Exhibit 8

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Paul J. Luckern
Chief Administrative Law Judge

In the Matter of CERTAIN ELECTRONIC DEVICES WITH MULTI-TOUCH ENABLED TOUCHPADS AND TOUCHSCREENS	Investigation No. 337-TA-714

DECLARATION OF RAVIN BALAKRISHNAN, Ph.D., RE: CLAIM CONSTRUCTION OF U.S. PATENT NO. 5,825,352

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I. INTRODUCTION

1. My name is Ravin Balakrishnan. My educational background, experience, publications, and qualifications are set forth in my CV, which is attached hereto as Exhibit 1 to this Declaration. I have been retained by Respondent Apple Inc. to offer opinions regarding certain claim terms in U.S. Pat. No. 5,825,352 ("the '352 Patent"). A copy of the '352 Patent is attached hereto as Exhibit 2. This declaration summarizes my opinions relating to the claim construction issues addressed below.

2. This report is based on information currently available to me. I may continue my investigation and study, which may include a review of documents and information that may be produced, as well as deposition testimony from depositions for which transcripts are not yet available or that may yet be taken in this case. Therefore, I may expand or modify my opinions as my investigation and study continues, and I may supplement my opinions and/or provide rebuttal opinions in response to any additional information that becomes available to me, any matters raised by Elan and/or opinions provided by Elan's expert(s), and/or any matters raised by the OUII Staff, and/or in light of any relevant orders from the ALJ or other authoritative body.

3. To the extent I am asked to testify at the Claim Construction hearing, I may provide background on the patents and reserve the right to use visual aids to illustrate my testimony.

II. SUMMARY OF OPINIONS

4. It is my opinion that the disputed terms of the '352 Patent should be interpreted to have the meanings listed in the table below:

Claim Term	Construction
"identify a first maxima in a signal corresponding to a first finger" (claims 1, 18)	"identify a first peak value in a finger profile taken on an axis obtained from scanning the touch sensor"

Claim Term	Construction
"identify a minima following the first maxima" (claims 1, 18)	"identify the lowest value in the finger profile taken on said axis that occurs after the first peak value, and before another peak value is identified"
"identify a second maxima in a signal corresponding to the second finger following said minima" (claims 1, 18)	"after identifying the lowest value in the finger profile taken on said axis, identify a second peak value in the finger profile taken on said axis"
"identify" (claims 1, 18)	"recognize a value to be"
"in response to" (claims 1, 18)	"after and in reaction to"
"means for selecting an appropriate control function" (claim 19)	This limitation is governed by 35 U.S.C. § 112(6). The recited function is selecting an appropriate control function based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers. Because the specification does not disclose a corresponding structure, this limitation is indefinite.
"pointing device click function" (claim 2)	"function that would normally result from a button click of a pointing device" **(agreed by the parties)**
"a 'select' function" (claim 4)	"a selection of an item or range of items" **(agreed by the parties)**
"control function" (claims 14, 19)	"function that would normally be provided by the actuation of the buttons or switches on a mouse"
"scanning the touch sensor" (claims 1, 18)	"measuring the values generated by a touch sensor to detect operative coupling and determining the corresponding positions at which the measurements are made" **(agreed by the parties)**

Claim Term	Construction
"means for scanning the touch sensor" (claim 18)	This limitation is governed by 35 U.S.C. § 112(6). The recited function is scanning the touch sensor. The corresponding structure is an analog multiplexer, a circuit to measure changes in capacitance of sensor conductors, an analog to digital converter, a microcontroller, and equivalents thereof. **(agreed by the parties)**
"means for providing an indication of the presence of two fingers in response to the identification of said first and second maxima" (claim 18)	This limitation is governed by 35 U.S.C. § 112(6). The recited function is providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima. The corresponding structure is the algorithm found in Fig. 8-1, which sets a finger value equal to two after determining if a scan in either the X direction or the Y direction has detected two fingers.
"means for detecting a distance between said first and second maxima" (claim 24)	This limitation is governed by 35 U.S.C. § 112(6). The recited function is detecting a distance between said first and second maxima. Because the specification does not disclose a corresponding structure, this limitation is indefinite.

Claim Term	Construction
"means for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time" (claim 26)	This limitation is governed by 35 U.S.C. § 112(6). The recited function is providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time. Because the specification does not disclose a corresponding structure, this limitation is indefinite.
"means for calculating first and second centroids corresponding to said first and second fingers" (claim 30)	This limitation is governed by 35 U.S.C. § 112(6). The recited function is calculating first and second centroids corresponding to said first and second fingers. Because the specification does not disclose a corresponding structure, this limitation is indefinite.

III. LEGAL STANDARD

5. I am not a legal expert and offer no opinions of the law. However, I have been informed by counsel of the legal standards that apply with respect to claim construction, and I have applied them in arriving at my conclusions.

6. With respect to construing the patent claims, I understand that one must first consider the intrinsic evidence, which includes the claim language, the specification, and the prosecution history of the asserted patent.

7. In particular, I understand that a person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. I also understand that one must then consider the specification to determine whether the inventor has employed any terms or words in a manner that is inconsistent with their plain and ordinary meaning. In

addition to the claims and the specification, one must review the patent's prosecution history, which is the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims. A patent applicant can limit claims during prosecution by, for example, altering claim language to overcome an Examiner rejection, arguing to overcome or distinguish a reference, or clearly and unambiguously disavowing claim coverage.

8. I also understand that one may also consider extrinsic evidence to ensure that a claim construction is not inconsistent with clearly expressed and widely held understandings in the pertinent technical field, which is especially so for technical terms. Such extrinsic evidence may take the form of expert and/or inventor testimony, dictionaries, technical treatises, and articles. I further understand that one may not rely on extrinsic evidence to contradict or vary the meaning of claims provided by the intrinsic evidence of record.

IV. ORDINARY SKILL IN THE ART

9. To assess the level of ordinary skill in the art, I understand one considers the types of problems encountered in the art, the prior solutions to those problems found in prior art references, the rapidity with which innovations are made, the sophistication of the technology and the level of education of active workers in the field.

10. In my opinion, one of ordinary skill in the art pertinent to the '352 Patent in January 1996, the date the patent application was filed, would generally have education and/or experience equivalent to the following: a Bachelors Degree in Computer Science, Electrical Engineering or Mathematics and three to five years experience working in the area of signal processing, human-computer interaction or the design, use, and/or evaluation of touch-sensitive input devices, or a Masters Degree or Ph.D and one to three years of experience in those fields. Under this definition, I was one of ordinary skill in January 1996 and have such skill today.

11. In arriving at my opinions regarding the meaning of the disputed claim terms of the ’352 Patent, I have considered the issues from the perspective of this person of ordinary skill in the art, at the timeframe of the filing date of the ’352 Patent.

12. My opinion on the level of ordinary skill in the art and the knowledge of a person having ordinary skill in the art relevant to the ’352 Patent is also generally addressed throughout this report.

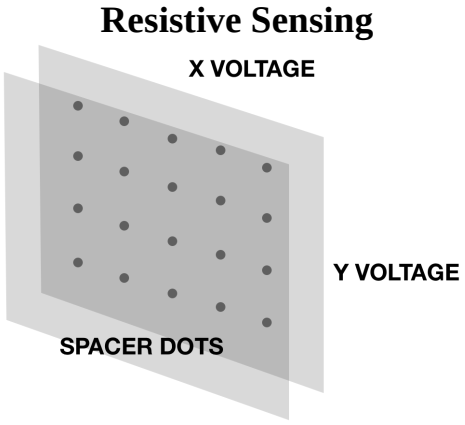
V. BACKGROUND

A. Technology Background

13. The ‘352 patent relates to touch sensitive input devices. A touch sensitive input device typically consists of a flat surface with an underlying sensing mechanism and associated software that can determine the position of a user’s finger on the surface. This touch location information can be used, for example, to control a cursor position on screen or activate virtual buttons. Touch sensitive devices may be opaque and operate independently of the computer display, or transparent and mounted as an overlay on the display.

14. From a hardware perspective, several different technologies have been developed over the years for sensing touch on the surface, with the three most common technologies being resistive, capacitive, and optical sensing. These different sensor types all provide different types of data that have to be analyzed. For instance, resistive touch sensitive devices and many capacitive devices provide data only along particular axes, (often the x and y axes), whereas some other types of capacitive and most optical devices provide data across the entire matrix of the sensed surface (e.g., every possible x-y position). Below, I provide a brief description of each of these kinds of touch sensors, all of which were known in the art prior to the filing of the ’352 Patent in January 1996.

15. Resistive touch sensing devices, in a typical instantiation, consist of two stacked sheets of electrically conductive material that are spaced slightly apart such that there is a gap between the two sheets. When a user touches the top sheet, it deforms slightly at the touch point and contacts the bottom sheet, creating an electrical connection between the two sheets at that point. A touch location can be calculated by varying a voltage across one sheet and measuring the voltage at the contact point on the other sheet. This measurement is used to derive the position of the contact along one axis (x or y). A similar voltage is placed across the second sheet in a direction perpendicular to the first, and the position on the second axis (x or y) is measured accordingly—thus providing an x, y position for the contact:



Commercially viable resistive touch sensing devices will typically include additional circuitry to, for example, remove electrical noise and improve sensing accuracy.

16. The advantages of resistive touch sensing devices are that they can be manufactured at low cost, in sizes ranging from a square inch to several square feet, and can sense contact from either human fingers or inanimate objects such as a stylus. The key disadvantages are that they cannot provide a correct position reading if the device is touched at more than one location concurrently, and they can only detect a finger or inanimate object when

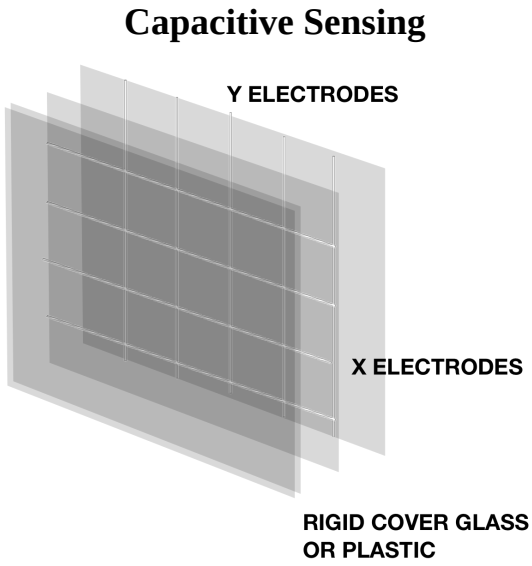
it comes in actual contact with the device and cannot provide information regarding the position or proximity of a finger/object as it approaches the device.

17. Capacitive touch sensing devices rely on measuring changes in capacitance on a conductive surface when it is touched.[1] Because the human body is electrically conductive, touching or coming in close proximity to a conductive surface will cause a distortion in that surface's capacitance, which is measured and analyzed to determine the location of the touch. There were many different implementations of capacitive touch sensing devices known in the art prior to January 1996. In one such instantiation, sometimes referred to as surface capacitive touch sensors, a small voltage is applied on the conductive layer that coats just one side of an insulating material. When an electrical conductor such as a human finger touches the surface, the finger and surface dynamically form a capacitor. The location of the touch is calculated by measuring the change in capacitance measured across the sensor's surface. While simple, fast, and durable, the accuracy of this approach is highly dependent on how uniformly the conductive layer is applied on the insulating substrate and is also prone to errors due to stray capacitances arising from electrical noise in the environment.

