Seely, Hsu, and Mulligan. In particular, Applicant discussed the lack of disclosure or teachings in Seely and Hsu for the claim limitation, "a plurality of insulation layers" recited in rejected claims 1 and 6. In the following section of

this paper, Applicant submits supplemental response to clarify the claimed subject matter and to expedite prosecution of the instant application.

### CLAIM REJECTIONS

During the interview, Applicant argued that Seely's insulation layer 94 is a single-sheet solder mask. Seely, Fig. 7; col. 6, 43-49. Therefore, Seely does not teach or suggest "a **plurality of insulation layers,**" as recited in claim 1. Neither Hsu nor Mulligan teaches or suggests this feature of claim 1 because they are directed to four layer touch-pad design that has a single insulation sheet that separates the first-axis conductors and second-axis conductors. See Applicant's previous response dated 09/20/2010, pp. 11-19.

To further clarify this claimed feature over the cited references, claim 1 has been amended to recite "**each insulation layer** of the plurality of insulation layers covering a surface of each first-axis conduction line **without encompassing the adjacent first-axis conductor cells.**" Emphasis added. The breaks 96 in Seely's solder mask exposes only the second-axis conductor cells (*i.e.*, floating diamonds 68), therefore the adjacent first-axis conductor cells are encompassed by the single-sheet solder mask. Seely, Fig. 7; col. 6, 50-54.

The Seely reference therefore does not teach or suggest Applicants' claimed subject matter that recites "**each insulation layer** of the plurality of insulation layers covering a surface of each first-axis conduction line **without encompassing the adjacent first-axis conductor cells.**" Claim 1.

Claim 6 has been similarly amended to recite "**an insulation layer** is formed on a surface of the first-axis conduction line **without encompassing the two adjacent first-axis conductor cells.**" As discussed above, Seely neither teaches nor suggests this feature of claim 6

because Seely's insulation layer is a single-sheet solder mask that encompasses the non-floating diamonds (*i.e.*, adjacent first-axis conductor cells). See Seely, Fig. 7.

Similarly, claims 32 and 42 have been amended to recite "**forming a plurality of insulation layers covering a surface of each first-axis conduction line without encompassing the adjacent first-axis conductor cells.**"

In addition, Applicant respectfully submits that claims 1-5 and 11-45 are allowable over the Seely, Hsu, and Mulligan references, taken alone or in any combination, because none of them teaches or suggests "**a plurality of second-axis conductor lines**" that are used to connect "**adjacent ones of the second-axis conductor cells of each second-axis conductor assembly.**" as called for in independent claim 1, and as similarly called for in independent claims 32 and 42. Rather, Seely teaches a single-sheet solder mask that has breaks in it so that a continuous conductive ink can be painted straight across the entire row (or column) of the floating diamonds. Seely, Fig. 7; col. 6, 50-54. Thus, Seely teaches to use a single conduction line for connecting each row of the floating diamonds, but not "**a plurality of second-axis conduction lines**" that respectively connect between adjacent ones of the second-axis conductor cells of each second-axis conductor assembly, as recited in claim 1 and similarly in claims 32, and 42. Neither Hsu nor Mulligan cures this deficiency in the primary reference Seely. Accordingly, Applicant respectfully submits that claims 1-5 and 11-45 are allowable under 35 U.S.C. §103(a) for this independent reason.

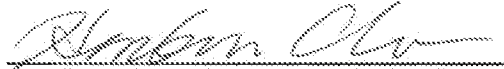
For these reasons, in addition to the verbal arguments discussed during the interview and the arguments set forth in the response filed September 20, 2010, Applicant respectfully submits that the Examiner's rejections of claims 1-10 over Seely, Hsu, and Mulligan have been overcome, and all the claims 1-45 now pending are in condition for allowance.



The Examiner is invited to call Applicant's undersigned representative if doing so would expedite prosecution.

