

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HP INC., DELL TECHNOLOGIES INC., DELL INC.,
ASUSTEK COMPUTER INC., and ASUS GLOBAL PTE. LTD.,
Petitioners,

v.

LITL LLC,
Patent Owner.

Case No. IPR2024-00404
Patent No. 8,624,844

DECLARATION OF MARTIN WALKER, Ph.D.

LiTL Exhibit 2021 HP Inc. v. LiTL IPR2024-00404

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I, Martin Walker, declare:

1. I submit this declaration in connection with Patent Owner's Response in the *Inter Partes* Review of claims 1, 3, 4, 7-10, 13, 14, 16-18, and 22 ("challenged claims") of U.S. Pat. No. 8,624,844 ("the '844 patent"; Ex. 1001). I have been retained by Wolf, Greenfield & Sacks, P.C., counsel for Patent Owner LiTL LLC, in this matter. I am being compensated for my time at my standard rate of \$650.00 per hour, plus actual expenses. My compensation is not dependent in any way upon the outcome of the *inter partes* review of the '844 patent.

I. PERSONAL AND PROFESSIONAL BACKGROUND

2. My curriculum vitae is attached at the end of this declaration as Exhibit A. My CV includes a list of matters in which I have provided technical analysis or opinion, such as by testimony at trial or by deposition, or in the form of an expert report. Below I summarize some of my relevant academic and non-academic experience.

3. As described in my CV, I received my B.S. in Electrical Engineering from Massachusetts Institute of Technology in 1973. I received my M.S. and Ph.D. degrees in Electrical Engineering from Stanford University in 1976 and 1979, respectively. I further completed the AEA Stanford Executive program with distinction in 1987.

4. For the last forty years I have worked in industry writing and analyzing source code. I began working on software source code in the 1970s as part of my Ph.D. research. During my consulting career, I have worked on numerous engagements relating to mobile devices, including analysis of Windows, Apple, and Android devices. During my consulting career, I gained experience in reverse engineering source code with respect to infringement of at least ten different families of patents. In particular, I have analyzed the operation of mobile systems to determine their functionality.

5. In 1983, I founded Analog Design Tools, Inc., and was its Chief Technical Officer (CTO) until 1989. Analog Design Tools developed a software product that was used to design integrated circuits (ICs). I was primarily responsible for writing the original business plan, raising the venture capital necessary to launch the company, and recruiting the staff. Later, I was responsible for all technical aspects of product definition and development. My efforts were instrumental in growing Analog Design Tools from a startup company to a leader in the field of analog design automation. Accordingly, I have first-hand experience at a startup software company developing a software product for end-user designers. I personally was involved in translating an idea for a product into a proof of concept that then evolved into a fully functioning and successful product.

6. In 1990, I was. Founder of Symmetry Design Systems and was its Executive Vice President until 1994. The company specialized in product design and consulting for the electronic design marketplace. In this role, I was instrumental in the development of Symmetry's products. I was personally involved in translating an idea for a product into a proof of concept and finally into a fully functioning product.

7. In 1995, I founded Frequency Technology (later called Sequence Design), which developed EDA software for the design of advanced system-on-chip integrated circuits. Sequence's products have become the *de facto* industry standard for parasitic extraction, circuit optimization, and RTL power analysis. As Chief Executive Officer, director, and Chief Scientist at Sequence, I was involved in overseeing the development of the company's products and technologies. I also took an active role in recruiting the technical and business staff. I worked with an expert in on-chip interconnect technology to formulate algorithms for interconnect analysis. Additionally, I developed a proof of concept for a validation process. This proof of concept formed the basis for an industry-adopted validation approach for interconnect analysis. I have also served as the CTO for Knowledge Networks, an internet-based consumer market research startup.

8. I have written over fifty articles in the fields of computer software design, including technical papers in peer-reviewed journals, an invited article in

IEEE Spectrum, and various conference proceedings. I have organized seminars and written numerous opinion pieces published in journals such as the EE Times. A list of my most recent publications can be found in my CV attached as Appendix A.

9. I, or companies I founded, have received numerous awards. In 1976, I received the IEEE Microwave Applications award recognizing contributions to the design of GaAsFET amplifiers. Analog Design Tools was awarded the 1984 Electronic Products New Product of the Year award for the Analog Workbench. Additionally, Frequency Technology was recognized by Fortune Magazine as a “Cool Company” in 1999.

10. I am the named inventor of the three U.S. patents, listed below. The patents are generally directed to the analysis of parasitic impedance within an integrated circuit:

- U.S. Patent No. 6,643,831 — Method and system for extraction of parasitic interconnect impedance including inductance (issued Nov. 4, 2003);
- U.S. Patent No. 6,381,730 — Method and system for extraction of parasitic interconnect impedance including inductance (issued Apr. 30, 2002); and
- U.S. Patent No. 5,901,063 — System and method for extracting parasitic impedance from an integrated circuit layout (issued May 4, 1999).

II. MATERIALS REVIEWED AND CONSIDERED

11. My findings, as explained below, are based on my years of education, research, experience, and background, as well as my investigation and study of relevant materials for this declaration. When developing the opinions set forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth in Section IV below. In forming my opinions, in addition to the Petition (Paper 6) and the Institution Decision (Paper 12), I have studied and considered the materials identified in the list below.

Exhibit	Description
1001	U.S. Patent No. 8,624,844
1002	Declaration of Dr. Andrew Wolfe
1003	File History for U.S. Patent No 8,624,844
1006	WIPO Pub. No. WO 95/24007 (“Lane”)
1007	Windows XP Pro – The Missing Manual (“Pogue”)
1008	U.S. Pat. No. 6,771,494 (“Shimano”)
1015	U.S. Pat. No. 5,689,667 (“Kurtenbach”)
1020	U.S. Pat. Pub. No. 2006/0026535 (“Hotelling”)
2001	[No Author Listed], The Litl webbook. European Consumers Choice. URL= https://www.europeanconsumerschoice.org/hi-tech/litlwebbook-computer-test-and-reviews/ [last accessed June 25, 2021]
2002	[No Author Listed], Litl Webbook Beats ChromeOS, Becomes First Cloud Computer. CoolThings. November 16, 2009. URL: https://www.coolthings.com/litl-webbook-beats-chromeosbecomes-first-cloud-computer/ [last accessed June 25, 2021]
2003	Noe, The Litl Webbook: A more social computing device. November 5, 2009. Corr77. URL: https://www.core77.com/posts/15122/The-Litl-Webbook-A-more-social-computing-device [last accessed June 25,

Exhibit	Description
	2021]
2004	Saxena, CES 2010: All New Litl Webbook Makes Its Debut Appearance. Elite Choice. URL: https://elitechoice.org/luxury/ces-2010-all-new-litl-webbook-makes-its-debut-appearance [last accessed June 25, 2021]
2005	McDonald, LiTL Webbook Review. Little Tech Girl. August 31, 2010. URL: https://littletechgirl.com/2010/08/31/litl-webbook-review/ [last accessed June 25, 2021]
2006	Strauss, Litl Webbook Re-Defines Computing. ABC News. December 14, 2009. URL: https://abcnews.go.com/Technology/GadgetGuide/litlwebbook-defines-computing/story?id=9311095 [last accessed June 25, 2021]
2007	Scinto, Introducing The Litl WebBook. The Gadgeteer. November 19, 2009. URL: https://the-gadgeteer.com/2009/11/19/introducing-the-litlwebbook/ [last accessed June 25, 2021]
2008	[No Author Listed], All-New Litl Webbook Debuts at 2010 CES. Cision. January 5, 2010. URL: https://www.prnewswire.com/newsreleases/all-new-litl-webbook-debuts-at-2010-ces-80716797.html [last accessed June 25, 2021]
2013	Merriam-Webster's Collegiate Dictionary, Eleventh Edition, 2007
2014	The American Heritage College Dictionary, Fourth Edition, 2007
2015	Webster's New College Dictionary, Third Edition, 2008
2016	Microsoft Windows XP Tablet PC Edition, Tablet PC: An Overview, White Paper, June 2002
2017	Yardena Arar, Computerworld, Microsoft previews pen-based Windows XP variant at TechXNY, June 25, 2002
2018	Windows XP Tablet PC Edition: Product Information available at: https://download.microsoft.com/documents/australia/windows/Tablet_PC_ProductInfo.pdf

Exhibit	Description
2019	Working with Input from Touch Screens, Microsoft, September 23, 2009 available at https://learn.microsoft.com/en-us/previous-versions/windows/desktop/windows-media-center-sdk/ee526140(v=msdn.10)
2020	Deposition Transcript of Andrew Wolfe, Ph.D., August 2, 2024
2022	Davidson, John, “Nice work, V2,” 14 Austl. Fin. Rev. (February 4, 2022)
2023	Bendre, Ritesh, “Neonode Airbar first impressions: This clever accessory adds touchscreen functionality to any non-touch laptop,” BGR India (July 25, 2017).
2024	Maxham, Alexander, “Apple's Next MacBook feature is something no one wanted,” Android Headlines (January 12, 2023)
2025	Saxena, Muskaan, “Touchscreen MacBooks could launch in the 'next few years' - but not before a significant iPad overhaul,” t-break Tech (June 3, 2024).
2026	Leung, Christopher, Handling Ambiguous User Input on Touchscreen Kiosks (June 2005)

III. MY UNDERSTANDING OF PATENT LAW

12. In developing my opinions, I discussed various relevant legal principles with Patent Owner’s attorneys. I understood them when they were explained to me and have relied upon such legal principles, as explained to me, in the course of forming the opinions set forth in this declaration. My understanding in this respect is as follows:

13. I understand that “*inter partes* review” (IPR) is a proceeding before the United States Patent & Trademark Office for evaluating the patentability of an issued patent’s claims based on prior-art patents and printed publications.

14. I understand that, in this proceeding, Petitioner has the burden of proving that the challenged claims of the ’844 patent are unpatentable by a preponderance of the evidence. I understand that “preponderance of the evidence” means that a fact or conclusion is more likely true than not true.

15. I understand that, in IPR proceedings, claim terms in a patent are given their ordinary and customary meaning as understood by a person of ordinary skill in the art (“POSA”) in the context of the entire patent and the prosecution history pertaining to the patent. If the specification provides a special definition for a claim term that differs from the meaning the term would otherwise possess, the specification’s special definition controls. If a claim element is expressed as a “means” for performing a specified function, I understand that it covers the corresponding structure described in the specification and equivalents of the described structure. I have applied these standards in preparing the opinions in this declaration.

16. I note that Patent Owner and Dr. Wolfe use the acronym “POSITA” when referring to the person of ordinary skill in the art. As I discuss in Section IV below, my opinions in this declaration are based on Dr. Wolfe’s proposed

definition of the person of ordinary skill in the art. Ex. 1002 ¶74. Thus, my declaration will generally use “POSA” and “POSITA” interchangeably to refer to the same definition of a person of ordinary skill discussed in Section IV below.

17. I understand that for an invention claimed in a patent to be patentable, it must be, among other things, new (novel—*i.e.*, not anticipated) and not obvious from the prior art. My understanding is that Petitioners have not alleged any claim to be anticipated, so my understanding of obviousness is set forth below.

A. Obviousness

18. I understand that a patent claim may be unpatentable if it would have been obvious in view of a single prior-art reference or a combination of prior-art references.

19. I understand that a patent claim is obvious if the differences between the subject matter of the claim and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the relevant field at the time the invention was made. Specifically, I understand that the obviousness question involves a consideration of:

- the scope and content of the prior art;
- the differences between the prior art and the claims at issue;
- the knowledge of a person of ordinary skill in the pertinent art; and

- if present, objective factors indicative of non-obviousness, sometimes referred to as “secondary considerations.”

20. I understand that in order for a claimed invention to be considered obvious, a POSA must have had a reason for combining teachings from multiple prior-art references (or for altering a single prior-art reference, in the case of obviousness in view of a single reference) in the fashion proposed.

21. I further understand that in determining whether a prior-art reference would have been combined with other prior art or with other information within the knowledge of a POSA, the following are examples of approaches and rationales that may be considered:

- combining prior-art elements according to known methods to yield predictable results;
- simple substitution of one known element for another to obtain predictable results;
- use of a known technique to improve similar devices in the same way;
- applying a known technique to a known device ready for improvement to yield predictable results;
- applying a technique or approach that would have been “obvious to try,” *i.e.*, choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.

- known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;
- some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior-art reference or to combine prior-art reference teachings to arrive at the claimed invention. I understand that this teaching, suggestion or motivation may come from a prior-art reference or from the knowledge or common sense of one of ordinary skill in the art.

22. I understand that for a single reference or a combination of references to render the claimed invention obvious, a POSA must have been able to arrive at the claimed invention by altering or combining the applied references, and must have had a reasonable expectation of success in doing so.

23. I understand that it is important to guard against slipping into the use of hindsight and to resist the temptation to read into the prior art the teachings of the invention in issue. I understand it is improper to rely on the inventor's own path to support a conclusion of obviousness; what matters is the path that the person of ordinary skill in the art would have followed, as evidenced by the pertinent prior art.