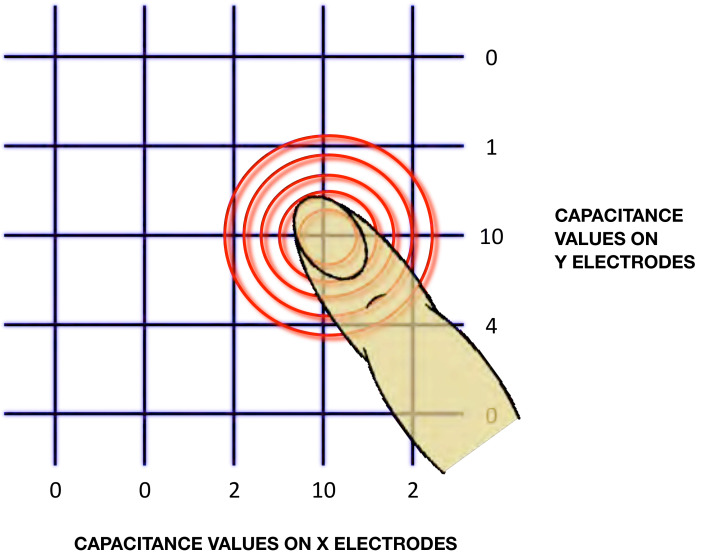
18. A more accurate capacitive touch sensing implementation, which was also known in the art prior to January 1996, is often referred to as projected self capacitive touch sensors. This method improves upon surface capacitive touch sensors by etching the conductive layer into a grid of electrodes. Each line within the grid is typically called a trace. A finger touching or in close proximity to the sensor will cause a change in capacitance that will vary at each electrode by an amount that depends on the electrode's distance to the touch location. In a common

[1] The term "capacitance" refers to the measure of electrical charge stored.

implementation, the grid is arranged along the Cartesian X-Y axes, with each row or column of the grid forming a trace, as shown below:

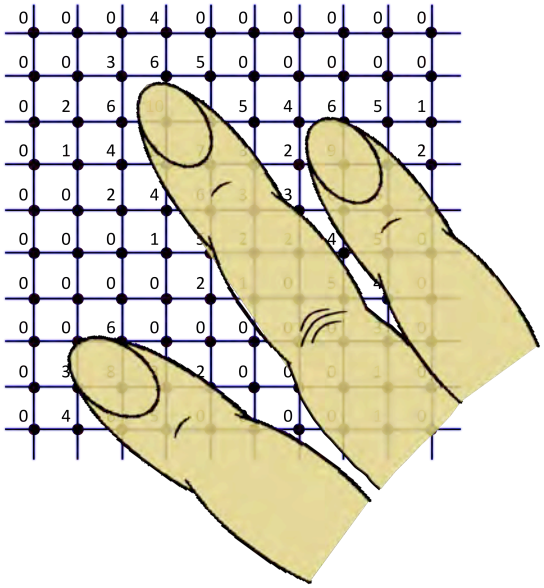


Determining the touch location is done by first scanning the capacitance values at each trace, resulting in a set of trace values along each of the X and Y axes as depicted below:



These trace values are then subsequently analyzed to determine where one or more touches are occurring.

19. While projected self capacitive touch sensors increase the accuracy of locating a contact, projected self capacitive touch sensors only provide one dimensional views of the contact (a view along the x axis and a view along the y axis. A more advanced type of capacitive touch sensor , called a mutual capacitive touch sensor, yields capacitive values at each x-y node on the touch sensor as illustrated below:



Briefly, this may be accomplished by, for example, sequentially measuring the difference in capacitance among pairs of perpendicularly oriented conductors until a measurement has been made for each pair of perpendicularly oriented conductors.

20. The advantages of capacitive touch sensors are that they can be made from a variety of materials including ones that are truly transparent, they enable the sensing of more than one touch point, and can also detect position of fingers that are not actually touching but are in close proximity to the device. Disadvantages are that capacitive touch sensors can typically only sense touch from a human and cannot detect electrically inert objects such as stylus. Furthermore, mutual capacitive touch sensors generate more data (n^2) than that provided by self

capacitive touch sensors (2n), thus requiring more computational power on the part of the touch sensor or computer.

21. Optical touch sensing devices are those that employ an imaging sensor, such as a camera, to create an image of the touch surface. A key advantage is that they are not limited to sensing just points of contact but rather can be used to sense touch and objects of more complex shapes; for example, a palm pressed against an optical touch sensing device can be detected in its entirety and not just as five finger touch points. Disadvantages include the fact that current instantiations result in devices much thicker than resistive or capacitive sensors and are thus not suitable for embedding in slim computing devices such as mobile phones.

22. Hardware is but one component of a touch sensing device. The signals produced by whatever hardware is used have to be read and analyzed by software to ultimately determine how the touch information is interpreted and presented to the host computer. Software for a touch sensing device would typically perform two high-level functions. First, the signals from the hardware will have to be read or scanned. This scanning step is in essence a data-acquisition process that is relatively straightforward in that no attempt is made to make "sense" of the data per se. Second, once the signal data has been acquired, it is followed by an analysis step where the data is then interpreted. The analysis step can vary in complexity depending on the comprehensiveness of the scanned data and the kinds of information one might want to extract from it.

23. Because of the different sensing technologies available, the algorithms used in the analysis step to determine the desired touch information will necessarily vary. When only data along two axes is provided, the analysis step is typically simple in that a much smaller data set has to be analyzed than when data across the entire matrix of the sensed surface is provided. The

downside is that the smaller data set also limits the type of information that can be inferred. For example, recognizing the outline of several fingers touching the surface is easily done with the rich data set from an optical touch sensor as opposed to the limited data from a resistive touch sensor that provided data along two axes.

24. During the timeframe of the ’352 Patent (i.e., January 1996), the amount of computational processing power that could be dedicated to the analysis of the touch device data was generally limited. The analysis would have to be performed either on an embedded microprocessor in the touch device itself, with limited memory and processing power, or on the host computer’s main processor, in which case it would be competing for resources with all the other software running on that host computer. Thus, simpler devices that reported smaller amounts of data, such as only along the x and y axes, and which consequently required a simpler analysis step, were more common even if they could not provide the sophisticated touch interpretations of the more complex devices.

25. Other factors that affected the choice of touch sensitive device and analysis software included battery life and the sophistication of the graphical processing unit. Designers of mobile computing devices that relied on batteries often had to make tradeoffs between choosing complex but power hungry touch devices and analysis software, and simpler ones that used less power. Similarly, even if the touch device and analysis software could detect and report multiple touch points cheaply and with low power, the graphical processor might not have had the wherewithal to handle the display of the dynamically moving graphical entities associated with those multiple touch points.

B. Overview Of The ’352 Patent

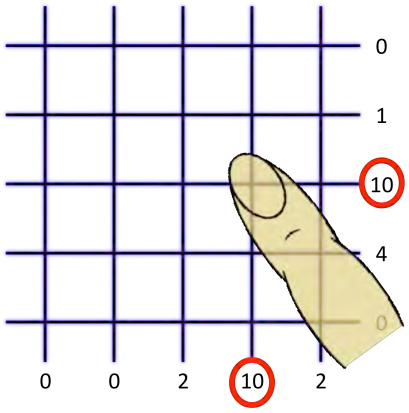
26. As explained in the specification, at the time of filing of the ’352 Patent there already existed a wide variety of touchpads that used any number of different sensing

technologies including those described above. *See, e.g., id.* at 1:18-26. Thus, one of ordinary skill in the art would recognize that the claimed invention of the ’352 Patent is not about new touchpad devices or new hardware for detecting contact with a touchpad. Rather the ’352 Patent is about a specific, supposedly-novel method for utilizing pre-existing touchpad technology to detect the presence of multiple simultaneous finger contacts with a touch sensitive input device. As the ’352 Patent puts it, the ’352 Patent “relates generally to touchpad devices, and more particularly relates to touchpad devices which detect at least the presence of one or more objects such as fingers . . . .” *See, e.g., id.* at 1:12-15. In other words, at a high level, the ’352 Patent pertains to the detection of one or more simultaneous contacts with a touchpad. *See, e.g., id.* at Title (“Multiple Fingers Contact Sensing Method For Emulating Mouse Buttons And Mouse Operations On A Touch Sensor Pad”); *see also id.* at Abstract (“Method and apparatus for detecting an operative coupling between one or more fingers or other appropriate objects and a touch pad . . . .”).

27. As explained in the specification, it is desirable to detect two finger contacts with a touchpad so that a touchpad may be used to perform both the cursor movement and button actuation functions of a conventional mouse, thus obviating the need for a traditional computer mouse. Within the context of the ’352 Patent, this is accomplished by allowing the first touchpad contact and subsequent movement to control a cursor, while the second touchpad contact is interpreted as button actuation. *See, e.g., id.* at 2:56-3:15 (noting that “the present invention can be described in most of its applications by establishing one finger as controlling movement of the cursor, and the second finger as controlling functions equivalent to a mouse button or switch”); *see also, e.g., id.* at 4:36-39 (noting that a “further object of the present

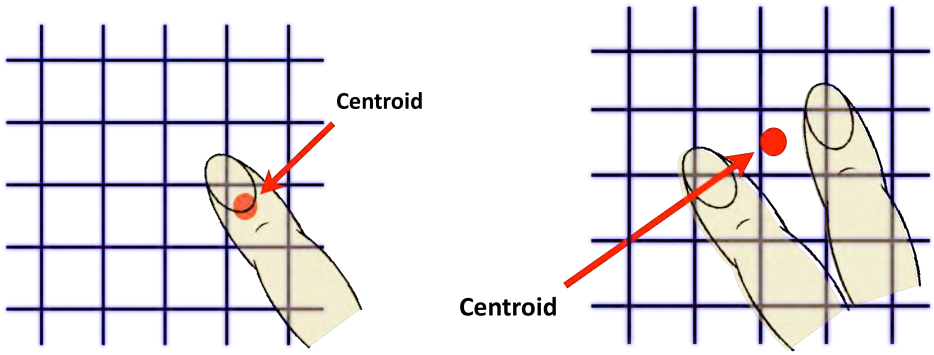
invention is to provide a method for effecting on a touchpad, through the use of multiple finger contacts, a plurality of conventional mouse button functions").

28. To enable such functions, the '352 Patent discloses a specific technique for detecting multiple finger contacts based on the presence of maximum and minimum in the capacitance profile of the touch sensitive surface. However both the use of maximum values to detect touches to the surface and the detection of two fingers to a touch sensitive surface were known at the time. For example, at the time of filing of the '352 Patent, it was known that the presence of a single finger contact could be determined by identifying a maximum in the signal data acquired from the touchpad, including in the prior art cited on the face of the '352 Patent. *See, e.g.,* U.S. Patent No. 4,686,332 (Exh. 3) (cited prior art determining finger contact based on the identification of two matrix wires carrying the maximum signal); U.S. patent No. 5,149,919 (Exh. 4) (determining stylus position based on sets of matrix wires containing the highest signals); U.S. Patent No. 4,733,322 (Exh. 5) (interpolating the three largest signals in a set of "drive" electrodes and to identify finger position). As shown below, the use of peak detection to identify a finger contact was both known and straightforward:



29. Likewise, to detect the presence of multiple fingers, a well-known centroid "jumping" algorithm was available, which was discussed at length during the prosecution history

of the ’352 Patent. *See generally* Apr. 8, 1998 Amendment (Exh. 6). Briefly, when one finger is in contact with a set of sensors on the touchpad, the location of the finger may be determined by computing a weighted average of the signal intensities from all touchpad sensors, which is referred to in the art as a “centroid.” Because the signal intensity will be greatest directly below the point of finger contact and will fall off sharply on either side of this point, the “centroid” will naturally correspond to the point of finger contact. However, when a second finger contacts the touchpad, there will, of course, be two points where the signal intensity peaks, each point corresponding to the contact of a finger. As a result, the “centroid” will immediately “jump” to a point that is approximately midway between the two fingers. It was well known in the art that this jumping could be used to determine the presence of two fingers. *See, e.g.* U.S. Patent No. 5,495,077 (Exh. 7). This “centroid jumping” phenomenon is depicted below:



30. In view of the above methods already known in the prior art, the supposed novelty of the ’352 Patent is directed to the patent’s disclosure of a specific method that enables the use of peak detection to identify multiple finger contacts in lieu of other methods like “centroid jumping.”

31. The method disclosed in the ’352 Patent relies on the analysis of “finger profiles” that are obtained from a scan of sensors on a touchpad. *See, e.g.*, ’352 Patent (Exh.2) at 5:20-43 (describing the use a capacitive touchpad with X direction and Y direction traces). As discussed

above, at the time of filing of the ’352 Patent, capacitive touchpads relied primarily on a process called projection scanning in which a scan of touch sensor “traces” along an axis results in a profile of the capacitances measured on that axis. *See, e.g., id.* at 5:56-65 (describing the scanning of traces and measurement of capacitance on each trace in typical traces).