Date: October 12, 2010

Respectfully submitted,



Hanbum Cho

Registration No: 58,993

Phone No.: (650) 614-7346

Fax No.: (650) 614-7401

**MAILING ADDRESS:**

Orrick, Herrington & Sutcliffe LLP  
IP Prosecution Department  
4 Park Plaza, Suite 1600  
Irvine, CA 92614-2558  
Customer Number: 34313

22271-4002/261004821.2

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	8613092
<b>Application Number:</b>	11842747
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3897
<b>Title of Invention:</b>	CONDUCTOR PATTERN STRUCTURE OF CAPACITIVE TOUCH PANEL
<b>First Named Inventor/Applicant Name:</b>	Ching-Yang Chang
<b>Customer Number:</b>	34313
<b>Filer:</b>	Hanbum Cho
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	22271.4002
<b>Receipt Date:</b>	12-OCT-2010
<b>Filing Date:</b>	21-AUG-2007
<b>Time Stamp:</b>	22:01:23
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Supplemental Response or Supplemental Amendment	4002_Supplemental_Amend_10_12_2010.pdf	2738413 <small>5636d6e436e623e1d9812b772fe4b398a99a5841</small>	no	13

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11/842,747</b>	Filing Date <b>08/21/2007</b>	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	SMALL ENTITY <input type="checkbox"/>		OR	SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		OR	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =			X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	(Column 3)		SMALL ENTITY		OR	SMALL ENTITY	
AMENDMENT	10/12/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 45	Minus	** 45 = 0	X \$ =		OR	X \$52=	0
	Independent <small>(37 CFR 1.16(h))</small>	* 4	Minus	***4 = 0	X \$ =		OR	X \$220=	0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	(Column 3)		SMALL ENTITY		OR	SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	** =	X \$ =		OR	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	*** =	X \$ =		OR	X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

Legal Instrument Examiner:  
 /TONYA MCBRIDE/

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A conductor pattern structure of a capacitive touch panel formed on a surface of a substrate, the conductor pattern structure comprising:  
a plurality of first-axis conductor assemblies, each first-axis conductor assembly comprising a plurality of first-axis conductor cells arranged on the surface of the substrate along a first axis in a substantially equally-spaced manner, a disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells;  
a plurality of first-axis conduction lines respectively connecting between adjacent ones of the first-axis conductor cells of each first-axis conductor assembly so that the first-axis conductor cells of each respective first-axis conductor assembly are electrically connected together;  
a plurality of insulation layers, each insulation layer of the plurality of insulation layers covering a surface of each first-axis conduction line without encompassing the adjacent first-axis conductor cells;  
a plurality of second-axis conductor assemblies, each second-axis conductor assembly comprising a plurality of second-axis conductor cells arranged on the surface of the substrate along a second axis in a substantially equally-spaced manner, each second-axis conductor cell being set in each disposition zone;

a plurality of second-axis conduction lines respectively connecting between adjacent ones of the second-axis conductor cells of each second-axis conductor assembly so that the second-axis conductor cells of each respective second-axis conductor assembly are electrically connected together, the second-axis conduction line being extended across a surface of the insulation layer of the respective first-axis conduction line,

wherein first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.

2. (Previously presented) The conductor pattern structure as claimed in claim 1, wherein the first-axis conduction lines consist of a transparent conductive material.
3. (Previously presented) The conductor pattern structure as claimed in claim 1, wherein the second-axis conduction lines consist of a transparent conductive material.
4. (Original) The conductor pattern structure as claimed in claim 1, wherein the insulation layer consists of a transparent insulation material.
5. (Original) The conductor pattern structure as claimed in claim 1, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
6. (Currently amended) A conductor pattern structure of a capacitive touch panel formed on a surface of a substrate, the conductor pattern structure comprising:  
at least two adjacent first-axis conductor cells; and  
at least two adjacent second-axis conductor cells,  
wherein the adjacent first-axis conductor cells are connected by a first-axis conduction line provided therebetween,

- wherein an insulation layer is formed on a surface of the first-axis conduction line  
without encompassing the two adjacent first-axis conductor cells, and a second-axis conduction line extends across a surface of the insulation layer to connect between the adjacent second-axis conductor cells, and
- wherein first-axis conductor cells and the second-axis conductor cells consist of a transparent conductive material.
7. (Previously presented) The conductor pattern structure as claimed in claim 6, wherein the first-axis conduction lines consist of a transparent conductive material.
  8. (Previously presented) The conductor pattern structure as claimed in claim 6, wherein the second-axis conduction lines consist of a transparent conductive material.
  9. (Original) The conductor pattern structure as claimed in claim 6, wherein the insulation layer consists of a transparent insulation material.
  10. (Original) The conductor pattern structure as claimed in claim 6, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
  11. (Previously presented) The conductor pattern structure as claimed in claim 1 further comprises a plurality of signal transmission lines formed on the surface of the substrate, each signal transmission line respectively connecting each first-axis conductor assembly and each second-axis conductor assembly.
  12. (Previously presented) The conductor pattern structure as claimed in claim 11, wherein the first-axis conduction lines consist of a transparent conductive material.
  13. (Previously presented) The conductor pattern structure as claimed in claim 11, wherein the second-axis conduction lines consist of a transparent conductive material.