IV. PERSON OF ORDINARY SKILL IN THE ART (“POSA”)

24. I have been informed and understand that for purposes of assessing whether prior-art references would have rendered the claim obvious, the patent and the prior-art references must be assessed from the perspective of a person having ordinary skill in the art (“POSA”) to which the patent is related, based on the understanding of that person at the time of the patent claim’s priority date. I have been informed and understand that a POSA is presumed to be aware of all pertinent prior art and the conventional wisdom in the art, and is a person of ordinary creativity. I have applied this standard throughout my declaration.

25. The ’844 patent involves technology in the field of computers. I have been asked to provide my opinions as to the state of the art in this field by 2008. I use this timeframe because the face of the ’844 patent indicates an earliest claimed priority date of April 1, 2008. Whenever I offer an opinion in this declaration about the knowledge of a POSA, the manner in which a POSA would have understood the claims of the ’844 patent or its description, the manner in which a POSA would have understood the prior art, or what a POSA would have been led to do based on the prior art, I am referencing the early 2008 timeframe, even if I do not say so specifically in each case.

26. Dr. Wolfe proposes the following description of a POSA:

In my opinion a POSITA with regard to the 844 Patent would have had a bachelor’s degree (or equivalent) in electrical

engineering, computer engineering, computer science, or a comparable subject and would have had two to three years of work experience in the design and architecture of laptop computers and other portable electronic devices. Alternatively, a person of ordinary skill in the art would have had an advanced degree (or equivalent) in electrical engineering, computer engineering, computer science, or a comparable subject and would have had one year of post-graduate research or work experience in the design and architecture of laptop computers and other portable electronic devices. A person of ordinary skill in the art would have been familiar the structural hardware aspects of laptop computers and other portable electronic devices as well as designs of user interfaces employed and displayed by computer operating systems and their organization of content and functionality. Similar skills and knowledge could be acquired by other means.

Ex. 1002 ¶74.

27. For purposes of my analysis in this Declaration, I have applied Dr. Wolfe's definition of the level of ordinary skill in the art, because, in my opinion, Dr. Wolfe's conclusions about the validity of the '844 patent are incorrect even under this definition, as I explain in this declaration.

28. By 2008, I held a PhD degree in electrical engineering, and I had more than 30 years of experience with computer architecture and software design. Therefore, I was at least a person of more than ordinary skill in the art during the relevant timeframe. Additionally, I worked with many people who fit the characteristics of the POSA, and I am familiar with their level of skill. When developing the opinions set forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth above.

V. THE '844 PATENT

29. Before Patent Owner (“LiTL”) introduced its Webbook product (shown below) more than a decade ago, “home computers were essentially the same as office computers,” and home users “struggle[d] with complex interfaces designed in pre-web times.” *See* Ex. 2001. LiTL recognized that the home environment could lend itself to more and different ways in which consumers would use computers. LiTL recruited leading user experience design (“UXD”) experts and worked closely with some of the world’s leading technology and UXD consultancies in a multi-year development effort that led to a computer that was more suitable for home use. Exs. 2001-2008; Ex. 1001, 6:43-63, 11:27-12:5, 14:14-29, 16:51-62, 1:15-17, 1:59-64, 2:7-9, 2:19-22.

LiTL Webbook



Ex. 2001, 1.

30. This design effort led to the filing of provisional application no. 61/041,365 on April 1, 2008, to which the '844 patent claims priority. Ex. 1001, 1.

A. Described Embodiments

31. The '844 patent describes, and independent claims 1, 10 and 18 require, a “portable computer configurable between a plurality of display modes including a laptop mode and an easel mode.” Ex. 1001, col. 17-19. Laptop and easel are just two of several display modes the specification discloses, including a “tablet mode” (*id.*, 1:35), “a closed mode, a laptop mode, an easel mode, a flat mode and a frame mode” (*id.*, 2:20-23). Some of these are illustrated in the figures reproduced below. The “portable computer has a conventional laptop appearance” in the “laptop mode,” whereas in the “easel mode” the “base of the computer and its display component stand upright forming an inverted ‘V.’” *Id.*, 1:61-64.

Closed Mode

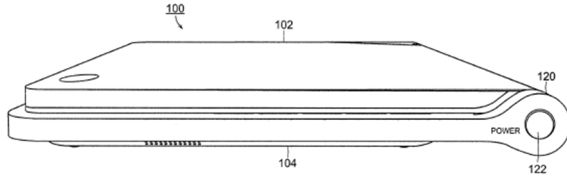


FIG. 2

Laptop Mode

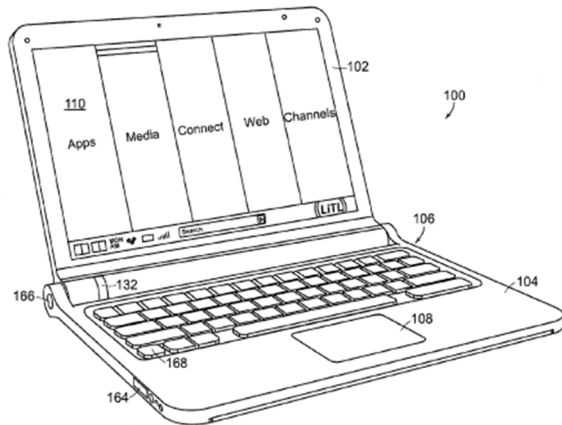


FIG. 17

Easel Mode

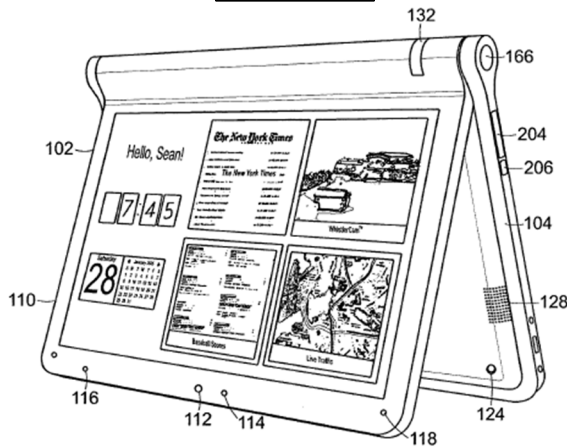


FIG. 4

Frame Mode

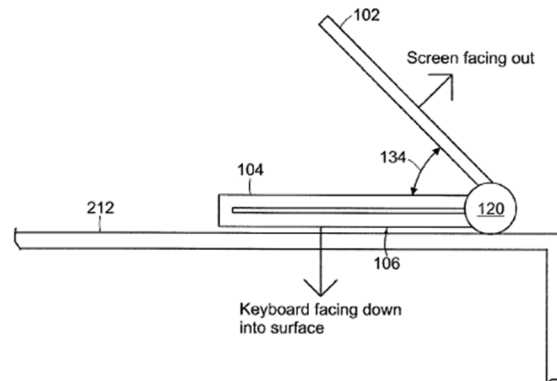


FIG. 26

Flat Mode

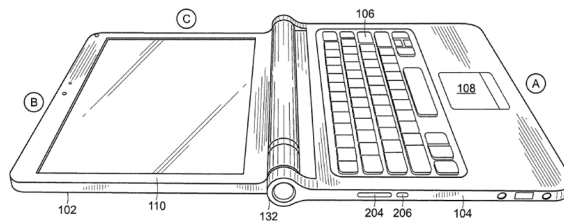


FIG. 27

32. The computer's keyboard is not easily accessible to the user in some of these configurations. *See e.g. id.*, Figs. 4-6 and 26. To address that, LiTL

developed a novel navigation control (scroll wheel 132) that is disposed about the longitudinal axis between the base and display components, so it is accessible to the user in all the computer's various configurations. *See e.g. id.*, Figs. 4, 7B and 15 (reproduced below). “[T]he portable computer may include integrated ‘navigation’ hardware that allows a user to easily and comfortabl[y] control various features and functions of the portable computer, and to manipulate content displayed on the portable computer. For example, [] scroll wheel **132** [] allows a user to control, adjust and/or select various functionality of the portable computer [and] may be used to provide ‘hardware navigation’ through information, such as menus, icons, etc., displayed on the display screen **110**.” *Id.*, 10:54-64; *see also id.*, 11:5-10 (“navigation may be performed using [] scroll wheel **132**”). The user can rotate scroll wheel 132 relative to the base to control various functionality of the computer.

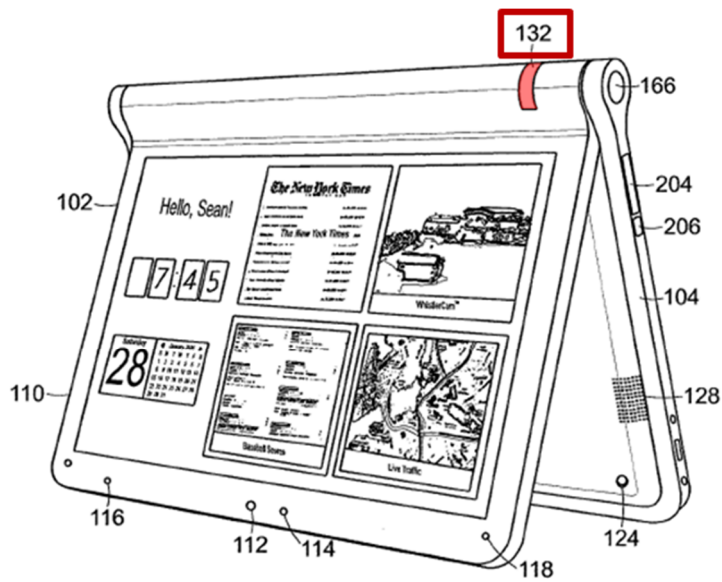


FIG. 4



FIG. 15

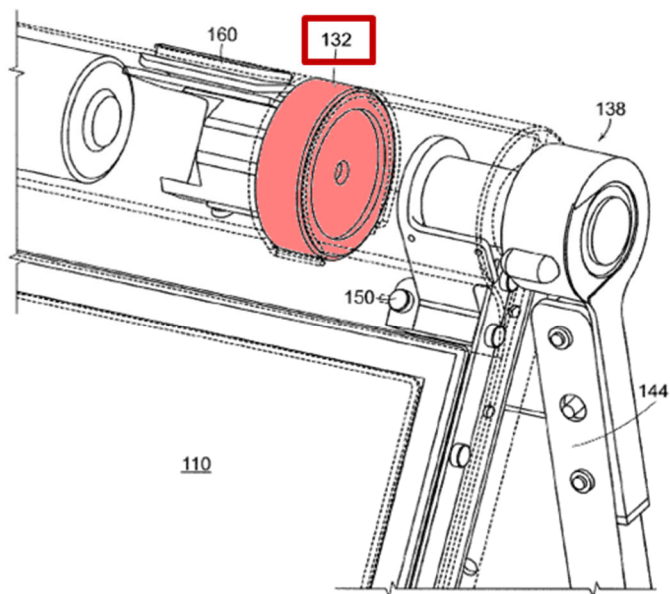


FIG. 7B

Id., Figs. 4, 7B, and 15 (annotated).

B. Prosecution History of the '844 Patent

33. The '844 patent has undergone extensive prosecution including the original prosecution (Ex. 1003), an IPR petition filed by Lenovo (United States) Inc. (“Lenovo”) that was denied institution (Ex. 1006), and an Ex Parte Reexamination No. 90/014,965, also filed by Lenovo, that resulted in the confirmation of the claims without amendment (Ex. 1005).

C. Challenged Claims

34. Petitioners challenge claims 1, 3, 4, 7-10, 13, 14, 16-18, and 22 (“challenged claims”). Petition, 1. Claims 1, 10, and 18 are independent claims. Claims 3, 4, 7-9, 13, 14, 16, 17, and 22 depend either directly or indirectly from claims 1, 10, or 18.

35. All three independent claims 1, 10, and 18 claim a “portable computer configurable between a plurality of display modes” that comprises “a navigation control” having the following additional requirements:

36. Claim 1 (Limitation [1e])¹ Further, the navigation control must be “disposed at least partially within the base and rotatable about the longitudinal axis” and “configured to permit a user to control at least one of operating parameters of the portable computer and content displayed.”

¹ I have applied the Petition’s lettered labels for convenience of reference.

37. Claim 10 (Limitation [10f]) further requires the navigation control be “accessible in each of the plurality of display modes” and “configured to permit a user to manipulate at least one of operating parameters of the portable computer and the content displayed.”

38. Claim 18 (Limitation [10f]) further requires the navigation control be “disposed at least partially about the longitudinal axis.”

39. These limitations are supported in the ‘844 Patent specification by the scroll wheel 132 which is a navigation control that is disposed at least partially within the base, is disposed about the longitudinal axis, is rotatable relative to the base about the longitudinal axis, and is both accessible and functional in each of the display modes to manipulate operating parameters and the content displayed. *Id.*, 10:54-64, 11:5-10, Figs. 4, 7B, and 15.