32. The ’352 Patent discloses a representative finger profile based on the use of such capacitive touchpads as set forth below:

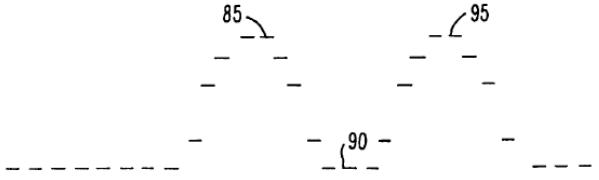
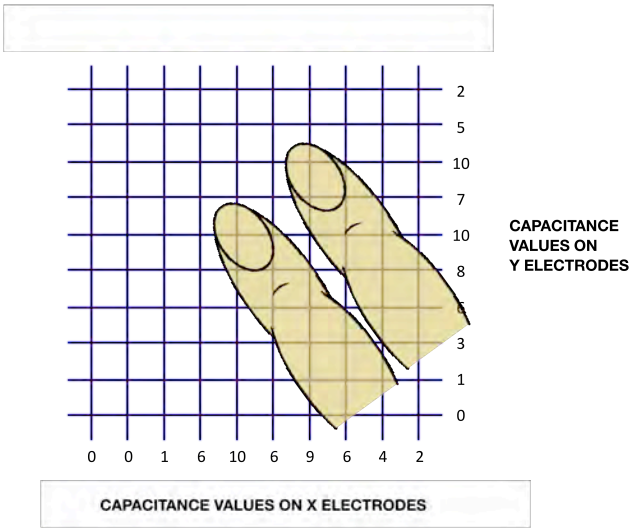


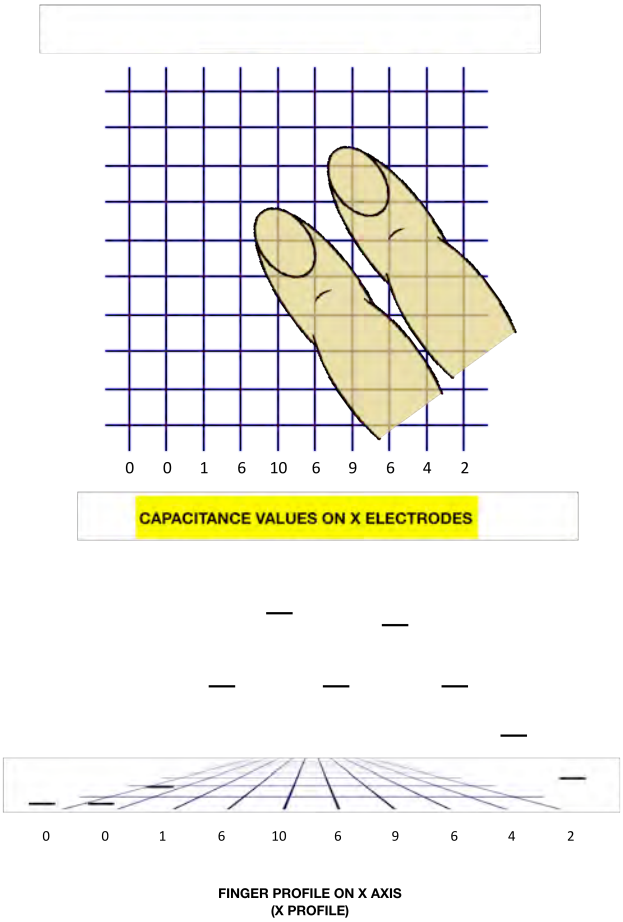
FIG. 3.

Id. at Fig. 3; *see also id.* at Fig. 4. The finger profile shown above represents the contact of two fingers with the touchpad surface; each peak shown above is determinative of a single finger contact. *See id.* at 4:56-67 (“FIG. 3 shows a finger profile for two non-overlapping fingers as sensed by the present invention.”).

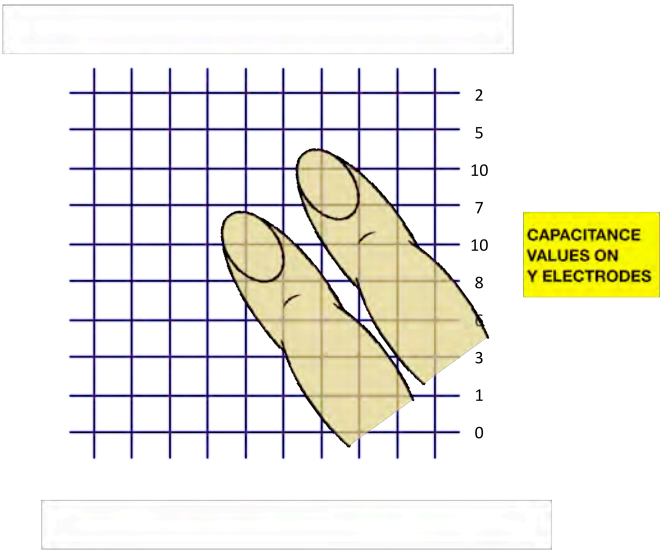
33. A finger profile is generated based on the capacitive values that are measured along an axis. For example, in the case of two finger contacts to a touchpad with traces along x and y axes, the touchpad would yield a set of capacitance values along the x axis and another set along the y axis:

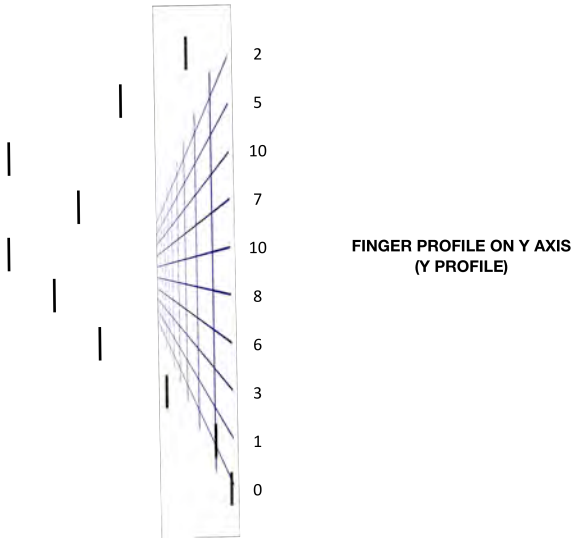


34. An X PROFILE is generated from the set of capacitance values along the x axis:

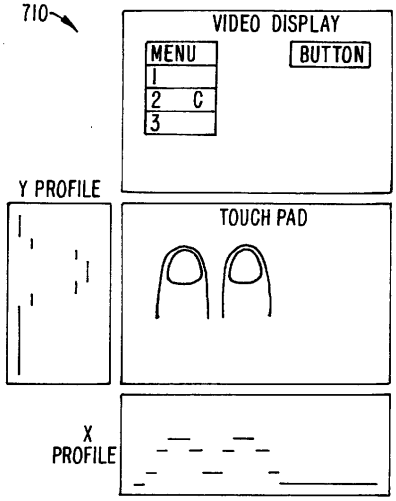


35. In the same way, a Y PROFILE is generated from the set of capacitance values along the y axis:





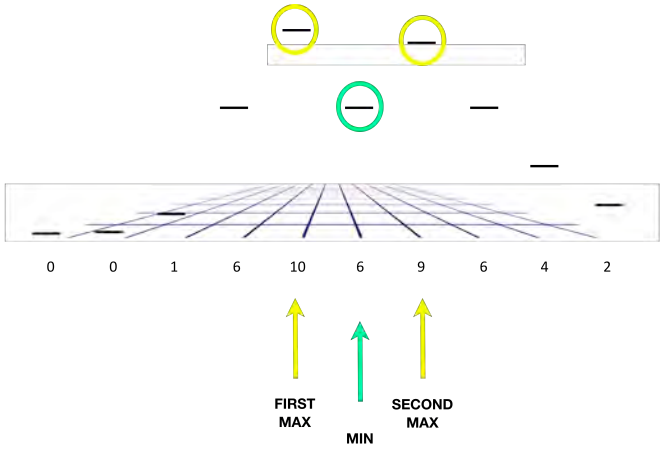
36. Consistent with this, the ’352 Patent discloses a pair of profiles generated from the contact of two fingers with a touchpad device that is capable of simultaneously measuring finger contact in both the X and Y directions:



Id. at Fig. 7B. Notably, when both fingers are contacting the touchpad at the same vertical position, the Y PROFILE includes only a single peak. In contrast, two peaks appear in the X PROFILE because each finger is contacting the touchpad at a different horizontal position.

37. As set forth in detail below, one of ordinary skill in the art would recognize that the use of a finger profile taken on an axis is key to the invention of the ’352 Patent. Indeed, the method of the ’352 Patent involves sequentially stepping through the elements of the finger profile one-by-one to identify extrema that determine the presence of fingers. Briefly, the method works by stepping through the elements of the finger profile until it is first determined that the values of the finger profile are no longer increasing. At that point, a first maximum has been identified, an event that is determinative of a first finger contact. After the first maxima has been identified, the algorithm starts looking for a minimum and continues stepping through the elements of the finger profile until the values of the finger profile are no longer decreasing. At this point, a first minima following the first maxima has been identified. Then, the algorithm

starts looking for a second maximum and once again steps through the elements of the finger profile until they are no longer increasing such that a "second maxima" following the first minima is identified. Similar to the detection of the "first maxima," which is determinative of a first finger contact, this detection of the "second maxima" is determinative of a second finger contact. *See, e.g., generally id.* at 9:18-10:65; Claim 1. This method is depicted below:



C. The Asserted Claims Of The '352 Patent

38. I understand that Elan has asserted claims 1, 2, 4, 7, 10, 12, 14, 16, 18, 19, 21, 24, 26, and 30 of the '352 patent against Apple's iPhone 3G, iPhone 3GS, iPod Touch and iPad personal media players, MacBook, MacBook Pro, and MacBook Air portable computers and the Magic Mouse wireless mouse products.

39. As explained above, the algorithm disclosed in the '352 Patent involves detecting two contacts by analyzing a "finger profile" obtained from scanning a touchpad. *See, id*. at 6:26-47. Tracking this description, the claims cover (1) analyzing a finger profile to identify (a) a first maxima, (b) a minima following the first maxima, and (c) a second maxima following the minima, and (2) then providing an indication of two fingers based on the identification of these values. *See, e.g., id*. at Claim 1. A complete listing of the asserted claims is as follows.

40. Claim 1 recites:

1. A method for detecting the operative coupling of multiple fingers to a touch sensor involving the steps of scanning the touch sensor to (a) identify a first maxima in a signal corresponding to a first finger, (b) identify a minima following the first maxima, (c) identify a second maxima in a signal corresponding to a second finger following said minima, and providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima.

41. Claim 2 recites:

2. The method of claim 1 further including the step of causing a pointing device click function to occur in response to the detection of at least a second maxima.

42. Claim 4 recites:

4. The method of claim 1 further including the step of enabling a "select" function in response to the detection of at least a second maxima.

43. Claim 7 recites:

7. The method of claim 6 wherein said maxima are peaks.

44. Claim 10 recites:

10. The method of claim 1 further comprising the step of: detecting a distance between said first and second maxima.

45. Claim 12 recites:

12. The method of claim 1 further comprising the step of: providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time.

46. Claim 14 recites:

14. The method of claim 1 further comprising the step of: selecting an appropriate control function based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers.

47. Claim 16 recites:

16. The method of claim 1 further comprising the step of calculating first and second centroids corresponding to said first and second fingers.

48. Claim 18 recites:

18. A touch sensor for detecting the operative coupling of multiple fingers comprising: means for scanning the touch sensor to (a) identify a first maxima in a signal corresponding to a first finger, (b) identify a minima following the first maxima, and (c) identify a second maxima in a signal corresponding to a second finger following said minima, and means for providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima.

49. Claim 19 recites:

19. The touch sensor of claim 18 further comprising: means for selecting an appropriate control function based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers.

50. Claim 21 recites:

21. The touch sensor of claim 18 wherein said maxima are peaks.

51. Claim 24 recites:

24. The touch sensor of claim 18 further comprising: means for detecting a distance between said first and second maxima.

52. Claim 26 recites:

26. The touch sensor of claim 18 further comprising: means for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time.

53. Claim 30 recites:

30. The sensor of claim 18 further comprising means for calculating first and second centroids corresponding to said first and second fingers.