14. (Previously presented) The conductor pattern structure as claimed in claim 11, wherein the insulation layer consists of a transparent insulation material.
15. (Previously presented) The conductor pattern structure as claimed in claim 11, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
16. (Previously presented) The conductor pattern structure as claimed in claim 11, wherein the transparent conductive material is Indium Tin Oxide (ITO).
17. (Previously presented) The conductor pattern structure as claimed in claim 11, wherein a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells is measured to detect a position of touch.
18. (Previously presented) The conductor pattern structure as claimed in claim 17, wherein the first-axis conduction lines consist of a transparent conductive material.
19. (Previously presented) The conductor pattern structure as claimed in claim 17, wherein the second-axis conduction lines consist of a transparent conductive material.
20. (Previously presented) The conductor pattern structure as claimed in claim 17, wherein the insulation layer consists of a transparent insulation material.
21. (Previously presented) The conductor pattern structure as claimed in claim 17, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
22. (Previously presented) The conductor pattern structure as claimed in claim 17, wherein each second-axis conduction line terminates on the edge of each second-axis conductor cell to the adjacent second-axis conductor cells.



23. (Previously presented) The conductor pattern structure as claimed in claim 17, wherein the transparent conductive material is Indium Tin Oxide (ITO).
24. (Previously presented) The conductor pattern structure as claimed in claim 1, wherein each second-axis conduction line terminates on the edge of each second-axis conductor cell to the adjacent second-axis conductor cells.
25. (Previously presented) The conductor pattern structure as claimed in claim 1, wherein a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells is measured to detect a position of touch.
26. (Previously presented) The conductor pattern structure as claimed in claim 25, wherein the first-axis conduction lines consist of a transparent conductive material.
27. (Previously presented) The conductor pattern structure as claimed in claim 25, wherein the second-axis conduction lines consist of a transparent conductive material.
28. (Previously presented) The conductor pattern structure as claimed in claim 25, wherein the insulation layer consists of a transparent insulation material.
29. (Previously presented) The conductor pattern structure as claimed in claim 25, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
30. (Previously presented) The conductor pattern structure as claimed in claim 25, wherein the transparent conductive material is Indium Tin Oxide (ITO).
31. (Previously presented) The conductor pattern structure as claimed in claim 1, wherein the transparent conductive material is Indium Tin Oxide (ITO).

32. (Currently amended) A method of constructing a conductor pattern structure of a capacitive touch panel, the method comprising:
- forming a plurality of first-axis conductor cells on a surface of a substrate arranged along a first axis in a substantially equally-spaced manner,
- forming a plurality of second-axis conductor cells on the surface of the substrate arranged along a second axis in a substantially equally-spaced manner;
- electrically connecting adjacent ones of the first-axis conductor cells along the first-axis using a plurality of first-axis conduction lines to form a plurality of first-axis conductor assemblies, wherein each second-axis conductor cell is set in each disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells;
- forming a plurality of insulation layers covering a surface of each first-axis conduction line without encompassing the adjacent first-axis conductor cells; and
- electrically connecting adjacent ones of the second-axis conductor cells along the second-axis using a plurality of second-axis conduction lines to form a plurality of second-axis conductor assemblies, each of the first-axis conductor cells and the second-axis conductor cells consisting of a transparent conductive material.
33. (Previously presented) The method of claim 32, wherein the first-axis conductor cells, the second-axis conductor cells and the first-axis conduction lines are formed simultaneously.
34. (Previously presented) The method of claim 32 further comprising forming a plurality of signal transmission lines on the surface of the substrate, each signal transmission line respectively connecting each first-axis conductor assembly and each second-axis conductor assembly.