D. The Challenged Claims Cover LiTL’s Webbook

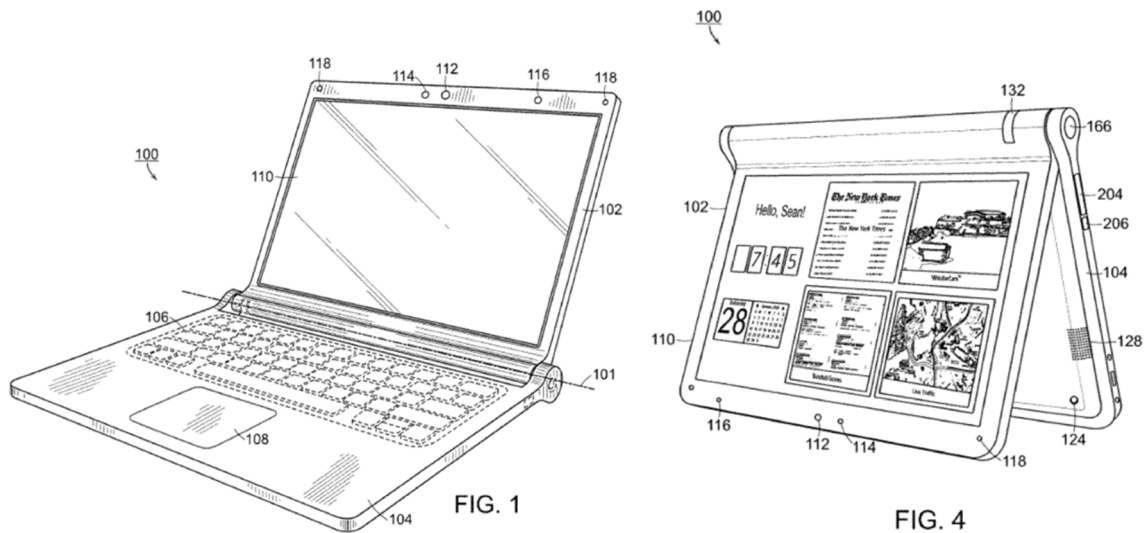
40. LiTL launched its Webbook in November 2009. Ex. 2002, 1 (“Litl Webbook Beats ChromeOS, Becomes First Cloud Computer”). The LiTL Webbook is nearly indistinguishable from the figures in the ‘844 Patent:

LiTL Webbook



Ex. 2001, 1.

'844 Patent Figures 1 & 4

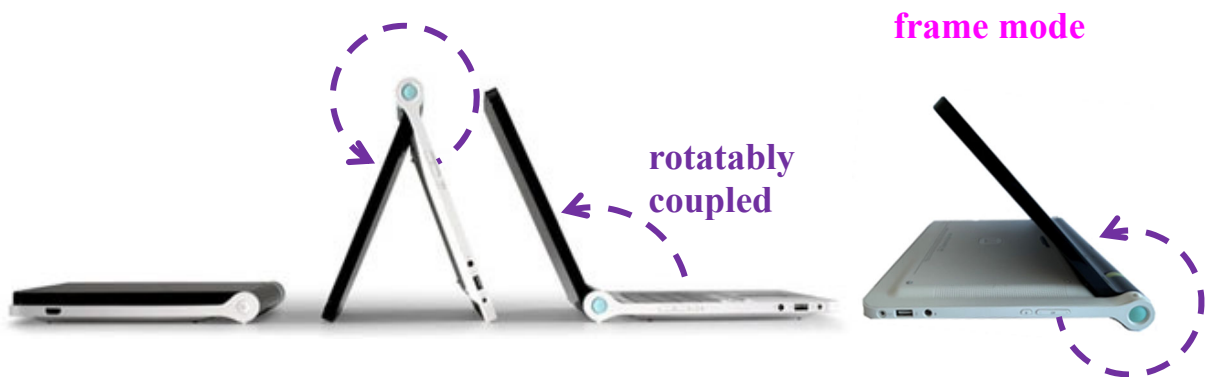


41. The Challenged Claims read on the LiTL Webbook too. This is demonstrated below using independent claims 1, 10, and 18 as examples and adopting the Petition's claim limitation labels:

[1pre] A portable computer configurable between a plurality of display modes including a **laptop mode** and an **easel mode** ... comprising:



[1b] a main display component **rotatably coupled** to the base ... about a **longitudinal axis** running along an interface between the main display component and the base ..., wherein



[1c] the **laptop mode** is configured to display ... a **first content mode** ...;

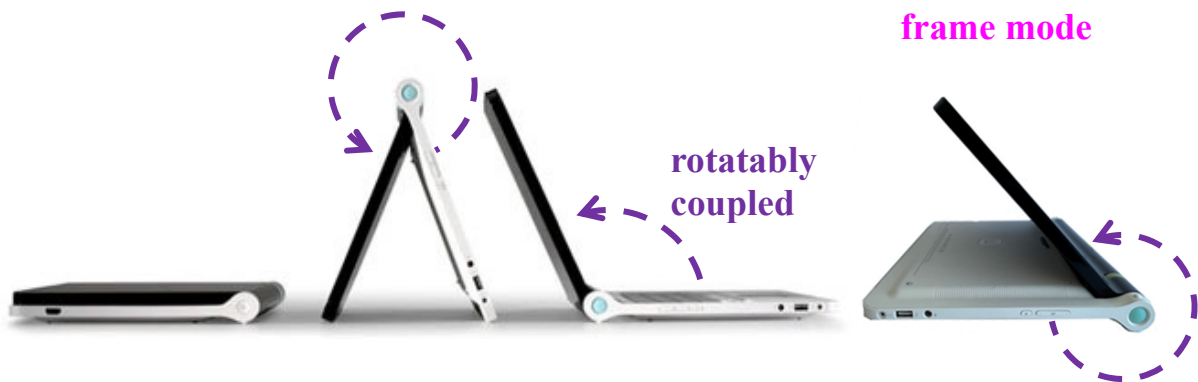
[1d] the **easel mode** is configured to display ... a **second content mode** ...; and

[1e] a **navigation control** ... rotatable about the longitudinal axis, ... configured to permit a user to control at least one of operating parameters of the portable computer and content displayed wherein the plurality of modes includes a **frame mode**....

[10pre] A portable computer configurable between a plurality of display modes including a **laptop mode** and an **easel mode** ... comprising:



[10b] a main display component **rotatably coupled** to the base ...;



[10c] a hinge assembly disposed at least partially within the base and the main display component that defines an **axis of rotation** ...;

[10d] the **laptop mode** is configured to display ... a **first content mode** ...;

[10e] the **easel mode** is configured to display ... a **second content mode** ...; and

[10f] a **navigation control** accessible in each of the plurality of display modes, and configured to permit a user to manipulate at least one of operating parameters of the portable computer and the content displayed wherein the plurality of modes includes a **frame mode**....

[18pre] A portable computer configurable between a plurality of display modes including a **laptop mode** and an **easel mode** ... comprising:



[18b] a main display component ...;



[18c] a hinge assembly ... defining a **longitudinal axis** running along an interface between the display component and the base ...;

[18d] the **laptop mode** is configured to display ... a **first content mode** ...;

[18e] the **easel mode** is configured to display ... a **second content mode** ...; and

[18f] a **navigation control** disposed at least partially about the longitudinal axis wherein the plurality of modes includes a **frame mode**....

See e.g., Ex. 2003, 2; Petition, ix-xiii (claim labels).

VI. CLAIM INTERPRETATION

42. I understand that determining whether a claimed invention is non-obvious requires comparing the prior art to the claim. I discuss in this Section below the interpretations I have applied to certain claim terms, in accordance with the standards set forth in Section III above.

A. “rotatable about” (claim 1)

43. Claim 1 requires a navigation control that is rotatable about the computer’s longitudinal axis independently from the computer’s base. Specifically, claim 1 is directed to a “portable computer configurable between a plurality of display modes ... comprising: a base ...; a main display component rotatably coupled to the base such that the main display component and the base are rotatable with respect to one another about a longitudinal axis running along an interface between the main display component and the base ...; ... and a navigation control disposed at least partially within the base and rotatable about the longitudinal axis...” Ex. 1001, 17:9-51. Claim 1 thus requires, in relevant part, (1) a display component, (2) a **base that is *rotatably coupled to the display*** component about a longitudinal axis, and (3) a **navigation control** that is both at least partially **disposed within the base and rotatable about the longitudinal axis**.

1. Plain Meaning Requires that the Claimed Navigation Control Is Rotatable Independently from the Base

44. Based on the plain language of the claim itself, for the navigation control to be at least partially disposed within the base, which the claim already requires to be rotatable about the longitudinal axis, then the navigation control that itself must be rotatable about the longitudinal axis as an additional claimed requirement must mean that the rotation of the navigation control be independent from the rotation of the base. This is because the claim requires that the base be rotatable about the longitudinal axis and that the navigation control be partially disposed within the base. A navigation control that is disposed within the base would necessarily be rotatable about the longitudinal axis, because the claim already requires the base to be rotatable about the longitudinal axis. But the claim does not only require that the navigation control be disposed in the base, it also requires that the navigation control itself be rotatable about the longitudinal axis.

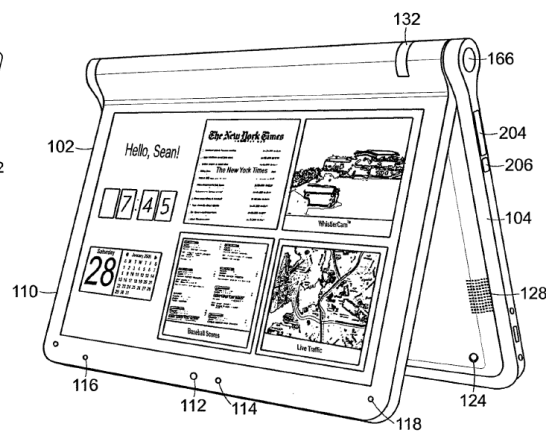
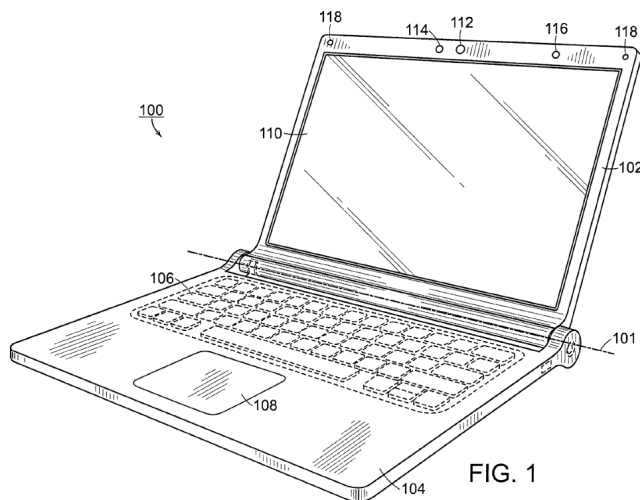
45. The only purpose of this additional limitation would be to further require that the navigation control be rotatable about the longitudinal axis independently from the base's ability to rotate about the longitudinal axis. In other words, if the claim did not require the navigation control be rotatable about the longitudinal axis independently from the base, then the added requirement that the navigation control be rotatable about the longitudinal axis, in addition to the requirement that it be at least partially disposed within the base, would be

superfluous, redundant, and have no meaning. That would therefore not be the meaning a POSA would ascribe to the term.

2. The Plain Meaning Interpretation is Consistent with the Specification's Disclosure of a Scroll Wheel

46. This interpretation of the added requirement that the navigation control be both partially disposed within the base *and* rotatable about the longitudinal axis is consistent with the specification.

47. The '844 Patent's computer can be placed by the user into different physical configurations (called display modes), including laptop mode (Fig. 1), easel mode (Figs. 4), frame mode (Fig. 26) and flat mode (Fig. 27).



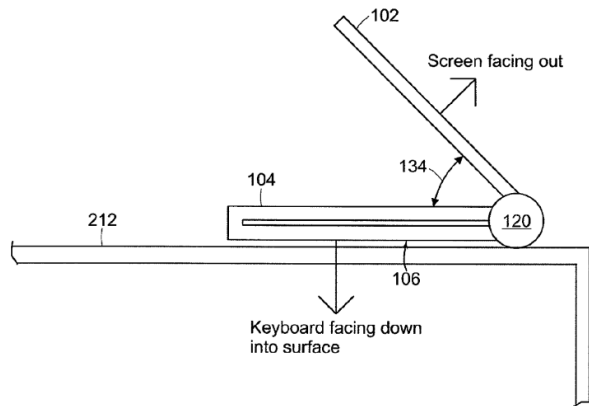


FIG. 26

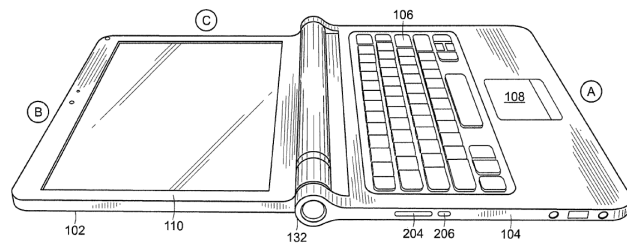


FIG. 27

Ex. 1001, Figs. 1, 4, 26, and 27.