VI. CLAIM CONSTRUCTION FOR THE '352 PATENT

A. "identify a first maxima in a signal corresponding to a first finger" / "identify a minima following the first maxima" / "identify a second maxima in a signal corresponding to a second finger following said minima" (claims 1 and 18)[2]

54. I understand the parties have proposed the following constructions for these terms:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"identify a first maxima in a signal corresponding to a first finger" (claims 1, 18)	"identify a first peak value in a finger profile taken on an axis obtained from scanning the touch sensor"	"identify a first highest absolute value in the a [sic] first set of values derived from the coupling of a first finger with the touch sensor"
"identify a minima following the first maxima" (claims 1, 18)	"identify the lowest value in the finger profile taken on said axis that occurs after the first peak value, and before another peak value is identified"	"identify a lowest absolute value that follows the first maxima"
"identify a second maxima in a signal corresponding to a second finger following said minima" (claims 1, 18)	"after identifying the lowest value in the finger profile taken on said axis, identify a second peak value in the finger profile taken on said axis"	"identify a second highest absolute value in a set of values derived from the coupling of a second finger with the touch sensor that follows the minima"

55. In January 1996, one of ordinary skill in the art would have understood the claim terms listed above to include both a spatial and a temporal requirement. As to the spatial requirement, one of ordinary skill in the art would have understood from the intrinsic record that the claims require a "finger profile" that is one-dimensional and taken on an axis. As to the

[2] Reference to claim numbers in this declaration are provided for ease of reference and by example. Unless otherwise noted, my opinions concerning the meaning of a given term applies to every claim that includes that term.

temporal requirement, one of ordinary skill in the art would have understood from the intrinsic record that first a maxima is identified, then a minima, and then a second maxima, in that order. I will address each of these requirements in turn.

1. One Of Ordinary Skill In The Art Would Understand The Claims To Require A One Dimensional Finger Profile Taken On An Axis

56. In the context of the '352 patent, one of skill in the art would understand the claims to require a one-dimensional finger profile taken on an axis. That is, one of skill in the art would understand the claim language as establishing that the first maxima, minima, and second maxima are relative to each other on an axis.

a. One Of Ordinary Skill In The Art Would Understand The Claims As Requiring A Finger Profile

57. I note first that the claims all require a "***signal***." In fact, as set forth, for instance in Claim 1, the claims are specifically directed to the detection of multiple fingers through the analysis of a "signal."

58. I understand that in multiple prior litigations the claim term "signal" was understood to refer to a "finger profile." First, I understand that in a prior litigation between Elan and Synaptics, all parties took the position that the claim term "signal" referred to a "finger profile." The Court in this prior litigation agreed with this view. For instance, I am informed that in the prior litigation involving Synaptics, the Court construed the claim term "identify a first maxima in a ***signal*** corresponding to a first finger" to mean "identify a first peak value in a ***finger profile*** obtained form scanning the touch sensor." I understand that the Court in that case construed the claim terms related to the identification of the "first minima" and "second maxima" in a similar manner. *See Elantech Devices Corp. v. Synaptics, Inc.*, 3:06-cv-01839, Claim Construction Order, April 6, 2007 (Exh. 8) at 15.

59. Second, I understand that in parallel litigation currently ongoing between Elan and Apple in the Northern District of California, the parties again agreed that these claim terms should be understood in terms of the phrase "finger profile." For instance, I understand that Elan proposed that the term "identify a first maximum in a signal corresponding to a first finger" be construed to mean "identify a first peak value in a finger profile obtained from scanning the touch sensor." *See* First Amended Joint Claim Construction Statement (Exh. 9), Exh. A. However, I now understand that in this Investigation the parties disagree as to whether the term "signal" in the claims refers to a "finger profile." Specifically, despite having taken the position in two previous litigations that the claims should be understood in terms of a "finger profile," I understand that Elan now contends that the claims should not be understood in this manner.

60. Momentarily putting aside the precise meaning of "finger profile," I disagree with Elan's recent position that the claims should not be understood in terms of a "finger profile." Indeed, the specification discloses nothing but the use of a "finger profile" to carry out the claimed methods. *See, e.g.*, '352 Patent (Exh. 2) at Figs. 3-4, 7B-7F-2; *id.* at 5:48-51 ("The analog to digital converter 80 then supplies the signals to the microcontroller 60, which operates to form, among other things, a finger profile for one or more fingers, X-Y cursor data, and control signals."); *id.* at 6:26-28 ("Referring next to FIG. 3, a finger profile is shown indicative of the presence of two fingers, spaced apart from one another.").

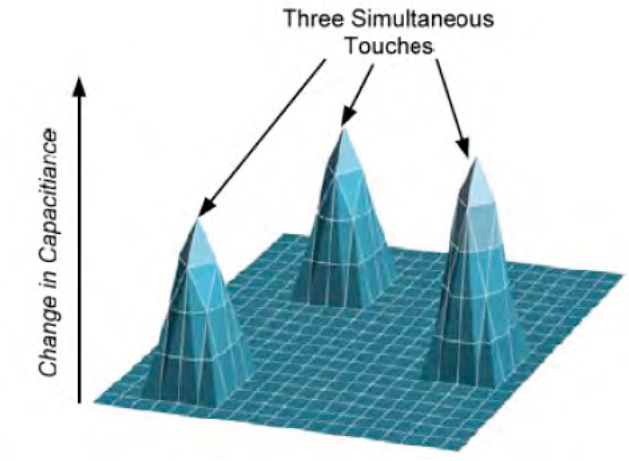
61. The prosecution history provides further confirmation to one of ordinary skill in the art that the claim term "signal" is a reference to a "finger profile." In addressing the claims which became independent claims 1 and 18, the patentee explained that "***[t]hese claims*** are directed to the feature of the invention which detects multiple fingers by detecting the multiple maxima ***in the profile*** on the touchpad." Apr. 8, 1998 Amendment (Exh. 6) at 352 CFH 0535

(emphasis added). Indeed, in response to a rejection based on the Miller prior art reference, the patentee explained that "[n]owhere does Miller suggest analyzing ***profile information*** to obtain this result, or to use the result to provide an indication of two fingers." *Id.* at 352 CFH 0536. Thus, completely consistent with the specification, during prosecution the patentee described the claimed invention in terms of a "profile."

b. One Of Ordinary Skill In The Art Would Understand That The Finger Profiles Are One Dimensional And Taken On An Axis

62. Given that the claims should be understood in terms of the phrase "finger profile," one of skill in the art would further understand that the finger profile reflects a one-dimensional representation of finger contact taken on an axis of the touchpad. This is apparent, first, from the term "profile," which is understood by both lay people and those of ordinary skill in the art to refer to a slice of some object that is taken along a direction. In this case, the "profile" is a slice of some representation of finger contact on the touchpad.

63. I have reviewed the written summary of opinions, declarations and deposition transcript of Elan's expert witness on claim construction in the parallel District Court action. I understand that, in his written summary of opinions and declaration, Mr. Dezmelyk characterized the following 2D image as a "profile":



64. *See* Dezmelyk Summary (Exh. 10) ¶ 22. However, when asked at deposition whether this two-dimensional image of a touch is a profile, Mr. Dezmelyk testified as follows: "[t]hat has a two-dimensional diagram showing capacitance against a plane. ***That's not a profile.***" Dezmelyk Tr. (Exh. 11) at 141:16-23; *see also id.* ("No, that's a prospective [sic] view of a kind of two-dimensional set of data. ***It's not a profile***.").

65. Although I do not generally endorse Mr. Dezmelyk's opinions on claim construction, I do agree with Mr. Dezmelyk's testimony that the two-dimensional image above is not a profile.[3] Consistent with this, I agree with Mr. Dezmelyk's deposition testimony that a finger profile reflects a one dimensional representation of finger contact taken on an axis. Indeed, when asked about this issue, Mr. Dezmelyk testified as follows:

> Q. And are there any profiles that are shown in the '352 patent that are shown in a sort of two-dimensional XY matrix of the type that we saw in Exhibit 5 to your deposition, which has figure 3 in it from your report?
>
> A. Well, a profile is – a profile is a profile. I think I've said that before. ***A profile is a – in essence, a view of data from one – like a slice almost through it or from one direction.***

Id. at 141:4-12 (emphasis added).

66. Mr. Dezmelyk's testimony to this effect is unsurprising for a variety of reasons. First, one of ordinary skill in the art would recognize that in the '352 Patent, the claim terms "first," "second," and "following" can only reasonably be understood as occurring on a one-dimensional "finger profile" that is taken on an axis. Otherwise, these claim terms would be at best ambiguous, and at worst meaningless. For example, it would be evident to one of ordinary

[3] Unlike a one dimensional finger profile consisting of capacitance values of traces along an axis, a two dimensional image like that shown above would result from a more advanced capacitive touch sensor in which capacitive values are measured at nodes throughout the touchpad (e.g., at each possible x-y position) instead of at trace lines along an axis. *See* Paragraph 19 above. The '352 Patent does not provide any disclosure or description of a two dimensional image of this kind.

skill in the art that in the above two-dimensional context there is no inherent way to order the peaks, identify the minima following a peak, or identify a second peak as "following" a minima. Some frame of reference must be imposed to facilitate such identification of extrema.

67. I understand Elan has taken the position that there are in fact a variety of ways to determine whether one peak is "first," "second," or "following" one another in the two-dimensional context. I do not disagree that one of ordinary skill in the art would understand that there are a number of ways for determining a relationship between extrema in a two dimensional plane. However, a person of ordinary skill in the art would understand that the claims and specification of the '352 Patent impose a particular frame of reference for performing the method of the claims – a one dimensional finger profile taken on an axis – and do not address theoretical cases of other relationships.

68. One of ordinary skill in the art would recognize that the claims confirm that they are referring to a signal that is one dimensional and taken on an axis. Specifically, in representative claim 1 below, one of ordinary skill in the art would recognize that the terms "first," "second," and, in particular, "following" support an interpretation of the claims as requiring a "finger profile" that is taken on an axis:

> 1. A method for detecting the operative coupling of multiple fingers to a touch sensor involving the steps of
>
> scanning the touch sensor to (a) identify a ***first maxima*** in a signal corresponding to a ***first finger***, (b) identify a minima ***following*** the ***first maxima***, (c) identify a ***second maxima*** in a signal corresponding to a ***second finger following*** said minima, and
>
> providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima.

69. '352 Patent (Exh. 2) at Claim 1 (emphasis added). Describing a "first maxima," a minima "following" the "first maxima," and finally a "second maxima" "following said

minima," one of skill in the art would naturally understand the claim as describing a sequence of extrema that are taken on an axis.

70. This understanding of the claims is confirmed by the specification. Most notably, when the Patentee sought to expand the scope of the invention beyond the preferred embodiment, the Patentee explained "[w]hile the foregoing example describes identification of minima and maxima in the X and Y directions, it will be apparent that an analysis along a diagonal or some other angular direction may be preferred in some instances, and is still within the scope of the present invention." *See, e.g., id.,* at 11:11-15. In other words, according to the specification, the finger profile is not limited to the X or Y directions, but can be along any other one-dimensional axis – but it is always along a single axis.

71. Consistent with this disclosure, the '352 Patent never discloses anything other than the analysis of one-dimensional profiles along the X and Y axes of the touch sensor. Indeed, the touch sensor technology that the '352 Patent describes in all embodiments is a touch sensor having traces parallel to either the X or Y axis. *See, e.g., id.,* at 1:28-40, 5:20-43, Fig. 2. Such touch sensors will produce finger profiles only along either the X or Y axis. *See, e.g., id.* at 5:44-6:1; Fig. 7B (depicting X profile and Y profile).

72. The specification describes using such touch sensors to create a finger profile along the X and Y axis consisting of a series of values that can then be analyzed to identify the first maxima, minima, and second maxima. In particular, the finger profile is created by scanning the traces and storing the values in RAM as values X(1) through X(Xcon) and Y(1) through Y(Ycon). *See, e.g., id.* at 5:60-65, 8:55-62, Fig. 7B. The specification then describes that algorithms encoded in circuitry, software, or firmware are used to step through the values that make up the finger profile one-by-one to "detect[] a first maxima 85 indicative of a first

finger in operative proximity to the touchpad 30, followed by a minima 90 indicative of a space between the fingers, and further followed by another maxima 95 indicative of a second finger operatively coupled to the touchpad 30." *See, e.g.*, *id.* at 6:29-34. Thus, in the context, of the '352 patent, one of ordinary skill in the art would recognize that the maxima and minima values are identified along a series of values that are taken on some axis, whether it be the X-axis, Y-axis, or some other axis.