35. (Previously presented) The method of claim 32 further comprising measuring a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells to detect a position of touch.
36. (Previously presented) The method of claim 32, wherein the first-axis conduction lines consist of a transparent conductive material.
37. (Previously presented) The method of claim 32, wherein the second-axis conduction lines consist of a transparent conductive material.
38. (Previously presented) The method of claim 32, wherein the insulation layer consists of a transparent insulation material.
39. (Previously presented) The method of claim 32, wherein the first-axis conductor cells and the second-axis conductor cells have a contour of hexagonal shape.
40. (Previously presented) The method of claim 32, wherein each second-axis conduction line terminates on the edge of each second-axis conductor cell to the adjacent second-axis conductor cells.
41. (Previously presented) The method of claim 32, wherein the transparent conductive material is Indium Tin Oxide (ITO).
42. (Currently amended) A method of constructing a conductor pattern structure of a capacitive touch panel, the method comprising:  
  
forming a plurality of first-axis conductor cells on a surface of a substrate arranged along  
  
a first axis in a substantially equally-spaced manner, wherein each first-axis  
  
conductor cell is separated by each disposition zone between adjacent ones of the  
  
first-axis conductor cells;

- electrically connecting adjacent ones of the first-axis conductor cells along the first-axis using a plurality of first-axis conduction lines to form a plurality of first-axis conductor assemblies;
- forming a plurality of insulation layers covering a surface of each first-axis conduction line without encompassing the adjacent first-axis conductor cells;
- forming a plurality of second-axis conductor cells in each disposition zone between adjacent ones of the first-axis conductor cells on the surface of the substrate arranged along a second axis in a substantially equally-spaced manner; and electrically connecting adjacent ones of the second-axis conductor cells along the second-axis using a plurality of second-axis conduction lines to form a plurality of second-axis conductor assemblies, each of the first-axis conductor cells and the second-axis conductor cells consisting of a transparent conductive material.
43. (Previously presented) The method of claim 42 further comprising forming a plurality of signal transmission lines on the surface of the substrate, each signal transmission line respectively connecting each first-axis conductor assembly and each second-axis conductor assembly.
44. (Previously presented) The method of claim 42 further comprising measuring a capacitance between a first cell of the plurality of first-axis conductor cells and a second cell of the plurality of second-axis conductor cells to detect a position of touch.
45. (Previously presented) The method of claim 42, wherein the transparent conductive material is Indium Tin Oxide (ITO).



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EXAMINER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

Application No.

11/842,747

Applicant(s)

CHANG ET AL.

Examiner

CHARLES HICKS

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1)  Responsive to communication(s) filed on 12 October 2010.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4)  Claim(s) 1-45 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-45 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 21 August 2007 is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a)  All    b)  Some \*    c)  None of:
- Certified copies of the priority documents have been received.
  - Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                             |                                                                                         |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                 | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____.                                               |

## DETAILED ACTION

This communication is responsive to amendments filed 09/20/2010 with claims 1-3 and 6-8 being amended, and claims 11-45 being new, and amendments filed 10/12/2010 with claims 1, 6, 32 and 42 being amended. Claims 1-45 are currently pending.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-9, 11-14, 16-20, 22-28, 30-38 and 40-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Bolender (US 2005/0030048).

In reference to claim 1, Bolender teaches a conductor pattern structure of a capacitive touch panel, formed on a surface of a substrate (Bolender, Fig. 3B; pg. 2, par. 28),

the conductor pattern structure comprising: a plurality of first-axis conductor assemblies, each first-axis conductor assembly comprising a plurality of first-axis conductor cells arranged on the surface of the substrate along a first axis in a substantially equally-spaced manner (Bolender, Fig. 3B; pg. 3, par. 35-36),

Art Unit: 2629

a disposition zone being delimited between adjacent ones of the first-axis conductor assemblies and between adjacent ones of the first-axis conductor cells (Bolender, Fig. 3B; pg. 3, par. 35-36),

a plurality of first-axis conduction lines respectively connecting between adjacent ones of the first-axis conductor cells of each first-axis conductor assembly so that the first-axis conductor cells of each respective first-axis conductor assembly are electrically connected together (Bolender, Fig. 3B; pg. 3, par. 35-36);

a plurality of insulation layers, each insulation layer of the plurality of insulation layers covering a surface of each first-axis conduction line without encompassing the adjacent first-axis conductor cells (Bolender, Figs. 3B, 12; pg. 3, par. 36; pg. 7, par. 70);

a plurality of second-axis conductor assemblies, each second-axis conductor assembly comprising a plurality of second-axis conductor cells arranged on the surface of the substrate along a second axis in a substantially equally-spaced manner (Bolender, Fig. 3B; pg. 3, par. 35-36),

each second-axis conductor cell being set in each disposition zone (Bolender, Fig. 3B; pg. 3, par. 35-36);

a plurality of second-axis conduction lines respectively connecting between adjacent ones of the second-axis conductor cells of each second-axis conductor assembly so that the second-axis conductor cells of each respective second-axis conductor assembly are electrically connected together (Bolender, Fig. 3B; pg. 3, par. 35-36);