48. The computer's keyboard is not easily accessible to the user in some of these configurations. *See e.g. id.*, Figs. 4-6 and 26. To address that, LiTL developed a novel navigation control (scroll wheel 132) that is disposed about the longitudinal axis between the base and display components, so it is accessible to the user in all the computer's various configurations. *See e.g. id.*, Figs. 4, 7B and 15 (reproduced below). "[T]he portable computer may include integrated 'navigation' hardware that allows a user to easily and comfortabl[y] control various features and functions of the portable computer, and to manipulate content displayed on the portable computer. For example, [] scroll wheel **132** [] allows a user to control, adjust and/or select various functionality of the portable computer [and] may be used to provide 'hardware navigation' through information, such as menus, icons, etc., displayed on the display screen **110**." *Id.*, 10:54-64; *see also id.*, 11:5-10 ("navigation may be performed using [] scroll wheel **132**"). The user

can rotate scroll wheel 132 relative to the base to control various functionality of the computer.

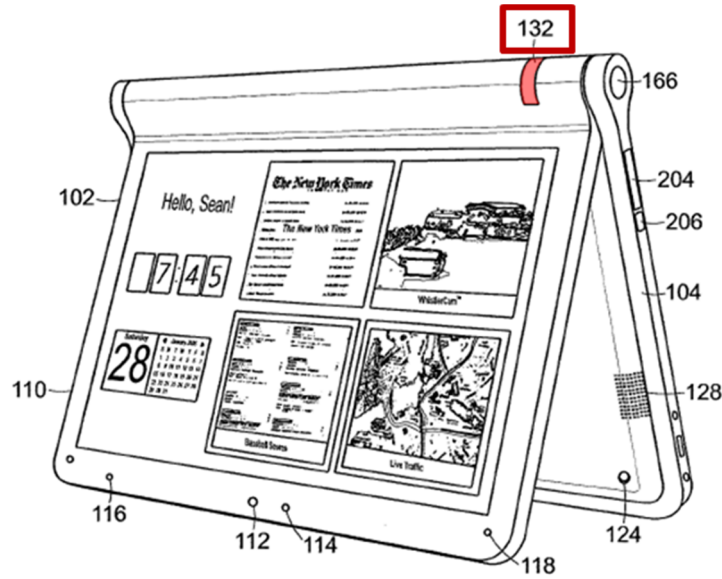


FIG. 4



FIG. 15

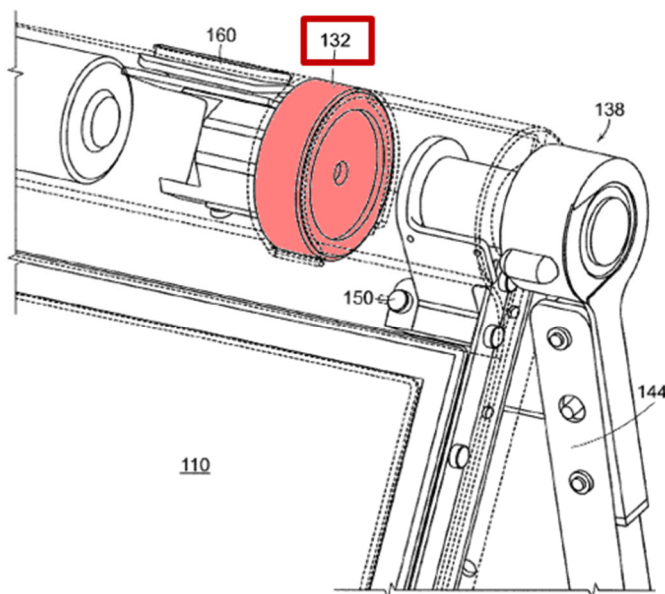


FIG. 7B

Id., Figs. 4, 7B, and 15 (annotated).

49. Construing “disposed at least partially within the base ***and rotatable*** about the longitudinal axis” in claim 1 to require that the navigation control be rotatable independently from the base’s ability to rotate about that axis is consistent with the specification and gives meaning to every limitation in the claim.

3. The Petition and Petitioners’ Expert Offer No Contrary Construction

50. I have read the Petition, the declaration of Dr. Andrew Wolfe, and Dr. Wolfe’s deposition transcript. Neither Petitioners nor Dr. Wolfe offer a contrary claim construction. The Petition at § III.F.4 has a claim construction section for “‘navigation control’ (claims 1, 10, 18).” Petition, 11. That claim construction section only addresses the “navigation control” language common to claims 1, 10 and 18 and does not address any of the language that differs among the navigation control clauses in those claims. *Id.* This claim construction section only addresses what types of components could be a navigation control and says nothing about claim 1’s “rotatable about the longitudinal axis” requirement. *Id.*

B. “disposed about” (claim 18)

51. Claim 18 requires a navigation control that is disposed at least partially around the longitudinal axis running along an interface between the display component and the base. Specifically, claim 18 is directed to a “portable computer configurable between a plurality of display modes ... comprising: a base

...; a main display component...; a hinge assembly ... configured to rotatably couple the main display component to the base, the hinge assembly defining a longitudinal axis running along an interface between the display component and the base...; ... and a navigation control disposed at least partially about the longitudinal axis.” Ex. 1001, 19:32-20:30. Claim 18 thus requires, in relevant part, (1) a longitudinal axis running along an interface between the display component and the base and (2) a navigation control disposed at least partially about the longitudinal axis.

1. Plain Meaning Requires that the Claimed Navigation Control Is Disposed At Least Partially Around the Axis

52. Based on the plain language of the claim itself, a navigation control that is disposed at least partially about the longitudinal axis means that the navigation control must be disposed at least partially around (e.g at least partially surrounding) the longitudinal axis.

53. The '844 Patent does not define what it means for one component to be disposed about an axis, but the plain meaning of “about” in this context means “around.” Ex. 2013 (defining “about” to mean “1: in a circle around: on every side of: AROUND”); Ex. 2014 (defining “about” to mean “All around; on every side”); Ex 2015 (same). Thus, construing “disposed at least partially about the longitudinal axis” to require that the navigation control be disposed at least

partially around or surrounding the longitudinal axis is consistent with the ordinary meaning of “about.”

2. The Plain Meaning Interpretation is Consistent with the Specification’s Disclosure of a Scroll Wheel

54. Such a construction is also consistent with the specification of the ‘844 Patent, which discloses a navigation control (scroll wheel 132) that is disposed surrounding the longitudinal axis so that it is rotatable relative to the base and accessible to the user even in configurations where the keyboard is inaccessible. *See e.g.*, Ex. 1001, Figs. 4, 7B, and 26, 3:56-56 (“a scroll wheel accessible in each of the plurality of display modes”). As shown in Fig. 7B annotated below, scroll wheel 132 is “disposed about the longitudinal axis” because it is disposed in the location of the longitudinal axis and indeed around that axis.

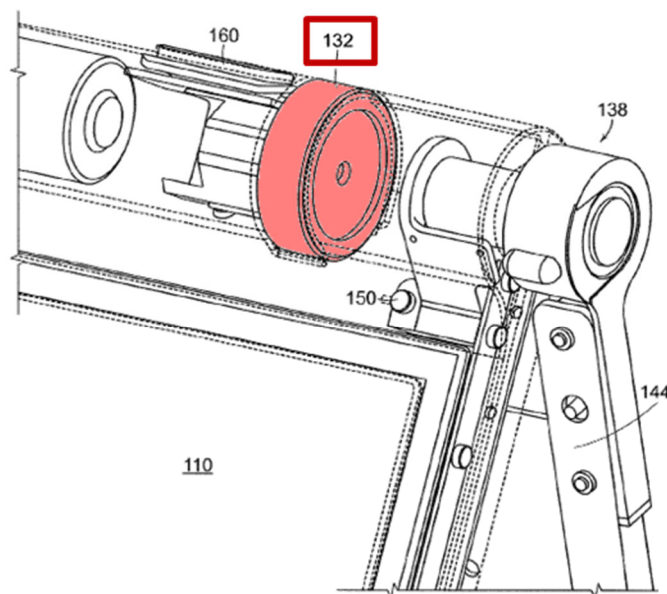


FIG. 7B

Ex. 1001, Fig. 7B (annotated).

3. The Petition and Petitioners' Expert Offer No Contrary Construction

55. I have read the Petition, the declaration of Dr. Andrew Wolfe, and Dr. Wolfe's deposition transcript. Neither Petitioners nor Dr. Wolfe offer a contrary claim construction. The Petition at § III.F.4 has a claim construction section for "navigation control' (claims 1, 10, 18)." Petition, 11. That claim construction section only addresses the "navigation control" language common to claims 1, 10 and 18 and does not address any of the language that differs among the navigation control clauses in those claims. *Id.* This claim construction section only addresses what types of components could be a navigation control and says nothing about claim 1's "rotatable about the longitudinal axis" requirement. *Id.* And Petitioner's

expert admitted at his deposition that he did not offer an opinion for the term “disposed about.” Ex. 2020, 87:22-25 (“Q. *You don’t provide an opinion on the term disposed, at least partially about the longitudinal axis; is that right?* A. *Correct.*”).

VII. NONE OF THE PETITION’S GROUNDS ESTABLISH OBVIOUSNESS OF THE CHALLENGED CLAIMS

56. I have been asked to provide my opinion concerning the arguments made by and evidence cited by the Petition in its allegations that claims 1, 3, 4, 7-10, 13, 14, 16-18, and 22 of the ’844 patent would have been obvious to a POSA. For the reasons explained below, it is my opinion that the Petition’s Grounds do not establish obviousness of any of the challenged claims.

A. Ground 1 Does Not Render Obvious Any Challenged Claim

57. Ground 1 fails to establish obviousness of any of the challenged claims because the Petition failed to establish that POSAs would have run Pogue’s Windows XP Pro operating system, which did not support the operation of touchscreens or pen-based inputs, on Lane’s pen-based computer as the Petition alleges. Pogue itself cautions against using Windows XP Pro if the computer does not have compatible hardware. Lane’s pen-based input, which Petitioners allege is a touchscreen, was not a compatible input device with Pogue’s Windows XP Pro. POSAs would have known that running Pogue’s Windows XP Pro on a computer with a touchscreen would have rendered that touchscreen inoperative. The Petition

fails to establish that POSAs would have run Pogue's Windows XP Pro as the operating system for Lane's pen-based computer when doing so would have rendered Lane's touchscreen inoperative.

58. Ground 1 fails to establish obviousness of any of the challenged claims because the Petition failed to establish that POSAs would have had at least a reasonable expectation that running Pogue's Windows XP Pro on Lane's computer would have resulted in an operational touchscreen, as the Petition alleges. Pogue never mentions a touchscreen because Pogue's Windows XP Pro did not support the operation of touchscreens. Petitioners cite Pogue, Lane, Shimano, and Kurtenbach as allegedly supporting an expectation of success, but POSAs would not have expected a touchscreen to be operational on a computer running Windows XP Pro as the operating system—the stated combination of Ground 1—just because the same touchscreen worked on a computer running some other unidentified operating system. And the Petition does not allege that POSAs would have modified Pogue's operating system, such as by adding software that did support the operation of touchscreens while running Pogue's Windows XP Pro, and fails to cite any evidence of a reasonable expectation of success in doing so.

59. Finally, Ground 1 additionally fails establish obviousness of 1, 3, 4, 7-9, 18, and 22 because Lane does not disclose a navigation control that is disposed

about, or is rotatable about, the longitudinal axis of the computer as required by those claims.

1. The Petition Failed to Establish that POSAs Would Have Run Pogue's Operating System, Which Does Not Support the Operation of Touchscreens, on Lane's Pen-Based Computer

60. The Petition failed to establish that POSAs would have been motivated to run the Windows XP Pro operating system disclosed by Pogue on Lane's pen-based computer when Pogue lacks any disclosure that its operating system supported the operation of a pen-based input. The Petition's alleged combination for Ground 1 was "Lane's computer running the [Windows] XP Pro operating system as taught in Pogue." Petition, 26. Lane discloses a "pen-based computing tablet." Ex. 1006, 3:13-14; *see also id.*, 8:18-19 ("a tablet for pen-based computing"), 10:20 (same). Petitioners argued that Lane's pen-based input was a "touchscreen or equivalent." Petition, 29. The Petition alleged that Lane's "touchscreen and pen-based computing would be operable in all configurations of the computer 10." Petition, 29, 48. But ***Pogue nowhere discloses support for a touchscreen*** and indeed ***Pogue's Windows XP Pro operating system did not support the operation of a touchscreen***. Running Pogue's Windows XP Pro on Lane's computer would have rendered Lane's pen-based computing inoperative.

a. Pogue's Windows XP Pro Did Not Support Touchscreens

61. The Windows XP Pro operating system, as disclosed by Pogue, did *not* support a touchscreen. Pogue explains that “*drivers* ... [are] controlling software required by every hardware component of a PC.” Pogue, 23 (emphasis original).² Drivers are required for the computer’s “mouse, keyboard, screen, CD-ROM drive, scanner, digital camera, palmtop” (*id.*), and its touchscreen. It is true that “[w]ithout the correct driver software, the corresponding piece of equipment doesn’t work at all.” *Id.*, 23.