73. It is my understanding that Elan contends that "on an axis" impermissibly limits the claims because there are multiple ways to scan the touchpad. For instance, I understand that Elan takes the position that the ordering among the extrema is a "function of the choice of scanning method." Elan's Opposition CC Brief (Exh. 12) at 14. Elan's argument is flawed for two reasons. First, for the reasons set forth below, Elan erroneously conflates the reading of the sensor data with how the data is analyzed. *See infra* ¶¶ 80-81. Elan provides the example of using raster scanning to scan the sensor, noting that such a scan imposes a non-axial order on how the data is read. A raster scan can indeed be used to read in the sensor data, but that does not impose any restriction on how the data is analyzed. Analyzing the data should not be confused with reading the data in from the touch sensor. Second, Elan's position that the method for reading in the data determines the order in which the data is analyzed is flatly inconsistent with the specification. The patent is ambivalent as to the method for reading the data, disclosing both sequential and concurrent scanning. '352 Patent (Exh. 2) at 7:34-40. It is hard to imagine how any order could be imposed on the data during the concurrent scanning of all the individual sensors in the touchpad.

74. In an apparent attempt to address this point, Elan appears to take the position that there are, in fact, no restrictions whatsoever on the analysis of the data. In particular, Elan takes

the position that "[t]he starting point for determining which follows another can be arbitrary, and there are several ways to determine relative position." Elan's Opposition CC Brief (Exh. 12) at 13. Similarly, I understand Elan has taken the position the extrema may be identified in any order because the "scan may proceed in any orderly manner that would result in an examination of all of the sensor values." *Id.* However, one of ordinary skill in the art would understand that the method of analyzing the data to determine the presence of multiple finger contacts cannot, as Elan contends, be arbitrary or be based on "any orderly" scan. Indeed, one of ordinary skill in the art would recognize that the method disclosed in the '352 Patent is a specific method for determining the presence of two fingers that is confined by the process set forth in the specification and file history.

75. I am also informed that Elan has taken the position in earlier litigation that Apple's proposed construction cannot be adopted because those of ordinary skill in the art would understand it to limit the claims to the use of finger profiles along only the X and Y axes that define some Cartesian coordinate system. In particular, I am informed that Elan has taken the position that those of skill in the art would understand the word "axis" to refer only to the X and Y basis vectors that define a traditional Cartesian coordinate system. However, I can unequivocally confirm that the term "axis" would not be so narrowly understood by one of ordinary skill in the art. In fact, the X and Y directions that one uses to define the Cartesian coordinate system are entirely arbitrary. The analysis of the finger profile could, of course, be done along any direction. In fact, as noted above, the specification unequivocally confirms this when it explains that "the foregoing example describes identification of minima and maxima in the X and Y directions, it will be apparent that an analysis along a diagonal or some other angular direction may be preferred in some instances, and is still within the scope of the present

invention." *See, e.g.*, '352 Patent (Exh. 2) at 11:11-15. Thus, in my opinion, there is no legitimate concern over Apple's construction being narrowly understood to apply only to a particular set of coordinate axes.

2. One Of Skill In The Art Would Understand The Claims To Include A Temporal Requirement

76. One of skill in the art would understand the claim language as calling for the extrema in the finger profile to be identified in a particular temporal order. Specifically, one of skill in the art would understand the claims to require the identification of first a maxima, then a minima, and then a maxima, in that temporal order.

77. Starting with the claim language itself, one of skill in the art would immediately recognize that steps (b) and (c) of claim 1 refer to the ***completed*** results of the prior step. For instance, step (b) of claim 1 refers to a minima "following" "***the*** first maxima." One simply cannot know if the minima is truly "following" "***the*** first maxima" unless it has previously been identified in both space and time. Similarly, step (c) of claim 1 refers to a "second maxima" "following ***said*** minima." Of course, one cannot know if a maxima is truly following a specific "***said*** minima" unless "***said*** minima" has already been identified in both space and time. Thus, the claims include a logical structure in which the sequence of steps build upon one another and depend upon the results of the previous steps. Based on this, one of skill in the art would understand the claim language as setting forth a requirement that the extrema be identified in a specific temporal order.

78. Put another way, the claim language clearly states that what is being identified is not just, for instance, "a minimum." Rather, the claims call for the identification of a specific minimum – one that follows the first maximum. It is not possible to identify such a minimum unless the first maximum had been previously been identified in time. Simply identifying a

minimum without *recognizing* that it follows a first maximum is just that – identifying a minimum, not identifying a minimum following a first maximum. Similarly, one cannot "identify a second maxima in a signal corresponding to a second finger following said minima" without having previously identified the minimum. If read as Elan would have it, the limitations "following the first maximum" and "following said minima" have no effect.

79. One of skill in the art would recognize that the specification corroborates this understanding. Indeed, in describing the very algorithm that identifies the extrema in the finger profile, the patent repeatedly includes language to confirm the algorithm's temporal nature. For instance, before the algorithm finds the first peak, the specification explains that the variable "Xstate is ***initially*** set to Peak1" to indicate that the algorithm is in the process of finding the first peak. *Id.* at 9:41. When the algorithm ultimately finds the first peak, the specification explains that "**[*a*]*t this point*,** the peak has been found," but "the valley has ***not yet*** been found." *Id.* at 9:53, 9:66-67. In describing the continuing process of walking through the traces downhill to find the minima, the specification explains that "***[e]ventually*** the value of X(N-1) will be greater than or equal to the value of X(N), such that the valley is detected" by the algorithm. *Id.* at 10:2-4. Yet "**[*a*]*s long as*** X(N) is greater than or equal to X(N-1)," the specification explains, the algorithm has not identified the second peak. *Id.* at 10:15-16. Ultimately, "X(N) will ***eventually start*** to decrease," at which point the algorithm has identified the second peak. *Id.* at 10:19-20. Seeing such temporal language in the specification, one of skill in the art would immediately recognize that the claims require identification of the extrema in a particular order: first a maxima, then a minima, and then another maxima. Indeed, in my opinion, no other manner of identifying the extrema is disclosed or even hinted at in the specification.

80. Despite the foregoing, I am informed that Elan contends that certain passages in the specification suggest that the extrema may be identified in some other order. *Id.* at 7:36-37. In particular, I am informed that Elan has taken the position that because the specification states that "sensors may be scanned sequentially or concurrently, depending on the hardware implementation," it means that the extrema in the finger profile can be identified in any order. However, the specification makes a clear distinction between scanning the sensors, on the one hand, and executing the algorithms (called "Xcompute" and "Ycompute") that identify the maxima and minima, on the other hand. *See, e.g.*, *id.* at 7:34-48 ("Referring still to Fig. 5, the cyclical process begins at step 400 . . . by scanning the conductor sensors . . . . The cycle process continues by performing the Xcompute loop . . . ."); *id.* at Fig. 5 (depicting the process of "SCAN CONDUCTORS: STORE IN RAM" as separate and coming before the "Xcompute" and "Ycompute" steps); *id.* at Fig. 8-1 (same). In other words, the "scanning" referred to by Elan is merely to the collection of raw data from the sensors, not the subsequent claimed method of analyzing that data (the "Xcompute" and "Ycompute" steps) to actually identify extrema. Thus, in my opinion, the evidence Elan relies upon to try and establish that the extrema can be identified in any order is actually completely irrelevant to that issue. It is certainly clear from the specification that the raw data may be collected from the touch sensor in any order. One of skill in the art, however, would certainly not understand that to mean that the claim language and specification as a whole should be ignored so that the claims may be understood to encompass the subsequent identification of extrema in any order.

81. Indeed, I understand that the parties have agreed that the claim term "scanning the touch sensor" means "measuring the values generated by a touch sensor to detect operative coupling and determining the corresponding positions at which the measurements are made."

See First Amended Joint Claim Construction Statement (Exh. 9), Exh. A. Completely consistent with the specification, this agreed upon construction refers only to the collection of raw data from the touch sensor. It does not refer to the analysis of that data to identify the extrema that are determinative of finger contact. Given the foregoing, those of ordinary skill in the art would reject Elan's attempt to conflate the "scanning" and "analysis" portions of the claim.

3. One Of Ordinary Skill In The Art Would Recognize That Elan's Constructions Suffer From A Number Of Problems

82. As noted above, for the purposes of this Investigation, Elan has proposed a new set of constructions that differ from the constructions Elan proposed on the two previous occasions that it litigated the '352 Patent. In my opinion, Elan's new constructions suffer from a number of additional problems that were not present in Elan's previous constructions and would fundamentally alter the claims to a form not reflected in the intrinsic record. One of ordinary skill in the art would immediately recognize these problems, and would thus be strongly dissuaded from adopting Elan's constructions.

83. First, I note that Elan's construction for "identify a first maxima . . ." calls for "a first set of values derived from the coupling of a first finger with the touch sensor . . . ." Similarly, Elan's construction for "identify a second maxima . . ." calls for "a set of values derived from the coupling of a second finger with the touch sensor . . . ." In this regard, Elan's constructions call for the analysis of two separate signals, or, alternatively, one signal that has been decomposed into two parts. The "first set of values" (*i.e.*, signal) apparently corresponds to the first finger, while another "set of values" (*i.e.*, signal) ostensibly corresponds to the second finger. Thus, Elan's constructions presuppose both (1) finger contact on the touchpad, and (2) that the signal (or signals) associated with the finger contact are already allocated to separate fingers. One of ordinary skill in the art would understand these constructions to be incorrect

because they preempt the very purpose of the claims, which is to determine whether there are multiple simultaneous finger contacts. Put another way, if, under Elan's constructions, the identifying steps of the claim merely involve the analysis of separate signals that are already known to each be attributable to the contact of a distinct finger, there would be no reason to carry out the claimed method, which the preamble says is "a method of detecting the operative coupling of multiple fingers . . . ." Simply put, one of ordinary skill in the art would understand that Elan's proposed constructions inappropriately put the cart before the horse.

84. One of ordinary skill in the art would be further troubled by Elan's proposed constructions because they inject ambiguity as to what signal or information is analyzed to determine if a "first minima" present. Specifically, while Elan's constructions call for the "first maxima" to be identified in a "first set of values" and the "second maxima" to ostensibly be identified in some other "set of values," Elan's construction for the "minima following the first maxima" term calls merely for the identification of a lowest absolute value following the first maxima. Elan's construction says nothing about whether the "minima" is identified in the "first set of values" associated with the first finger, the "set of values" associated with the second finger, or in some other unidentified signal or "set of values."

85. In any event, one of ordinary skill in the art would recognize that Elan's proposal for the claims to be understood in terms of separate signals corresponding to each finger finds no support in the claims or specification. Elan misinterprets the claim language "a first maxima in a signal corresponding to a first finger" as calling for a signal that is specifically for a certain finger. In my opinion, this represents a misreading of the claim language. In fact, it is the maximum that corresponds to a finger; the signal is an overall signal that reflects any and all

contact with the touchpad along an axis. In other words, the claim language "corresponding to a first finger" modifies the words "first maxima," not the word "signal."

86. To the extent Elan contends that the claim language is ambiguous on this issue, one of ordinary skill in the art would recognize that the specification does not contemplate any other reading. Indeed, the specification discloses nothing other than the use of a single finger profile that represents any and all contacts with the touchpad along an axis. *See, e.g.,* '352 Patent (Exh. 2) at Figs. 3-4, 7B-&F-2. Along these lines, the algorithm disclosed in the patent for determining the presence of two fingers analyzes a single array of data representing the contact along an axis at each sensor in the touchpad. *See, e.g., id.* at 8:56-58 ("X(N) Values, stored in memory, of finger-induced portion of capacitance measured on each conductor. N varies from 1 to Xcon."); *id.* at 8:61 ("Xcon The number of sensor conductors in the X direction."). There is no disclosure in the specification of the use of distinct data arrays for separate fingers, nor is there any disclosure in the specification regarding the segmentation of a single array of data into sub-arrays that each correspond to separate fingers. In light of this, one of ordinary skill in the art would immediately recognize that Elan's constructions reflect a misreading of the claims.