62. Pogue explains that “Windows XP [came] with drivers for over 12,000 components” (*Id.*, 23) but a driver for a touchscreen was not one of them. For example, Pogue discloses a mouse is the list of hardware that Windows XP Pro did provide a driver. *Id.*, 23, 296 (“mouse, or its driver”). Pogue discloses how to use the mouse to manipulate operating parameters and the content displayed, teaching how to use the mouse to cut and copy content displayed and how to change the sharing and security settings of a folder. *Id.*, 19. Pogue discloses a keyboard as one of the pieces of hardware that Windows XP Pro provided a driver. *Id.*, 23. Pogue discloses how to use the keyboard to manipulate operating parameters and the content displayed. *Id.*, 21. Pogue teaches that “[y]ou can use the

² Citations refer to applied, not native, page numbers.

keyboard for everything,” such as “how you might print two copies of a document without using the mouse.” *Id.*, 21. And Pogue teaches how to use the keyboard to cut and copy content displayed. *Id.*, 140. In stark contrast to navigation controls like the mouse and keyboard, Pogue never mentions a touchscreen.

63. Pogue was the only reference that Petitioners cited to establish how Windows XP Pro operated. Petitioners and their expert cite no other evidence of how Windows XP Pro worked, including no other evidence about a POSA’s knowledge of Windows XP Pro.

64. Pogue never mentions a touchscreen because the Windows XP Pro operating system disclosed by Pogue did not support an operable touchscreen. For a mouse and touchpad, “the movement of the input pointer corresponds to the *relative* movements of the user’s finger” or mouse. Ex. 1020, ¶[0009]. In contrast, “[w]hen using a touch screen, a user makes a selection on the display screen by pointing *directly* to GUI objects on the screen (usually with a stylus or finger).” *Id.* Pogue discloses the Windows XP Pro operating system is capable of tracking the *relative* movements from the input of a mouse. Pogue, 38 (“[a]s you move your mouse pointer...”), 44 (“keeping the mouse still”), 218 (“dragging the mouse”), 283 (“Moving the mouse is the best way to get rid of a screen saver. A mouse click ... could trigger an action you didn’t intend.”). Pogue even discloses the ability to change the ratio of the movement of the mouse to the movement of the pointer. *Id.*,

295 (“you can set things up so that moving the mouse one *millimeter* moves the pointer one full *inch*—or vice versa”). But Pogue does not disclose any ability for its Windows XP Pro to interpret inputs of user gestures on a touchscreen.

65. I have personal experience with Microsoft’s Windows XP Pro operating system as well. Windows XP Pro never did include support for a touchscreen. Further, there was never an update or patch that allowed Windows XP Pro to support the operation of a touchscreen. In fact, Microsoft never made a driver that allowed Windows XP Pro to support the operation of a touchscreen. Accordingly, I know that running the Windows XP Pro operating system on a computer with a touchscreen would result in the touchscreen being non-functional.

66. In sum, Pogue never mentions a touchscreen, unlike other input devices like a mouse or keyboard, because the version of Windows XP Pro disclosed by Pogue—the version relied on by the Petition—did not support the operation of touchscreens.

b. The Petition Failed to Establish that POSAs Would Have Had Reason to Run Pogue’s Operating System on Lane’s Pen-Based Computer When Pogue’s Operating System Did Not Support Lane’s Pen-Based Computing

67. The Petition alleges POSAs would have run Pogue’s Windows XP Pro on Lane’s pen-based computer because Lane “does not specify an operating system” and “market forces” dictated the selection of Pogue’s Windows XP Pro as

“the most widely used operating system.” Petition, 25-26. But the Petition’s analysis fails to address why POSAs would have blindly used Pogue’s Windows XP Pro as the operating system just because it was the most popular when Pogue itself cautions against using Windows XP Pro for computers with incompatible hardware, like Lane’s touchscreen.

68. Lane discloses a computer that relies upon the operation of a pen-based input device that Petitioners argue is a touchscreen. Specifically, Lane discloses a “pen-based computing tablet.” Ex. 1006, 3:13-14; *see also id.*, 8:18-19 (“a tablet for pen-based computing”), 10:20 (same). Petitioners argued that Lane’s pen-based input was a “touchscreen or equivalent.” Petition, 29. And the Petition alleged that Lane’s “touchscreen and pen-based computing would be operable in all configurations of the computer 10.” Petition, 29, 48. Logically, when looking for an operating system for Lane’s computer, POSAs would have looked for an operating system that supported the operation of a touchscreen.

69. POSAs would not have selected Pogue’s Windows XP Pro as the operating system for Lane’s computer because, as explained in Section VII.A.1.a (¶¶ 61-66), above, Pogue’s Windows XP Pro did not support touchscreen operation. In fact, if Pogue’s Windows XP Pro had been run on Lane’s computer, as Petitioners allege, Lane’s pen-based input device would have been inoperative. POSAs would have known this at least because Pogue never mentions the

operation of a touchscreen despite explaining in detail how other input devices like a mouse and a keyboard interacted with the Windows XP Pro operating system.

Pogue, 19, 21, 23, 38, 44, 140, 218, 283, 295.

70. Moreover, Pogue cautions that “[b]efore you even buy a copy of Windows XP, your first order of business should be to check your computer against the list of hardware requirements for Windows XP, as published by Microsoft.” *Id.* 645-46. That list includes a computer with a “[k]eyboard and Microsoft mouse or compatible pointing device.” *Id.* The Petition makes no allegation Lane’s touchscreen was a compatible pointing device and cites no evidence to support such an allegation. The evidence shows that Lane’s touchscreen was not a compatible pointing device with Pogue’s operating system. *See* § VII.A.1.a (¶¶ 61-66), *supra*. POSAs would, therefore, not have selected Pogue’s Windows XP Pro as the operating system for Lane’s computer because they would have known that doing so would have rendered Lane’s pen-input device inoperative.

71. Moreover, the Petition makes no allegation that Pogue’s Windows XP Pro operating system required any modification, such as by adding software that supported the operation of touchscreens generally or Lane’s touchscreen specifically while running Pogue’s Windows XP Pro. Dr. Wolfe admitted during cross-examination that he did not suggest any modifications to Pogue’s Windows

XP Pro in his declaration. Ex. 2020, 82:7-17 (“Q. In your declaration, you don’t state that there’s any modifications that would have been required to Pogue’s Windows XP Pro in order for it to support the operation of touch screens; right? A. Correct....”). Dr. Wolfe testified that “[t]he user or manufacturer would have provided a driver, just like they do for every other piece of hardware in the system” (*id.*) but offered no evidence that Lane’s touchscreen included a driver that was compatible with Pogue’s Windows XP Pro as would have been required for a POSA to have run Pogue’s operating system on Lane’s pen-based computer.

72. Furthermore, the Petition makes no allegation that POSAs would have selected a different version of the Windows operating system other than the one disclosed by Pogue. Dr. Wolfe testified that Pogue was the only reference that he considered to establish how Windows XP Pro operated. Ex. 2020, 21:9-13 (“Q. Pogue is the only reference that you cite as disclosing the features of Windows XP Pro; is that right? A. Yes. As disclosing the features that I rely on, that’s correct.”).

73. In sum, the Petition failed to show that POSAs would have blindly picked an operating system just because it was the most popular even though it would have rendered Lane’s pen-based input inoperative.

c. The Petition Failed to Establish that POSAs Would Have “Configured” Lane’s Computer to Run Pogue’s Windows XP Pro as Opposed to Using a Different Operation System

74. The Petition alleges that POSAs “would have been motivated to configure Lane’s laptop to satisfy” the “minimum and recommended hardware requirements” specified by Pogue but fails to cite any evidence in support of that conclusion. Petition, 26.

75. On the contrary, POSAs would have looked for a different operating system than the one disclosed by Pogue in order to support Lane’s pen-based input device. Pogue cautions that “[b]efore you even buy a copy of Windows XP, your first order of business should be to check your computer against the list of hardware requirements for Windows XP, as published by Microsoft.” Pogue, 645-46. That list included a computer with a “[k]eyboard and Microsoft mouse or compatible pointing device.” Pogue, 645-46. As a touchscreen was not a “compatible pointing device” as explained in Section VII.A.1.a (¶¶ 61-66), above, POSAs would not have run Pogue’s Windows XP Pro on Lane’s computer due to Pogue’s warning not to “even buy a copy of Windows XP” if the computer’s hardware was not compatible.

76. But even if POSAs had looked to configure *Lane’s computer* to make it work with Pogue’s Windows XP Pro (as opposed to finding a different operating system that enabled the use of Lane’s pen-based input device), POSAs would have

configured Lane's computer to have a "[k]eyboard and Microsoft mouse or compatible pointing device" as Pogue disclosed was required. Pogue, 645-46. As touchscreens were not compatible, and Pogue cautioned POSAs against buying a copy of Windows XP Pro if the computer had incompatible hardware, POSAs would have configured Lane's computer to not include a touchscreen because it would not have worked.

77. In sum, the Petition fails to establish that POSAs would have configured Lane's computer to make it work with Pogue's operating system as opposed to using a different operating system that enabled Lane's touchscreen. But even if POSAs had been so modified to configure Lane's computer, POSAs would not have included a touchscreen because Pogue does not disclose touchscreens to be a compatible pointing device with Windows XP Pro.

2. The Petition Failed to Establish that POSAs Would Have Had a Reasonable Expectation that Lane's Touchscreen Would Be Operational When Running Pogue's Operating System

78. An independent reason why Ground 1 fails to establish the obviousness of any challenged claim is that the Petition failed to establish that POSAs would have had a reasonable expectation that Lane's touchscreen would be operable when running Pogue's Windows XP Pro as the Petition alleges. The Petition's alleged combination for Ground 1 was "Lane's computer running the [Windows] XP Pro operating system as taught in Pogue." Petition, 26. The Petition

alleged that Lane’s “touchscreen and pen-based computing would be operable in all configurations of the computer 10.” *Id.*, 29, 48. But Pogue’s Windows XP Pro did not support the operation of touchscreens or pen-based input as explained in Section VII.A.1.a (¶¶ 61-66), above. POSAs would have known this and would not have expected running Pogue’s Windows XP Pro on Lane’s computer to have resulted in an operable touchscreen as the Petition alleges.

79. Petitioner’s arguments regarding a reasonable expectation of success appear to rely wholly upon two ***unstated*** premises: *First*, is that if a touchscreen is disclosed as operational on one computer running on one operating system, then POSAs would have reasonably expected such a touchscreen to work on a different computer running a different operating system, like Pogue’s Windows XP Pro. *Second*, is that making touchscreens operational would have been nothing more than routine optimization, within the capabilities of a POSA. Specifically, the Petition cites Lane, Shimano, and Kurtenbach, in arguing that Lane’s touchscreen would be operable in all configurations of Lane’s computer. Petition, 28-29. But none of those references disclose anything about whether touchscreens are operational on a computer running Windows XP Pro as the Petition alleges for Ground 1. And the Petition never explains why prior art references that disclose nothing about the operation of the Windows XP Pro operating system are at all informative of POSAs’ expectation of whether Lane’s pen-based input device

would be operative when running Pogue's Windows XP Pro as the operating system. But both of Petitioners' premises are unsupported and wrong.

80. Petitioners' first premise is wrong because POSAs would have known that different operating systems support different hardware. Just because some hardware works on one computer running one operating system does not mean POSAs would have expected it to work on a different computer running a different operating system. Our own personal experience tells us this: Macs and Windows PC are not compatible. One would not expect a Mac to be operative when attempting to run a Windows operating system.

81. The same is true for touchscreens. Even if Lane, Shimano, and Kurtenbach disclose operable touchscreens, it is in the context of being operable on some ***undisclosed operating system***. Just because the touch screens worked on some undisclosed operating system did not mean that POSAs would have then expected Lane's touchscreen to be operative when running Pogue's Windows XP Pro, particularly when POSAs knew that operating system did not in fact support the operation of touchscreens.

82. Petitioners' second premise is also wrong because making a touchscreen operational for an operating system that did not already support touchscreens would have been well beyond the capabilities of a POSA. To this day (as of 2022 at least), "[t]he MacOS operating system doesn't provide any support

for touchscreens.” Ex. 2022, 2; Ex. 2023, 1 (“macOS doesn’t support touchscreens”). POSAs would have known that “*it’s not as simple as popping in a touchscreen onto the MacBook Pro and calling it a day.*” Ex. 2024, 1. Rather, “to make such a *drastic change* as *switching to a touchscreen*, macOS would also need a massive update to accommodate the new functionality.” Ex. 2025, 1. If getting an operating system to allow the operation of a touchscreen is such a massive undertaking today, it would have been an equally massive undertaking in 2008; well beyond the scope of routine optimization for a POSA. Indeed, that is why Microsoft needed to release a new and different operating system when it sought to support the operation of touchscreens. Getting a touchscreen to work on Pogue’s Windows XP Pro operating system was not as simple as downloading the correct driver.

a. POSAs Would Have Known that Pogue’s Windows XP Pro Did Not Support Touchscreens

83. Pogue itself provides no basis for establishing a reasonable likelihood that running Pogue’s Windows XP Pro on Lane’s computer would have resulted in an operable touchscreen. Pogue was the only prior art reference that Petitioners cited to establish how Windows XP Pro operated. Petitioners cite no other evidence of how Windows XP Pro worked, including no other evidence about a POSA’s knowledge of Windows XP Pro. And Pogue never mentions the ability to support the operation of touchscreens or pen-input devices.

84. Petitioners cite Pogue at 646 (native page 632) as allegedly supporting “a reasonable expectation of success” (Petition, 26), but on that page, Pogue merely provides a list of hardware requirements including a “[k]eyboard and Microsoft mouse or compatible pointing device”—never listing compatibility with a touchscreen or pen-input device. Pogue, 645-46. A pen-input and touchscreen are different from a mouse, as explained in Section VII.A.1.a (¶¶ 61-66), above. For example, a mouse tracks *relative* movement, whereas a touchscreen relies on the ability of the operating system to interpret *direct* inputs of user gestures. Ex. 1020, ¶[0009]. Petitioners cite no evidence in the Petition that Lane’s pen-input device was a compatible pointing device with Pogue’s Windows XP Pro operating system. Petition, 26.

85. As explained in Section VII.A.1.a (¶¶ 61-66), above, touchscreens and pen-input devices were not compatible with Pogue’s Windows XP Pro and would not have been operational on a computer running that operating system. POSAs would have known that Pogue’s Windows XP Pro did not support touchscreens because Pogue never mentions the ability to support the operation of touchscreens or pen-input devices, unlike Pogue’s discussion throughout on how a mouse and a keyboard are input devices that are supported by the Windows XP Pro operating system. See § VII.A.1.a (¶¶ 61-66). Pogue thus does not support a reasonable

expectation that a touchscreen would have been operational on Lane's computer when running Pogue's Windows XP Pro.

b. POSAs Would Not Have Expected a Touchscreen to Be Operable on a Computer Running Windows XP Pro Because It Was Operable on a Computer Running a Different Operating System

86. Petitioners cite Lane (Ex. 1006), Shimano (Ex. 1008), and Kurtenbach (Ex. 1015) as allegedly establishing that Lane's touchscreen would be "operable in all configurations of the computer" when running Pogue's Windows XP Pro.

Petition, 28-29. But none of those references ever mention Windows XP Pro, let alone disclosing its ability to enable the operation of touchscreens.

87. Even if Lane, Shimano, or Kurtenbach disclosed operable pen-based computing or touchscreens, that did not mean POSAs would have had a reasonable expectation that Lane's touchscreen would be operative when running Pogue's Windows XP Pro, which did not support the operation of a touchscreen. This is because POSAs would have known that different operating systems support different input devices as further explained in Section VII.A.2.c (¶¶ 88-90), below. Thus, whether a touchscreen was operational on a computer running an undisclosed operating system would have had no bearing on POSAs' expectations of whether a touchscreen would operate on a computer running Pogue's Windows XP Pro.

c. POSAs Would Not Have Expected All Hardware to Be Operable on a Computer Running Windows XP Pro

88. POSAs would not have expected all hardware to be operable on a computer running Pogue’s Windows XP Pro, even if it was operable on a computer running a different operating system.

89. Operating systems that did not support touchscreens is not a unique issue of Pogue’s Windows XP Pro. For example, as of 2022, “[t]he MacOS operating system doesn’t provide any support for touchscreens.” Ex. 2022, 2; Ex. 2023, 1 (“macOS doesn’t support touchscreens”). While there exists “specially developed” “third-party software” to get touchscreens to work on computers running the MacOS (Ex. 2022, 2; Ex. 2023, 1), Petitioners fail to cite any evidence of specially developed third-party software to get touchscreens to work on computers running Pogue’s Windows XP Pro.

90. Thus, even if Lane, Shimano, and Kurtenbach disclosed operable touchscreens, their operation was on a computer running an undisclosed operating system—not Windows XP Pro. Just because the touch screens worked on an undisclosed operating system did not mean that POSAs would have then expected Lane’s touchscreen to be operative when running Pogue’s Windows XP Pro, particularly when POSAs knew that operating system did not in fact support the operation of a touchscreen. In sum, none of Lane, Shimano, or Kurtenbach support

a reasonable expectation that Lane's touchscreen would be operable with Lane running Pogue's Windows XP Pro as the Petition alleges.

d. Making a Touchscreen Operate on a Computer Running Pogue's Windows XP Pro Would Have Been Beyond the Capabilities of a POSA

91. Petitioners fail to establish a reasonable expectation that Lane's touchscreen would be operable when running Pogue's Windows XP Pro for the additional reason that making a touchscreen operate on a computer running Pogue's Windows XP Pro would have been beyond the capabilities of a POSA as defined by Petitioners and Dr. Wolfe.

92. Petitioners define a POSA as having "a bachelor's degree (or equivalent) in electrical engineering, computer engineering, computer science, or a comparable subject and would have had two to three years of work experience in the *design and architecture of laptop computers* and other portable electronic devices." Petition, 7. Petitioners define an alternate POSA as one having an advanced degree in the same fields "and would have had one year of post-graduate research or work experience in the *design and architecture of laptop computers* and other portable electronic devices." *Id.* Petitioners state that a POSA "would have been familiar the structural *hardware aspects* of laptop computers and other portable electronic devices as well as *designs of user interfaces* employed and displayed by computer operating systems and their organization of content and

functionality.” *Id.* Petitioners’ POSA thus may have had experience in hardware design and the design of user interfaces, but critically, Petitioners do not define a POSA as having any work experience or specific expertise involving computer coding.

93. Petitioners’ POSA thus would have had no experience creating drivers. Petitioners’ POSA would thus have had no experience modifying operating systems. And Petitioners’ POSA would thus have had no experience in how to make a touchscreen operable on a computer running Pogue’s Windows XP Pro operating system that did not already support the operation of touch screens.

94. While Petitioners imply, without any evidence, that POSAs could have easily made a touchscreen work on a computer running an operating system that was not designed to support the operation of touchscreens, in reality, “***it’s not as simple as popping in a touchscreen*** onto [a computer running an operating system that does not support touchscreens] ***and calling it a day.***” Ex. 2024, 1. On the contrary, “to make such a ***drastic change*** as ***switching to a touchscreen***” would “need a **massive** update to accommodate the new functionality.” Ex. 2025, 1.

95. While neither the Petition nor the declaration of Dr. Wolfe identify any way that a computer running the Windows XP Pro disclosed by Pogue could support the operation of a touchscreen, based on my familiarity with computer

operating systems, would have required creation of a driver that integrated the touch screen with Windows XP Pro and translated the output of a touchscreen to emulate the output of a mouse that Windows XP Pro could properly interpret. This task, however, would be beyond the skills of a POSA as defined in the Petition and by Dr. Wolfe—even if a POSA had a computer science degree specifically and the experience identified by Petitioners and Dr. Wolfe. A person with an undergraduate or graduate computer science degree without prior experience creating drivers or operating systems specifically, would not have been able to make Lane’s touchscreen operable when running Pogue’s Windows XP Pro and, thus, would not have had a reasonable expectation of successfully combining the teachings of those two references to result in an operable touchscreen.

96. Creating a driver to take the output of a touchscreen to emulate a mouse, would have presented multiple layers of challenges to even a person who had coding experience, which the POSA as defined in the Petition and by Dr. Wolfe did not. The problem a POSA would have faced is different in kind from the more routine situation where an operating system *supports* a certain type of input device like a keyboard and third-party keyboard manufacturers can write drivers to work with that operating system. The reason is because in those circumstances the provider of the operating system provides application programming interfaces (APIs) to third parties so that they write drivers to interface with the operating

system for *supported* devices like a keyboard. Windows XP Pro did not support a touchscreen so Microsoft provided no API to third-party touchscreen manufacturers to assist them in writing a driver that would work with Windows XP Pro.

97. One challenge a person creating a touchscreen driver would have faced would have been compensating for the lower precision of a touchscreen over a mouse. A mouse is very accurate and has the ability to select an object that is as small as 1 pixel by 1 pixel. A finger touching a touchscreen or even a stylus touching a touchscreen, however, is most typically significantly larger than a single pixel. Ex. 2026, 13 (as of 2005, “touchscreens [were] still notorious for their inaccuracy”), 25 (“This makes it difficult to select precise pixels on the screen, given the large error factor of the fingertip”). To get a touchscreen or pen-based input to provide meaningful input for an operating system such as Windows XP Pro that only supported a mouse and not a touchscreen, a person creating a driver would have needed to compensate for the larger fingerprint of a finger or stylus on the display in comparison with the high precision capable with a mouse.

98. Another challenge a person creating a touchscreen driver would have faced would have been the necessity of translation between the action of touching a touch screen and clicking a mouse. These two actions have different syntactic meaning. Touching a touch screen has the syntactic meaning of moving the cursor

to the (computed or estimated) position of the stylus or finger. And touchscreen gestures include swiping, pinching and multi-touch actions. In contrast, a mouse click has the meaning of selecting the item associated with the current mouse position. These two events have different meanings, thus a person creating a touchscreen driver would need to disambiguate touching and clicking. Put another way the software would need to determine if a touch meant “move the cursor” or “select the item associated with the cursor position.”

99. Thus, in order to get a touchscreen or pen-based input to provide meaningful input for an operating system such as Windows XP Pro that only supported a mouse and not a touchscreen, a person creating a touchscreen driver would have needed to overcome the ambiguity of the user intention of first touching a touchscreen and how that should be presented as output to the operating system.

100. Another challenge a person creating a touchscreen driver would have faced would have been creating a driver unique to the specific touchscreen to be used. Ex. 2026, 26 (“Mice do not need to be calibrated.... On touchscreens, *miscalibration is a frequent and important problem*.... they consistently interpret input incorrectly, skewing it to one direction or another. Even slight miscalibrations can cause the users to unintentionally make undesired selections, which can be very aggravating.”). Because the input of a mouse is relative, the

associated mouse software need not concern itself with the resolution of the screen or what its orientation is. Moving the mouse will simply move the cursor an amount proportional to the movement of the mouse until the edge of the screen is encountered, at which point, further movement of the mouse does not result in movement of the cursor.

101. Emulating a mouse based on a touchscreen input is more challenging because the dimensions of the touch screen, its orientation, and the present location of the pointer within the screen must all be known by the touchscreen driver in order to transmit as simulated mouse output the correct amount of relative movement to the operating system so that the operating system knows to move the pointer to the location where the finger or stylus is pressing the screen, and not someplace else. To get a touchscreen or pen-based input to provide meaningful input for an operating system such as Windows XP Pro that only supported a mouse and not a touchscreen, a person creating a touchscreen driver would have needed to compensate for each specific touchscreen used and its orientation.

102. Another challenge a person creating a touchscreen driver would have faced would have been coordinating the output of the touchscreen with the operating system's mouse sensitivity settings. Windows XP Pro had the ability to change the sensitivity of the mouse movements. Pogue, 295 ("you can set things up so that moving the mouse one *millimeter* moves the pointer one full *inch*—or vice

versa”). Higher sensitivity meant that moving the mouse a slight amount would result in large movements of the pointer. Lower sensitivity meant that moving the mouse a large amount would only result in small movements of the pointer. If the output of the touchscreen driver was not coordinated with the sensitivity setting, pressing the touchscreen would result in the pointer undershooting or overshooting its intended target. What’s more, repeated pressing of the touchscreen would have no effect on the location of the pointer because the touchscreen would believe the pointer to already be at the location being pressed and so would not send a signal to indicate to the operating system the need to move the pointer.

103. A challenge a POSA, as defined by the Petition and Dr. Wolfe, would have faced would have been an inability to implement any solution to the above-enumerated challenges. As explained above, such a POSA would have had no work experience whatsoever with coding. Work experience coding drivers would have been a prerequisite to developing a software driver to enable a touchscreen to operate on a computer running Pogue’s Windows XP Pro operating system. Without experience coding drivers, a person would not have known how to implement workarounds to any of the other challenges described above. Even if a person were to have two to three years of experience with coding, writing a new OS/device interface would be well beyond even those abilities.

104. I have personally worked to create device drivers. Thus, I have a personal understanding of the level of difficulty in creating such drivers. Such a driver to emulate the output from a mouse by a touchscreen would involve real-time operation and would involve the creation of interrupt handlers to successfully interact with multiple different aspects of the operating system. Creating such a driver would have been a daunting task to a person or team of people with significant experience in creating such drivers. I am not surprised that I am unfamiliar with and have been unable to locate evidence that such a driver for Windows XP Pro ever existed given the level of difficulty. A POSA without any experience coding drivers would have never been capable of creating such a driver based on my experience.