87. Finally, Elan's proposal that these claim terms be construed in terms of an "absolute value" in the signal or signals is inconsistent with the understanding of persons of ordinary skill in the art. For instance, Elan contends that the claim term "identify a minima following the first maxima" should be construed to mean "identify a lowest absolute value that follows the first maxima." One of ordinary skill in the art would understand, however, that an "absolute value" would always be a positive number, reflecting the distance that a certain point is away from the origin of the coordinate axis. As a result, in certain circumstances, Elan's proposed constructions could be quite problematic. Consider, for example, a situation where the

touchpad signal is referenced on a range of –N to +N volts offset such that the two maxima are above the X or Y = 0 axis and have positive values, while the minima lies below the X or Y = 0 axis and has a negative value. In these circumstances, the "lowest absolute value" that follows the first maxima would not, in fact, correspond to the minima in the finger profile. Rather, it would simply correspond to the point at which the finger profile first crosses the X or Y = 0 axis. One of skill in the art would understand that the '352 Patent is not concerned with the identification of such points, and that it is thus inappropriate to introduce the concept of "absolute value" into the claims.

B. "identify" (claims 1 and 18)

88. I understand the parties have proposed the following constructions for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"identify"	"recognize a value to be"	Plain meaning

89. "[I]dentify" first appears in claim 1:

> 1. A method for detecting the operative coupling of multiple fingers to a touch sensor involving the steps of
>
> scanning the touch sensor to (a) ***identify*** a first maxima in a signal corresponding to a first finger, (b) ***identify*** a minima following the first maxima, (c) ***identify*** a second maxima in a signal corresponding to a second finger following said minima, and
>
> providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima.

'352 Patent (Exh. 2) at Claim 1 (emphasis added).

90. One of skill in the art would recognize the claim language as supporting Apple's proposed construction, which specifically requires recognition that a value corresponds to a certain thing (*e.g.*, a maximum or minimum). Indeed, those of ordinary skill in the art would

recognize that this concept is reflected in the claim term "identify." Apple's position is also wholly consistent with the specification.

91. As explained above, the process of identifying the extrema in the '352 Patent involves sequentially comparing values stored at neighboring traces to determine if the "finger profile" is increasing to a peak or decreasing to a valley. When this algorithm determines that the values in the "finger profile" stop increasing, the specification explains that "the peak has been ***found***." *Id.* at 9:51-60. Accordingly, the "XPeak1" variable is set to the value of the maximum, and the "Xstate" status variable is set to indicate that the analysis is currently within a "valley" of the profile. *Id.* Because the specification explains that the peak is actually "found"—an event that is confirmed by the setting of two status variables—one of ordinary skill in the art would understand that the "identify[ing]" in the claims requires actual recognition of the first maxima as a maxima.

92. In a nearly identical fashion, the specification discloses that when the algorithm determines that the values of the finger profile are no longer decreasing such that the profile is at a minimum, "the valley is ***detected***." As a result, the "XValley" status variable is set to the value of the minimum, and the "Xstate" status variable is set to indicate that the analysis now proceeds uphill to a second peak. *Id.* at 10:1-8. As above, because the specification explains that the valley is "detected"—an event that is confirmed by the setting of two status variables—one of skill in the art would understand that the "identify[ing]" in the claims requires actual recognition of the minima as a minima.

93. This understanding of the claims is further supported by the prosecution history. Specifically, during prosecution, the examiner rejected the claims as anticipated by the Miller prior art reference. In so doing, the examiner explained that the Miller prior art reference

disclosed a system that "save[d] information for every node in its sensor matrix" such that if two fingers were to touch the apparatus "the corresponding profile plots would illustrate exactly" the finger profiles disclosed in the '352 patent. 12/5/97 Rejection (Exh. 13) at 352 CFH 0478. The patentee responded that Miller did not "suggest analyzing profile information" so that the "detection of two maxima" could be used to determine if two fingers were present. 4/8/1998 Amendment and Response (Exh. 6) at 352 CFH 0535-36. One of ordinary skill in the art would understand that the Applicant was explaining that the claims required more than the generation and storage of information that corresponded to multiple finger contacts. Indeed, subsequent analysis of that data according to the claims was required so that the touchpad could truly recognize the extrema determinative of multiple finger contacts.

94. Finally, I have reviewed the transcript of the claim construction hearing from the parallel District Court action between Elan and Apple, where the parties also dispute the meaning of the claim term "identify." My review of this transcript reveals that although Elan formally contends that this term requires no construction, it is actually in agreement with Apple that this claim term connotes recognition. *See* Jun. 23, 2010 CC Hearin Tr. (Exh. 14) at 59:11-17 ("THE COURT: Is it your view that putting aside whether or not it needs a construction, do you agree that there is an aspect – as you understand the term as you will be presenting argument on this issue does 'identify' connote some sort of recognition? It's beyond simply perception. It's actually recognizing something; Isn't that – MR. DEBRUINE: Yes."); *see generally also id.* at 59:20-63:5. This agreement is, in my opinion, unsurprising in light of the evidence discussed above.

C. "in response to" (claims 1 and 18)

95. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"in response to"	"after and in reaction to"	Plain meaning

96. "[I]n response to" first appears in claim 1:

> 1. A method for detecting the operative coupling of multiple fingers to a touch sensor involving the steps of scanning the touch sensor to (a) identify a first maxima in a signal corresponding to a first finger, (b) identify a minima following the first maxima, (c) identify a second maxima in a signal corresponding to a second finger following said minima, and providing an indication of the simultaneous presence of two fingers ***in response to*** identification of said first and second maxima.

'352 Patent (Exh. 2) at Claim 1 (emphasis added).

97. One of ordinary skill in the art would recognize that the claim language supports Apple's proposed construction. That is, one of ordinary skill in the art would recognize that the claim language calls for two maxima—and two maxima alone—to be determinative of the presence of two fingers. I understand that Elan's position is that the "in response to" limitation permits that two fingers be indicated based on the presence of two maxima plus any other criteria (unstated by Elan). *See, e.g.*, June 23, 2010 CC Hearing Tr. (Exh. 14) 69:5-16. I disagree with Elan's interpretation for the reasons explained below.

98. Claim 1 is specifically directed to a "method for detecting . . . multiple fingers." '352 Patent (Exh. 2) at Claim 1. Claim 1 further recites scanning the touch sensor to identify a first maxima, identify a minima, and finally identify a second maxima. *See id.* Following these steps—without any intervening or additional steps—the claim recites "providing an indication of . . . two fingers in response to identification of said first and second maxima." *Id.* Given this, one of ordinary skill in the art would understand that it is the identification of two maxima that is determinative of the presence of two fingers, not the identification of two maxima plus some other unspecified criteria.

99. One of ordinary skill in the art would recognize that the specification further supports this interpretation. For instance, the specification explains as follows:

> Referring next to FIG. 3, a finger profile is shown indicative of the presence of two fingers, spaced apart from one another. In particular, the circuitry, software or firmware of the touchpad circuitry, such as that shown in FIG. 2, detects a first maxima 85 indicative of a first finger in operative proximity to the touchpad 30, followed by a minima 90 indicative of a space between the fingers, and further followed by another maxima 95 indicative of a second finger operatively coupled to the touchpad 30.

Id. at 6:26-34. Explaining that the maxima are "indicative" of finger contact, this passage confirms that the presence of two fingers is determined by the presence of two maxima, as reflected in Apple's proposed construction.

100. The prosecution history further confirms Apple's proposed construction. For instance, during prosecution, the Applicant argued as follows:

> The present invention uniquely utilizes the detection of two maxima to determine if two fingers are present on the touchpad.

101. April 8, 1998 Amendment and Response (Exh. 6) at 352 CFH 0536. In my opinion, it is noteworthy that the Applicant characterized the invention as "uniquely" utilizing the detection of two maxima—and not some other unstated criteria—to determine if two fingers are present. Based on this alone, one of ordinary skill in the art would understand that the claim term "in response to" does not encompass indications that are provided in response to multiple factors, with identification of the first and second maxima being only one factor rather than a determinative factor.

102. Notably, this is not a stray remark from the prosecution history but one of several instances in the prosecution history where the Applicant characterized the '352 Patent in a similar fashion. For instance, during prosecution the Applicant explained as follows:

> The remaining claims are independent method and apparatus claims 1 and 35, and claims dependent thereon. ***These claims are directed to the feature of the invention which detects multiple fingers by detecting the multiple maxima in the profile on the touchpad. This distinguishes the prior art***, which calculates multiple fingers by detecting a rapid movement in the total centroid. This rapid movement of the prior art is due to the centroid being calculated on the combination of the two fingers, with the result being that the centroid moves rapidly when one finger is lifted.

Id. at 3 (emphasis added); *see also id.* at 4 ("The present invention addresses this deficiency of the '591 method by detecting two maxima in the profile information. This allows the detection of two fingers being present even if they are both placed down at the same time. Such a method is not shown or suggested by either of the Synaptics patents, which in fact teach away from this method."). Thus, in addition to stating that the use of two maxima to determine the presence of two fingers made the '352 patent "unique," the Applicant explicitly argued that the claims were different from the prior art on precisely the same basis.

103. Finally, I note that although the specification suggests that additional minor computational adjustments can be made before the final reporting of the number of fingers contacting the touchpad, *see, e.g.*, '352 Patent (Exh. 2) at 10:52-65, one of ordinary skill in the art would recognize that the claim language, specification, and file history establish that the indication of two fingers is based directly on the identification of the first and second maxima. As noted above, the claims include the steps of providing an indication of two fingers immediately following the identification steps. One of ordinary skill in the art would not understand the '352 Patent to disclose the use of additional factors to determine the presence of two fingers or the claims to cover such factors, whatever they might be. Accordingly, one of ordinary skill in the art would understand that "in response to" does not cover an indirect reaction.

D. "control function" (claims 14 and 19)

104. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"control function"	"function that would normally be provided by the actuation of buttons or switches on a mouse"	A function in response to contact with the touchpad, other than or in addition to movement of a cursor

105. "[C]ontrol function" first appears in claim 14:

> 14. The method of claim 1 further comprising the step of:
>
> selecting an appropriate ***control function*** based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers.

'352 Patent (Exh. 2) at Claim 14 (emphasis added).

106. One of ordinary skill in the art would recognize that the claims support Apple's interpretation. For instance, unasserted Claim 11 refers to a "drag ***control function***," which is a typical "function that would normally be provided by the actuation of the buttons or switches on a mouse" (in combination with movement of the mouse). *See id*. at Claim 11. Based on the usage of the term "control function" in Claim 11, one of skill in the art would understand that the terms should be understood in a likewise fashion in other claims.

107. The specification confirms this understanding. Indeed, as noted above, the '352 Patent is entitled "Multiple fingers contact sensing method for emulating mouse buttons and mouse operations on a touch sensor pad." *Id.* at Title. Thus, one of ordinary skill in the art would immediately recognize upon first glancing at the '352 Patent that it relates to detecting multiple finger contacts for the specific purpose of emulating a mouse. Individual claims that are directed specifically to events that result from the detection of a number of fingers, an amount of time the fingers are in contact with the touchpad, and any movement of said fingers would be understood by those of skill in the art accordingly.

108. The rest of the specification confirms this understanding. Indeed, the specification teaches that the very purpose of detecting multiple fingers is to emulate the mouse button. *See, e.g.*, *id.* at 2:56-3:15 (noting that "the present invention can be described in most of its applications by establishing one finger as controlling movement of the cursor, and the second finger as controlling functions equivalent to a mouse button or switch"); 4:36-39 (noting that a "further object of the present invention is to provide a method for effecting on a touchpad, through the use of multiple finger contacts, a plurality of conventional mouse button functions"). In other words, the specification teaches that contacting the touch sensor with the second finger will cause the equivalent of pressing a mouse button. *See, e.g.*, *id.* at 6:50-58 ("As noted previously, the second or additional fingers are typically involved to provide 'button' or control functions, similar to actuation of the buttons or switches on a mouse."); 11:56-12:4 ("In particular, the ability of the previously described methodology to recognize multiple fingers allows the first finger to serve, essentially, as the 'point' finger, while additional fingers serve as the 'click' finger(s)."). Because the specification repeatedly confirms that multiple fingers are detected so that a mouse button may be emulated, one of ordinary skill in the art would understand that the term "control function" in the context of the '352 patent refers to functions normally associated with the actuation of buttons or switches on a mouse.

109. This understanding is also confirmed by the prosecution history. As noted above, the '352 Patent was originally entitled merely "Multi-Contact Sensing Method and Apparatus." However, to more clearly point out that a primary purpose of the invention was to emulate mouse functions, the Applicant amended the title to its current form, which specifically refers to "Emulating Mouse Buttons and Mouse Operations." *See* August 22, 1997 Amendment and Response (Exh. 15) at 1. Similarly, in discussing a "control function," Applicant explained that

"[i]n particular, claim 20 specifies a control function, which could be a cursor movement, click, etc. Claim 24 further specifies the control function is in a particular embodiment a cursor movement." *Id*. at p.7-8. Thus, the applicant equated the term "control function" to well-known conventional functions of a mouse.