105. Moreover, to even begin writing a device driver, a POSA would have needed access to Windows XP source code, which Microsoft does not make public. A POSA thus would not have had the capability to modify Windows XP Pro to support a touch screen even if one knew how.

106. Indeed, that is why Microsoft needed to release a new and different operating system when it sought to support the operation of touchscreens. A new and different operating system was required because supporting the operation of a touchscreen required more than just emulating a mouse. For example, to scroll through content with a mouse, the user typically clicks on a scroll bar and drags it

in the direction the user wants to scroll. Pogue, 359 (describing scroll bars). With a touchscreen, however, the user is able to touch the screen and drag a finger in any direction to scroll. Ex. 2019. Clicking the mouse and dragging it does not scroll as would be the case for a touchscreen (outside the context of dragging a scroll bar) and instead “drag things around on the screen” (Pogue, 19), resizes windows (*id.*, 58), moves windows (*id.*, 83), copies and pastes (*id.*, 178), among other functions.

107. Rolling out a new and different operating system than the one disclosed in Pogue, including inventing the gestures used for a touchscreen that other input devices do not use, would have thus been well beyond the scope of routine optimization.

108. Rolling out a new and different operating system than the one disclosed in Pogue would also have been beyond the skills of a POSA for the same reasons it would be beyond the capabilities of a POSA to create a new driver.

109. In sum, modifying a computer that was running Windows XP Pro, as described by Pogue, to support the operation of a touchscreen would have involved more than routine experimentation and, more importantly, would have been beyond the skills of a POSA as defined in the Petition and by Dr. Wolfe.

3. Ground 1 Fails for Claims 1, 3, 4, and 7-9 for the Additional Reason That Lane Does Not Disclose a Navigation Control

**that is Rotatable About the Computer's Longitudinal Axis
Independently from the Computer's Base**

110. Ground 1 fails to establish the obviousness of independent claim 1 and the dependent claims challenged in Ground 1 (dependent claims 3, 4, and 7-9) because Lane does not disclose a navigation control that is *rotatable about* the longitudinal axis of the computer independently from the computer's base as required by those claims.

111. Lane's electronic mouse is the only navigation control that the Petition alleges as meeting the navigation control in claim 1. Petition, 45-48. Petitioners annotated Lane Fig. 1 (reproduced below) to identify the electronic mouse 32. Petitioners allege that Lane's mouse includes a "pressure pad used to move the cursor" and "two buttons which a POSITA would have recognized as the left and right buttons for the electronic mouse 32 by which the user can right click or left click." *Id.*, 45-46.

“disposed about” the longitudinal axis must therefore be rotatable about that axis too. Dr. Wolfe’s declaration is *verbatim* the same as the Petition and so never opines that the Lane’s mouse 32 is rotatable about the longitudinal axis either. Ex. 1002 ¶¶120-123.

113. In sum, Lane’s mouse 32 is not “rotatable about the longitudinal axis” as required by claim 1 and the Petition offers no argument or evidence to the contrary. Ground 1 for claims 1, 3, 4, and 7-9 thus fail to establish the obviousness of those claims for this additional reason

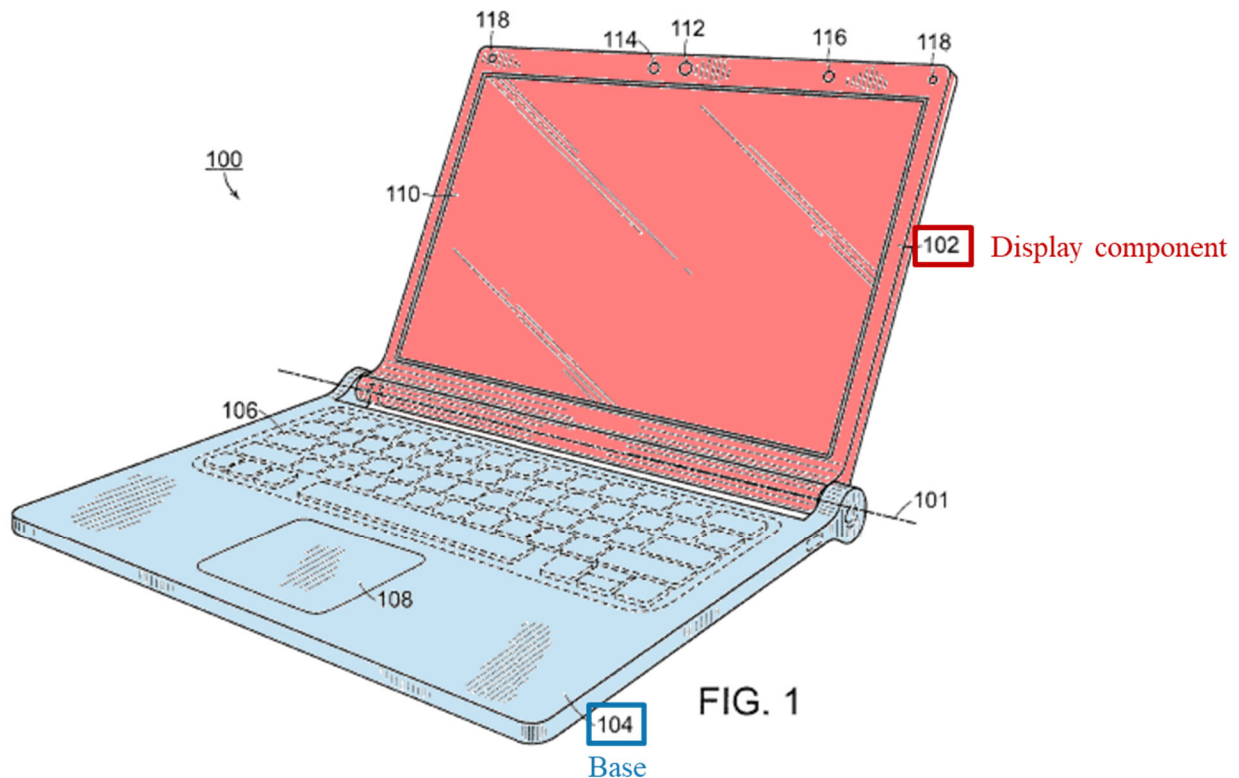
4. Ground 1 Fails for Claims 18 and 22 for the Additional Reason That Lane Does Not Disclose a Navigation Control that is Disposed About the Computer’s Longitudinal Axis

114. Ground 1 fails to establish the obviousness of claims 18 and 22 in Ground 1 because Lane does not disclose a navigation control that is *disposed about* the longitudinal axis of the computer as required by those claims.

115. The Petition asserts that both Lane’s electronic mouse and its touchscreen are disposed about the longitudinal axis despite neither of those components surrounding the longitudinal axis, even partially, as claimed. Petition, 48-49. The Petition argues that those components are “disposed about” the longitudinal axis because “the electronic mouse 32 is *part of the base*” and “the touchscreen/display 35 is *part of the main display component* which in its entirety is disposed and rotatable about the longitudinal axis.” *Id.* The Petition, however,

offers no evidence-based reason why a navigation control that is entirely within the base or display also meets the separate claim requirement that the navigation control be at least partially disposed about the longitudinal axis as claimed. *Id.* Such an implicit construction is wrong.

116. Construing the requirement that the navigation control be “disposed at least partially about the longitudinal axis” to require nothing more than that it be “part of the base” or “part of the main display component” (Petition, 48-49) would give no meaning to “disposed at least partially about the longitudinal axis” and render that language superfluous. Claim 18 requires both a base and a main display component and every other component, navigation control or otherwise, of the computer disclosed by the ’844 Patent is either part of the base or the main display component. Ex. 1001, Fig. 1.



117. In sum, neither Lane’s mouse nor its touchscreen is “disposed at least partially about the longitudinal axis” as required by claim 18 and the Petition offers no evidence-based argument to the contrary. Ground 1 for claims 18 and 22 thus fails to establish the obviousness of those claims for this additional reason

B. The Remaining Grounds 2-6 Fail to Remedy Ground 1’s Failings

118. Grounds 2-6 all build on Ground 1’s Lane-Pogue combination. None of Grounds 2-6 remedy any of Ground 1’s above-discussed deficiencies. Thus, Grounds 2-6 fail to establish obviousness of any challenged claim for the same reasons as I discuss above with respect to Ground 1.

1. Ground 2: Hotelling Fails to Establish Pogue's Windows XP Pro Operating System Could Support the Operation of Lane's Touchscreen or Pen-Based Inputs

119. Ground 2 adds Hotelling (Ex. 1020) and alleges that in view of Hotelling, a POSA would have been motivated to configure Lane's display 35 "as a touchscreen that is active in all physical configurations/display modes." Petition, 57. But Ground 2 relies entirely on Ground 1's showing to establish that POSAs would have been motivated to run Pogue's Windows XP Pro on Lane's computer as the operating system and that POSAs would have had at least a reasonable expectation that such a combination would have operable touch screens. Indeed, Dr. Wolfe, confirmed my understanding during his cross-examination. Ex. 2020, 68:9-23 ("Q. So *for Ground 2, is the combination still Lane's computer running Pogue's Windows XP Pro?* A. *It is.* And it still has Lane's touchscreen. But it makes it clear that Lane's -- where Lane may only have a limited description of some aspects of its touchscreen, Hotelling makes it clear what an ordinary touchscreen at the time could do....").

120. Ground 2 thus fails to show POSAs would have been motivated to run the Windows XP Pro operating system disclosed by Pogue on Lane's pen-based computer when Pogue lacks any disclosure that its operating system supported the operation of a pen-based input for the same reasons described above for Ground 1. See §VIII.A.1, above. Ground 2 additionally fails to establish that POSAs would

have had a reasonable expectation that Lane’s touchscreen would be operable when running Pogue’s Windows XP Pro, as the Petition alleges, for the same reasons described above for Ground 1. *See* § VIII.A.2, above; And Ground 2 fails to show that the combination would have a navigation control that is rotatable about the longitudinal axis as required by claim 1 or is disposed at least partially about the longitudinal axis as required by claim 18 for the same reasons described above for Ground 1. *See* § VIII.A.3-4, above.

2. Ground 3 Relies Entirely on Ground 1 to Meet the Limitations of Independent Claim 10

121. Ground 3 adds Segawa to the Lane-Pogue combination to meet additional limitations in dependent claim 17. Petition, 58-60. Ground 3 relies entirely on Ground 1 to meet the limitations of independent claim 10. *Id.* Indeed, Dr. Wolfe admitted on cross-examination that he only relied on Segwa as disclosing the “*use of a navigation control*” and relied on the combination of Lane and Pogue to meet the navigation control limitation in Ground 3. Ex. 2020, 84:24-85:5. Ground 3 therefore fails to establish the obviousness of any challenged claim for the same reasons I discuss above for Ground 1. *See* §VIII.A.

3. Grounds 4 & 5 Relies Entirely on Ground 1 & 2 to Meet the Limitations of Independent Claims

122. Grounds 4-5 swap Lane’s hinge with a single axis hinge, but otherwise rely entirely on Ground 1’s Lane-Pogue computer (Ground 4) or Ground

2's Lane-Pogue-Hotelling computer (Ground 5) to meet the claims. Petition, 61-63. Indeed, Dr. Wolfe admitted on cross-examination that he only relied on the combination of Lane and Pogue as disclosing a navigation control in Grounds 4 and 5. Ex. 2020, 85:9-21. Grounds 4 and 5 therefore fails to establish the obviousness of any challenged claim for the same reasons I discuss above for Grounds 1 and 2. *See* §§ VIII.A and VIII.B.1.

4. Ground 6 Relies Entirely on Ground 2 to Meet the Limitations of Independent Claim 10

123. Ground 6 adds Segawa to Ground 4's Lane-Pogue-MIT computer to meet additional limitations in dependent claim 17. Petition, 64. Ground 6 relies entirely on Grounds 1 (by way of Ground 4) to meet the limitations of independent claim 10. *Id.* Indeed, Dr. Wolfe admitted on cross-examination that he only relied on the combination of Lane and Pogue as disclosing a navigation control in Ground 6. Ex. 2020, 85:22-86:1. Ground 6 therefore fails to establish the obviousness of any challenged claim for the same reasons I discuss above for Ground 1. *See* §VIII.A.

* * *

I declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and

the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: Aug 28, 2024


Martin Walker

Exhibit A

To the Declaration of Martin Walker PhD

Martin G. Walker, PhD

Consultant Curriculum Vitae

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650-331-0200

Professional Summary

Dr. Walker has testified in jury trials and arbitrations involving hardware and software technology issues. Testimony has been provided in federal and state courts and at the ITC on matters relating to infringement and validity of various patents as well as misappropriation of trade secrets. He has been engaged as a “technology neutral” to assist in the resolution and adjudication of electronic discovery issues. Dr. Walker is particularly adept at explaining complex technology issues to lay audiences and, as such, has often been asked to present Markman tutorials and prepare demonstratives for arguments as well as his testimony. He regularly works with attorneys to help articulate and manage the many technology issues that arise in complex litigation.