110. Finally, and perhaps most telling, during prosecution, the Applicant explained as follows: "The steps of claim 23 relating to using the first finger for cursive movement and a second finger for a control function is discussed, for example, on page 8, lines 31-38." *Id*. at p.8 The excerpt from page 8 of the patent that the applicant referred to is as follows:

> To operate effectively, the present invention must detect and distinguish the presence of a single finger, and the presence of multiple fingers. ***As noted previously, the second or additional fingers are typically involved to provide 'button' or control functions, similar to actuation of the buttons or switches on a mouse.*** Although the following example describes in detail the use of only two fingers, one for cursor control and a second as a button, the teachings herein are believed sufficient to permit those skilled in the art to construct apparata using multiple fingers for additional buttons.

'352 Application (Exh. 16) at 8:31-38 (emphasis added). Thus, to explain where the patent referred to a "control function," the Applicant pointed to the exact portion of the specification that describes emulating mouse buttons. In light of this usage, one of ordinary skill in the art would understand that in the context of the '352 patent a "control function" is, in fact, a function that would normally be provided by the actuation of buttons or switches on a mouse.

E. "means for providing an indication" (claim 18)

111. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"means for providing an indication"	This limitation is governed by 35 U.S.C. § 112(6). The recited function is providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima. The corresponding structure is the algorithm found in Fig. 8-1, which sets a finger value equal to two after determining if a scan in either the X direction or the Y direction has detected two fingers.	This limitation is governed by 35 U.S.C. § 112(6). The function is providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima. The corresponding structure is firmware or software that provides data indicating the simultaneous presence of two fingers in response to identification of said first and second maxima and equivalents thereof.

112. "[M]eans for providing an indication" first appears in claim 18:

> 18. A touch sensor for detecting the operative coupling of multiple fingers comprising:
>
> means for scanning the touch sensor to (a) identify a first maxima in a signal corresponding to a first finger, (b) identify a minima following the first maxima, and (c) identify a second maxima in a signal corresponding to a second finger following said minima, and
>
> ***means for providing an indication*** of the simultaneous presence of two fingers in response to identification of said first and second maxima.

'352 Patent (Exh. 2) at Claim 18 (emphasis added).

113. I understand that the parties agree that this is a means-plus-function term. I further understand that the parties agree that the claimed function is "providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima."

114. As to the corresponding structure, one of ordinary skill in the art would recognize that it is the algorithm of Figure 8-1 of the '352 Patent. As set forth below, in the algorithm of

Fig. 8-1, a "FINGER" variable is set to indicate the number of fingers contacting the touch sensor:

> At step 850, a determination is made whether two fingers are in contact with the touchpad by evaluating both Xcompute and Ycompute. If neither Xcompute nor Ycompute indicate the presence of two fingers, the answer is NO and the process drops to step 855. However, if either the Xcompute routine or the Ycompute routine indicates the presence of two fingers [*i.e.*, identified a first maxima, minima, and a maxima], the answer at step 850 is YES and the process moves to step 860, where the value of the variable FINGER is set to 2.

115. *Id.* at 14:8-17. By setting the FINGER variable to 2, the algorithm provides an indication to other software or software modules capable of accessing the FINGER variable that two fingers are simultaneously present. Indeed, in January 1996, setting a variable to a value was one of many well-known techniques for providing an indication in the context of computer programming. Thus, one of ordinary skill in the art would recognize that the algorithm set forth in Fig. 8-1 is the corresponding structure for this claim element.

116. Elan, however, takes the position that the corresponding structure is "firmware or software that provides data indicating the simultaneous presence of two fingers in response to identification of said first and second maxima." I disagree with this view. In my opinion, Elan's proposed corresponding structure is vague and ambiguous and does not provide a link to any structure in the specification. Indeed, Elan's proposed structure makes no reference to anything in the specification and instead just recites the claimed function verbatim as something that can be done by generic firmware or software. Thus, under Elan's proposed constructions, the claims apparently cover every conceivable method of carrying out the claimed function. This view, however, does not provide any guidance to one of ordinary skill in the art regarding the scope of the claims. Rather, it leaves them boundless. As a result, under Elan's proposed construction,

one of ordinary skill in the art would be unable to determine the scope of the claims, a situation that one of ordinary skill in the art would find unacceptable.

117. I understand that Elan has recently identified portions of the specification as supporting its proposed corresponding structure, including Figures 5 (steps 465, 540), 6-1, 6-2 (step 310), 8-1 (steps 860, 915), 9-1 and 9-2 (steps 980) and 7:1-6, 7:49-8:15, 14:3-55 and 15:12-31. Although neither Elan nor Mr. Dezmelyk have explained how these portions of the specification support its proposed corresponding structure, I have reviewed these passages and disagree that that they provide any support for the generic corresponding structure Elan has proposed. In fact, even if Elan were proposing that these passages were themselves corresponding structure for the "means for providing an indication" limitation, I would disagree. A person of ordinary skill in the art would not understand the passages Elan identifies as providing corresponding structure for the function of "providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima," but instead, as relating to other functions such as computing motion and setting "button" states.

F. "means for selecting an appropriate control function" (claim 19)

118. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"means for selecting an appropriate control function"	This limitation is governed by 35 U.S.C. § 112(6). The recited function is selecting an appropriate control function based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers. Because the specification does not disclose a corresponding structure, this limitation is indefinite	This limitation is governed by 35 U.S.C. § 112(6). The function is selecting an appropriate control function based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers. The corresponding structure includes the structure of claim 18 and firmware, software or hardware that receive as inputs the number of fingers detected, the amount of time the fingers are detected and any movement of said fingers and selects an appropriate control function and equivalents thereof.

119. One of ordinary skill in the art in January 1996 would not have been able to identify the corresponding structure of "means for selecting an appropriate control function" in the specification of the '352 Patent because the specification fails to disclose the corresponding structure for performing this function.

120. "[M]eans for selecting an appropriate control function" first appears in claim 19:

> 19. The touch sensor of claim 18 further comprising:
>
> ***means for selecting an appropriate control function*** based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers.

'352 Patent (Exh. 2) at Claim 19 (emphasis added).

121. I understand that the parties agree that this is a means-plus-function term. I further understand that the parties agree that the claimed function is "selecting an appropriate

control function based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers."

122. As to the corresponding structure, one of ordinary skill in the art would recognize that although the specification discloses various cursor movement and control functions, it fails to disclose a structure or algorithm that would actually carry out the process of "selecting an appropriate control function" based on a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers. I understand that Elan again takes the position that the corresponding structure of "means for selecting an appropriate control function" is simply generic firmware or software that can perform the claimed function. Indeed, as above, Elan's proposed structure makes no reference to anything in the specification and instead just recites the claimed function verbatim as something that can be done by generic firmware or software. However, one of ordinary skill in the art would recognize that this vague and ambiguous recitation does not provide a link to any actual structure in the specification. Thus, under Elan's proposed constructions, the claims apparently cover every conceivable method of carrying out the claimed function. This view, however, does not provide any guidance to one of ordinary skill in the art regarding the scope of the claims. Rather, it leaves them boundless. More importantly, my review of the specification reveals that it does not disclose any structure, algorithm, or method for using the touch values generated from the touch sensor to determine the number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers and then use those things to select an appropriate control function. In these circumstances, one of skill in the art would be completely unable to determine the scope of the claims.

123. I am informed that Elan has taken the position that its proposed corresponding structure should perhaps be understood more narrowly than the plain language of its proposed corresponding structure would indicate. Specifically, I am informed that in parallel litigation in the Northern District of California, Elan has taken the position that Figs. 7B-7F-2 and 8-9 and accompanying text constitute corresponding structure for this claim element. However, even if Elan's proposed construction were understood narrowly, it is my opinion that Elan's construction would still be unsatisfactory because none of Figs. 7B-7F-2 and 8-9 include necessary logic for taking the combination of the number of fingers detected, the amount of time said fingers are detected, and any movement of the fingers and producing an appropriate control function (for example, click, double-click, or drag functions). This translation is the claimed function and, in my opinion, the patent provides no algorithm for performing it.

124. Beginning first with Figs. 7B-7F-2, the following excerpt pertaining to these figures is typical in that it discloses a series of exemplary mappings between gestures and control functions, but fails to disclose any sort of algorithm or mechanism for translating the inputs (*i.e.*, a number of fingers detected, the amount of time the fingers are detected, and any movement of fingers) into the required outputs (*i.e.*, an appropriate control function):

> While the foregoing sequence can be programmed to define any number of cursor movement and control functions, an exemplary definition of the functions associated with such sequences can be the following: For the period from 700 through 705 the relative motion of a single finger can be defined to mean cursor movement for that period, from the beginning point until the relative ending point. During the period 710 to 720, a second finger is detected and then removed, which is defined in an exemplary embodiment as a single finger tap which may be a 'select' function such as selecting one item from a screen menu. During the period 720 until 730, the single finger again moves the cursor, while at 740 the second finger reappears to enable a different function. The second finger moves across the sensor, together with the first finger, until at 755 both fingers are removed. Again, such sequences--all of which may be regarded as gestures--can be mapped to control functions in numerous ways, but

> one reasonable definition is that the presence of two fingers engaged in relative motion is a 'drag function,' such as where an entity was selected by the first tap and dragged to a new location, where it is dropped by the removal of both fingers at 750.

Id. at 13:1-22. In my opinion, this text, and other text like it, provides at most a black box of exemplary control functions that result from some undefined process.

125. Indeed, the passage above explains that the illustrations in Figs. 7A-F "***can be programmed*** to define any number of cursor movement and control functions . . . ." *Id.* at 13:1-4 (emphasis added). Stating only that the touchpad "can be programmed" so that the illustrations define "any number" of functions, this passage only suggests the possibility of an algorithm. It does not, in my opinion, actually disclose an algorithm. Similarly, the passage above explains as follows: "Again, such sequences—all of which may be regarded as gestures—***can be mapped*** to control functions in numerous ways, but one reasonable definition is . . . ." *Id.* at 13:16-20. Though suggesting that some mapping is possible, this passage fails to offer guidance as to ***how*** an "appropriate control function" is actually selected. Instead, it provides mere examples of outcomes of some algorithm.

126. While Figs. 7A-F and its accompanying text disclose the results of some algorithm, Figs. 8-9 disclose nothing but a method for determining some of the inputs to the algorithm. Indeed, one of ordinary skill in the art would recognize that these figures and their accompanying text describe only a method for keeping track of finger position and an algorithm for determining "whether zero, one or two fingers are in contact with the touchpad." *See id.* at 13:61-64, 14:4-15:31, Fig. 8. That is, these figures, provide at most a method for determining two of three things that claim 19 specifically recites as the input to the claimed function.

127. As to the third input to the claimed function (*i.e.*, the amount of time the fingers are on the touchpad), these figures fail to include any disclosure whatsoever. Furthermore, my

review of the rest of the ’352 Patent specification reveals that it too fails to include any disclosure related to this issue. Along these lines, my review of the claim construction hearing transcript from the parallel District Court action reveals that Elan was unable to identify any disclosure pertaining to determining the amount of time the fingers are in contact with the touchpad. Instead, Elan asserted that this is something that would be within the knowledge of one skilled in the art and pointed to disclosures related to this issue in references that are completely extrinsic to the ’352 Patent, such as prior art computing devices and patent applications. *See, e.g.*, June 23, 2010 CC Hearing Tr. (Ex. 14) at 76:19-77:25. Thus, Elan’s reliance on Figs. 8-9 of the Patent falls short—it discloses only two of the three inputs to the claimed function.

128. More importantly, even if Figs. 8-9 disclosed all of the inputs to the claimed function, the ’352 Patent still would not, in my opinion, disclose a structure that corresponds to the claimed function. Indeed, although the ’352 Patent discloses two of the three inputs to the claimed function (Figs. 8-9) and also the outputs (*i.e.*, Fig. 7) of the claimed function, it fails to include any disclosure of an actual algorithm for mapping the inputs to the outputs. One of ordinary skill in the art would recognize this is the structure that would correspond to the claimed function. Failing to include any disclosure related to this issue, one of skill in the art would be left unable to ascertain the scope of the claims.

G. "means for detecting a distance between said first and said second maxima" (claim 24)

129. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"means for detecting a distance between said first and said second maxima"	This limitation is governed by 35 U.S.C. § 112(6). The recited function is detecting a distance between said first and second maxima. Because the specification does not disclose a corresponding structure, this limitation is indefinite	This limitation is governed by 35 U.S.C. § 112(6). The function is detecting a distance between the first and second maxima and equivalents thereof. The corresponding structure includes the structure of claim 18 and firmware, software or hardware that determines the distance between the location of the first maxima and the location of the second maxima and equivalents thereof.

130. One of ordinary skill in the art in January 1996 would not have been able to identify the corresponding structure of "means for detecting a distance between said first and said second maxima" in the specification of the '352 Patent because the specification fails to disclose the corresponding structure for performing this function.

131. "[M]eans for detecting a distance between said first and said second maxima" first appears in claim 24:

> 24. The touch sensor of claim 18 further comprising:
>
> ***means for detecting a distance between said first and second maxima.***

'352 Patent (Exh. 2) at Claim 24 (emphasis added).

132. I understand that the parties agree that this is a means-plus-function term. I further understand that the parties agree that the claimed function is "detecting a distance between said first and second maxima."

133. One of ordinary skill in the art would recognize that although the specification discloses certain reasons for needing to measure the distance between the first and second

maxima, it fails to disclose a structure or algorithm that would actually carry out this task. The following excerpt from the specification is exemplary:

> To avoid artifacts, a threshold may be applied to the both the maximum and minimum distance between the maxima representative of multiple fingers. For example, a threshold requiring the maxima to be within five centimeters of one another may be used to limit the maximum distance between the fingers; other thresholds may be appropriate in some embodiments. A threshold representative of the minimum distance may be configured by establishing a maximum value of the local minima 100.

Id. at 6:59-67. Although this passage explains that it is desirable to detect the distance between peaks to "avoid artifacts" and "limit the maximum distance between the fingers," it fails to set forth even a rudimentary algorithm for determining the distance between fingers. After reviewing the specification of the '352 Patent thoroughly, I was unable to detect any such disclosure. Accordingly, it is my opinion that one of skill in the art would be completely unable to determine the scope of the claims.

134. Elan contends that the corresponding structure is "firmware, software or hardware that determines the distance between the location of the first maxima and the location of the second maxima and equivalents thereof." I disagree with this view. In my opinion, Elan's proposed corresponding structure is vague and ambiguous and does not provide a link to any structure in the specification. Indeed, Elan's proposed structure makes no reference to anything in the specification and instead just recites the claimed function verbatim as something that can be done by generic firmware or software. Thus, under Elan's proposed constructions, the claims apparently cover every conceivable method of carrying out the claimed function. This view, however, does not provide any guidance to one of ordinary skill in the art regarding the scope of the claims. Rather, it leaves them boundless. Accordingly, one of ordinary skill in the art would find Elan's proposed construction unacceptable.

135. I understand that Elan has recently identified portions of the specification as supporting its proposed corresponding structure, including 3:21-26 and 6:59-67. Although neither Elan nor Mr. Dezmelyk have explained how these portions of the specification support its proposed corresponding structure, I have reviewed these passages and disagree that that they provide any support for the generic corresponding structure Elan has proposed. In fact, even if Elan were proposing that these passages were themselves corresponding structure for the "means for detecting a distance between said first and second maxima" limitation, I would disagree. A person of ordinary skill in the art would not understand the passages Elan identifies as providing corresponding structure for the function of "detecting a distance between said first and second maxima," but instead, as merely stating the *possibility* that distance could be detected. Neither passage cited by Elan would teach a person of ordinary skill in the art *how* this distance is detected in the context of the '352 patent.

H. "means for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time" (claim 26)

136. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"means for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time"	This limitation is governed by 35 U.S.C. § 112(6). The recited function is providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time. Because the specification does not disclose a corresponding structure, this limitation is indefinite	This limitation is governed by 35 U.S.C. § 112(6). The function is providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time. The corresponding structure includes the structure of claim 18 and firmware, software or hardware that outputs a value corresponding to a click function in response to the removal and reappearance of the second maxima within a predetermined period of time and equivalents thereof.

137. One of ordinary skill in the art in January 1996 would not have been able to identify the corresponding structure of "means for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time" in the specification of the '352 Patent because the specification fails to disclose the corresponding structure for performing this function.

138. "[M]eans for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time" first appears in claim 26:

> 26. The touch sensor of claim 18 further comprising:
>
> ***means for providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time.***

'352 Patent (Exh. 2) at Claim 26 (emphasis added).

139. I understand that the parties agree that this is a means-plus-function term. I further understand that the parties agree that the claimed function is "providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time."

140. In my opinion, the specification fails to disclose any structure or algorithm that would "provid[e] a click function." One of ordinary skill in the art in January 1996 would have understood that there are two steps involved in "providing a click function." Indeed, a "click function" has some effect on an application or the operating system, whereas detecting the "click" on a touch sensor is performed by completely separate hardware and software (such as the touch sensor microprocessor, firmware, and/or a touch sensor driver). Thus, to provide a click function, (1) separate hardware and software must first communicate that a click was detected to the appropriate application or operating system, and (2) then the appropriate application or operating system must carry out the function associated with that click (*i.e.*, the click function). My review of the specification reveals that it fails to disclose any structure or algorithm that would accomplish either of these things. As a result, one of ordinary skill in the art would be unable to determine the scope of the claims.

141. Elan contends that the corresponding structure is "firmware, software or hardware that outputs a value corresponding to a click function in response to the removal and reappearance of the second maxima within a predetermined period of time and equivalents thereof." I disagree with this view. In my opinion, Elan's proposed corresponding structure is vague and ambiguous and does not provide a link to any structure in the specification. Indeed, Elan's proposed structure makes no reference to anything in the specification and instead does little more than recite the claimed function verbatim as something that can be done by generic

firmware or software. The only thing Elan's construction adds relative to the plain language of the agreed upon function is language calling for the firmware or software to "output[] a value" that corresponds to a click function. In my opinion, this adds nothing of substance. Certainly, it does not disclose an algorithm for "providing a click function." Accordingly, one of ordinary skill in the art would recognize that Elan's proposed construction offers no guidance for determining the scope of the claims.

142. I understand that Elan has recently identified portions of the specification as supporting its proposed corresponding structure, including Figures 7-9, 2:38-4:16, 7:1-5, and 11:24-16:5. Although neither Elan nor Mr. Dezmelyk have explained how these portions of the specification support its proposed corresponding structure, I have reviewed these passages and disagree that that they provide any support for the generic corresponding structure Elan has proposed. In fact, even if Elan were proposing that these passages were themselves corresponding structure for the "means for providing a click function" limitation, I would disagree. A person of ordinary skill in the art would not understand the passages Elan identifies as providing corresponding structure for the function of "providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time." Nowhere in the figures or passages cited by Elan is there a disclosure to one of ordinary skill in the art as to how a click function can be provided based on actions within a predetermined period of time. Indeed, while considerations such as finger count, finger movement and button state are disclosed as inputs for functions, the '352 Patent does not disclose to one of ordinary skill in the art how functions are performed based on action within a set period of time.

I. "means for calculating first and second centroids corresponding to said first and second fingers" (claim 30)

143. I understand the parties have proposed the following construction for this term:

Claim Term	Apple's Proposed Construction	Elan's Proposed Construction
"means for calculating first and second centroids corresponding to said first and second fingers"	This limitation is governed by 35 U.S.C. § 112(6). The recited function is calculating first and second centroids corresponding to said first and second fingers. Because the specification does not disclose a corresponding structure, this limitation is indefinite	This limitation is governed by 35 U.S.C. § 112(6). The function is calculating first and second centroids corresponding to the first and second fingers. The corresponding structure includes the structure of claim 18 and hardware, firmware or software that calculates the centroids of the measured values corresponding to the first and second fingers and equivalents thereof.

144. One of ordinary skill in the art in January 1996 would not have been able to identify the corresponding structure of "means for calculating first and second centroids corresponding to said first and second fingers" in the specification of the '352 Patent because the specification fails to disclose any corresponding structure for performing this function.

145. "[M]eans for calculating first and second centroids corresponding to said first and second fingers" first appears in claim 30:

> 30. The sensor of claim 18 further comprising ***means for calculating first and second centroids corresponding to said first and second fingers.***

'352 Patent (Exh. 2) at Claim 30 (emphasis added).

146. I understand that the parties agree that this is a means-plus-function term. I further understand that the parties agree that the claimed function is "calculating first and second centroids corresponding to said first and second fingers."

147. One of ordinary skill in the art would recognize that although the specification discloses an algorithm to calculate a single centroid and recognizes the prior art problem

associated with attempting to calculate two centroids simultaneously (a separate centroid for each of two fingers contacting the touch sensor), the specification fails to disclose an algorithm to calculate both centroids.

148. For instance, the specification explains as follows:

> In an exemplary embodiment, the Xcompute process then continues by calculating the centroid for the fingers detected, so long as the maxima exceed a threshold value. In accordance with the present invention, two approaches may be used in calculating centroid values. In a first implementation, only a single centroid value is calculated for the combination of one or more fingers. In this arrangement, it will be apparent that, when a second finger contacts the touchpad, the centroid 'jumps' laterally approximately to the midpoint of the two fingers. In a second implementation, a centroid value may be calculated for each maxima, yielding multiple centroid values when multiple fingers interact with the pad. ***For purposes of clarity, the following description will be limited to the first implementation.***

Id. at 10:31-45 (emphasis added). Thus, according to the bolded text above, the specification specifically omits the description of detecting both centroids.

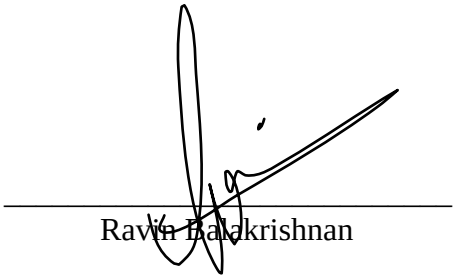
149. In my opinion, this omission is critical because one of ordinary skill in the art in January 1996 would have understood that detecting two centroids does not involve simply applying the same algorithm used for detecting a single centroid twice. One reason for this was the well-known "segmentation" problem. Briefly, in certain situations where two fingers contact the touch pad, it is difficult to determine whether a capacitance reading should be grouped as part of the first finger's contact area (first centroid) or the second finger's contact area (second centroid). Thus, an algorithm is required to "segment" the two contact areas. My review of the specification reveals that it fails to disclose any algorithm that would accomplish this or any of the other tasks attendant to calculating two separate centroids. As a result, one of ordinary skill in the art would be unable to determine the scope of the claims.

150. Elan contends that the corresponding structure is "hardware, firmware or software that calculates the centroids of the measured values corresponding to the first and second fingers and equivalents thereof." I disagree with this view. In my opinion, Elan's proposed corresponding structure is vague and ambiguous and does not provide a link to any structure in the specification. Indeed, Elan's proposed structure makes no reference to anything in the specification and instead does nothing more than recite the claimed function verbatim as something that can be done by generic firmware or software. Thus, under Elan's proposed constructions, the claims apparently cover every conceivable method of carrying out the claimed function. This view, however, does not provide any guidance to one of ordinary skill in the art regarding the scope of the claims. Rather, it leaves them boundless. Accordingly, one of ordinary skill in the art would find Elan's proposed construction unacceptable.

151. I understand that Elan has recently identified portions of the specification as supporting its proposed corresponding structure, including Figs 6 and 9 and 10:31-51. Although neither Elan nor Mr. Dezmelyk have explained how these portions of the specification support its proposed corresponding structure, I have reviewed these passages and disagree that that they provide any support for the generic corresponding structure Elan has proposed. In fact, even if Elan were proposing that these passages were themselves corresponding structure for the "means for calculating first and second centroids" limitation, I would disagree. A person of ordinary skill in the art would not understand the passages Elan identifies as providing corresponding structure for the function of "calculating first and second centroids corresponding to said first and second fingers." To the contrary, the patent specifically describes an implementation in which one centroid value is calculated while omitting a corresponding description for implementations in which more than one centroid value is calculated. *Id.* at 10:31-51 (describing

two implementations and noting that "[f]or purposes of clarity, the following description will be limited to the first implementation").

Dated: 7/14/2010



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