Dr. Walker is a recognized expert with over 40-years of experience in the design of integrated circuits, including analog, digital, and RF/microwave circuits. During his career in industry, Dr. Walker was a founder of three ventures in the specialized field of Electronic Design Automation where he designed and deployed software products that were essential to the design of complex semiconductor ICs. Dr. Walker has first-hand experience in the design of advanced ICs.

During his consulting career, Dr. Walker has focused on the analysis of hardware systems and software source code. He has analyzed complex systems with respect to patent infringement, misappropriation of trade secrets, and copyright infringement. He has analyzed, written expert reports and testified regarding hardware source code including schematics, netlists, Verilog, VHDL and SPICE and software source code. Source code analysis has involved assembly language, C, C++, java, perl, and python. He is familiar with a wide variety of source code repositories including CVS, RCS, Subversion, Perforce, Rational ClearCase, and git.

Dr. Walker has also performed numerous analyses of system-on-a-chip devices that has involved the combined analysis of hardware and software source code. He has been asked to analyze, and document the operation of the systems in the context of the misappropriation of trade secrets, copyright infringement, and patent infringement or validity.

Martin G. Walker, PhD

Consultant Curriculum Vitae

Litigation Projects

- | | | |
|----|---|---|
| 1. | Matter
Description
Law Firm
Client
Status
Dates | Polaris Innovations Ltd v Nanya Technology Corp.
Patent Infringement
Sidley Austin
Nanya
Ongoing
2024- |
| 2. | Matter
Description
Law Firm
Client
Testimony
Status
Dates | ThroughPuter, Inc v. Amazon Web Services
Patent Infringement
Fenwick & West
Amazon
Deposition
Ongoing
2024- |
| 3. | Matter
Description
Law Firm
Client
Status
Dates | Pantech v LG Electronics
Patent Infringement
Mayer Brown
Pantech
On going
2023- |
| 4. | Matter
Description
Law Firm
Client
Testimony
Status
Dates | Pantech v OnePlus
Patent Infringement
Mayer Brown
Pantech
Deposition, trial
On going
2023- |
| 5. | Matter
Description
Law Firm
Client
Testimony
Status
Dates | Samsung v Mianyang BOE et al
Patent Infringement
Kilpatrick Townsend
MobileSentry
Deposition
Closed
2023 |
| 6. | Matter
Description
Law Firm
Client
Status
Dates | Apple v Sonrai
Patent validity
DLA Piper
Apple
Closed
2023 |

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7.	Matter	Certain Radio Frequency Transmission Devices and Components Thereof
	Description	Patent infringement
	Law Firm	Morgan Lewis
	Client	Zebra
	Testimony	Deposition/ITC hearing
	Status	Closed
	Dates	2021-22
8.	Matter	Intellectual Tech LLC v Zebra Technologies, Corp
	Description	Patent infringement
	Law Firm	Morgan Lewis
	Client	Zebra
	Testimony	Deposition/ITC hearing
	Status	Closed
	Dates	2021-22
9.	Matter	NXP v MediaTek
	Description	Patent infringement
	Law Firm	Jones Day
	Client	NXP
	Testimony	Deposition
	Status	Closed
	Dates	2022
10.	Matter	Google v Sonrai
	Description	Patent validity
	Law Firm	Paul Hastings
	Client	Google
	Testimony	Deposition
	Status	Closed
	Dates	2021-22
11.	Matter	HEALTHeSTATE, LLC v. United States & ASM Research, LLC
	Description	Contract dispute/False Claims Act
	Law Firm	Covington
	Client	ASM (Accenture)
	Status	Closed
	Dates	2021-22
12.	Matter	Certain Portable Battery Jumpstarters and Components Thereof (including Canadian counter part litigation)
	Description	Patent infringement
	Law Firm	Perkins-Coie
	Client	Carku
	Testimony	Deposition; ITC hearing
	Status	Closed
	Dates	2021-22

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13.	Matter	Intertrust v Intertrust Defendants (AMC Theatres, Cinemark, and Regal)
	Description	Patent Infringement
	Law Firm	Norton Rose Fulbright
	Client	Defendants
	Status	Closed
	Dates	2020-21
14.	Matter	Singular Computing LLC v. Google
	Description	Patent infringement
	Law Firm	Keker
	Client	Google
	Testimony	Deposition, trial
	Status	Closed
	Dates	2020-2024
15.	Matter	Gree, Inc v Supercell OY
	Description	Patent infringement
	Law Firm	Fenwick
	Client	Supercell
	Status	Closed
	Dates	2020
16.	Matter	Lexmark International v Universal Imaging Industries, LLC
	Description	Patent Infringement
	Law Firm	Banner & Witcoff
	Client	Lexmark
	Testimony	Deposition
	Status	Closed
	Dates	2019-2024
17.	Matter	Elastic v. floragunn
	Description	Copyright infringement of source code
	Law Firm	O'Melveny & Meyers
	Client	Elastic
	Testimony	Deposition
	Status	Closed
	Dates	2019-22
18.	Matter	Liion v. Vertiv
	Description	Misappropriation of trade secrets
	Law Firm	Benesch, Friedlander
	Client	Vertiv
	Testimony	Deposition
	Status	Closed
	Dates	2019-20

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Consultant Curriculum Vitae

- | | | |
|-----|---|---|
| 19. | Matter
Description
Law Firm
Client
Testimony
Status
Dates | Monarch v. Cisco
Patent infringement
Heim, Payne & Chorush
Monarch
Deposition
Closed
2020-21 |
| 20. | Matter
Description
Law Firm
Client
Status
Dates | VLSI v Intel
Patent Infringement
Wilmer Hale
Intel
Closed
2018-2023 |
| 21. | Matter
Description
Law Firm
Client
Status
Dates | Motorola Solutions v Hytera
Misappropriation of trade secrets/source code copying
Kirkland & Ellis
Motorola Solutions
Closed
2018-19 |
| 22. | Matter
Description
Law Firm
Client
Status
Dates | Midwest Athletics v. Ricoh
Patent Infringement
Jones Day
Ricoh
2018-19
Closed |
| 23. | Matter
Description
Law Firm
Client
Testimony
Status
Dates | T-Q Delta v 2-Wire
Patent infringement
Goodwin Procter
2-Wire
Depositions, jury trials
Closed
2018-2020 |
| 24. | Matter
Description
Law Firm
Client
Status
Dates | E-Systems v Mentor
Patent infringement
Burns Charest LLP
E-Systems
Closed
2018 |

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25.	Matter	IV vs T-Mobile, Sprint
	Description	Patent infringement
	Law Firm	Kwun Bhansali Lazarus
	Client	T-Mobile, Sprint
	Testimony	Deposition
	Status	Closed
	Dates	2018-19
26.	Matter	Xilinx
	Description	Patent validity
	Law Firm	Haynes Boone
	Client	Xilinx
	Status	Closed
	Dates	2018
27.	Matter	Unity Opto
	Description	Patent validity
	Law Firm	Alston Bird
	Client	Unity Opto
	Status	Completed
	Dates	2018
28.	Matter	Red Rock Analytics v Samsung Electronics
	Description	Patent validity
	Law Firm	Heim Payne & Chorush
	Client	Red Rock Analytics
	Status	Closed
	Dates	2018-19
29.	Matter	GeoSolutions v GyPSii
	Description	Source code copying/contract dispute
	Law Firm	Squire Patton Boggs
	Client	GeoSolutions
	Testimony	Arbitration hearing in Beijing/Arbitration hearing in Amsterdam
	Status	Closed
	Dates	2018-19
30.	Matter	Uchytel v Avanade et al
	Description	False claims act
	Law Firm	Kirkland
	Client	Avanade
	Testimony	Deposition
	Status	Closed
	Dates	2017-18

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Consultant Curriculum Vitae

31.	Matter Description Law Firm Client Status Dates	Compulife Software vs One Resource Group Misappropriation of trade secrets/copyright infringement/source code copying Berger-Singerman One Resource Group Closed 2017
32.	Matter Description Law Firm Client Status Dates	Attia v Google Misappropriation of trade secrets Wilson Sonsini Google Closed 2017-19
33.	Matter Description Law Firm Client Status Dates	Qualcomm v Apple Patent infringement Wilmer Hale Apple/Intel Closed 2017-18
34.	Matter Description Law Firm Client Status Dates	Apple Patent validity Haynes Boone Apple Closed 2017
35.	Matter Description Law Firm Client Status Dates	British Telecom v Valve, Inc Patent infringement Pillsbury/Barceló Harrison Valve Closed 2017
36.	Matter Description Law Firm Client Status Dates	R2 v Intel Patent infringement Wilmer Hale Intel Closed 2017
37.	Matter Description Law Firm Client Status Dates	NXP v NFC Technology Patent validity Finnegan NFC Technology Closed 2017

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38.	Matter Description Law Firm Client Testimony Status Dates	Raytheon v Cray Patent infringement Steptoe & Johnson Raytheon Depositions Closed 2016-19
39.	Matter Description Law Firm Client Status Dates	CCE v AT&T Patent infringement Paul Hastings AT&T Closed 2016-17
40.	Matter Description Law Firm Client Testimony Status Dates	Intellectual Ventures v Ricoh Americas Corp Patent infringement Orrick Ricoch Deposition Closed 2016
41.	Matter Description Law Firm Client Status Dates	AVM v Intel Patent Infringement Wilmer Hale Intel Closed 2015-18
42.	Matter Description Law Firm Client Status Dates	NFC Technology v Samsung Electronics Co. Patent infringement Finnegan NFC Technology 2015-16 Closed
43.	Matter Description Law Firm Client Status Dates	Xilinx v McCubbery Patent validity Haynes Boone Xilinx 2015 Closed

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44.	Matter Description Law Firm Client Status Dates	Verizon et al v Orlando Communications Patent validity Keker Van Nest T-Mobile Closed 2015-16
45.	Matter Description Law Firm Client Testimony Status Dates	ATopTech v Synopsys Patent validity Jones Day Synopsys Deposition Closed 2014-15
46.	Matter Description Law Firm Client Testimony Status Dates	Lenovo et al v Personal Audio Patent Infringement White Case Google Deposition Closed 2015
47.	Matter Description Law Firm Client Status Dates	Oracle America, Inc. v Terix et al Copyright infringement GCA Law Terix/Maintech Closed 2015
48.	Matter Description Law Firm Client Status Dates	XimpleWare, Inc. v Versata et al Source code copying Valorem Law Versata Closed 2014-15
49.	Matter Description Law Firm Client Testimony Status Dates	Newell et al. v Yapstone et al. Contract dispute Valorem Law Newell Deposition Closed 2014-2015

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50.	Matter Description Law Firm Client Testimony Status Dates	Realtek v LSI Logic Patent infringement Reed Smith Realtek Deposition/ITC heargin Closed 2012-2014
51.	Matter Description Law Firm Client Testimony Status Dates	InterDigital v Samsung Patent infringement Wilson Sonsini/Latham InterDigital Deposition Closed 2013
52.	Matter Description Law Firm Client Testimony Status Dates	InterDigital v Nokia Patent infringement Wilson Sonsini/Latham InterDigital Deposition/ITC hearing Closed 2013
53.	Matter Description Law Firm Client Testimony Status Dates	UnWired Planet v Apple Patent infringement Gibson Dunn Apple Markman tutorial Closed 2013-14
54.	Matter Description Law Firm Client Testimony Status Dates	HSM v. Fujitsu, et al. Patent infringement Weil Gotshall Micron Deposition Closed 2013-16
55.	Matter Description Law Firm Client Status Dates	Monster LLC Patent validity Dechert Monster LLC Closed 2014

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56.	Matter Description Law Firm Client Status Dates	SnapOn v Bosch Patent infringement Grippo & Elden SnapOn Closed 2012-14
57.	Matter Description Law Firm Client Status Dates	Norman IP v Lexmark et al Patent infringement Sherman & Sterling MBZ Closed 2013-14
58.	Matter Description Law Firm Client Testimony Status Dates	Mortgage Grader v Costco Patent infringement TechKnowledge Law Group Mortgage Grader Deposition Closed 2104
59.	Matter Description Law Firm Client Testimony Status Dates	British Telecom v Google Patent Infringement White Case Google Deposition Closed 2102-14
60.	Matter Description Law Firm Client Testimony Status Dates	Skyhook v Google Patent Infringement Steptoe and Johnson/Keker-Van Nest Google Deposition Closed 2011-15
61.	Matter Description Law Firm Client Testimony Status Dates	AMCC v Sandforce, LSI Logic, et al Patent infringement Gibson Dunn AMCC Deposition Closed 2013

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62.	Matter Description Law Firm Client Testimony Status Dates	Dynetix v Synopsys Patent infringement Orrick Synopsys Deposition Closed 2012
63.	Matter Description Law Firm Client Testimony Status Dates	Interdigital v Huawei, ZTE, et al Patent infringement Wilson Sonsini Interdigital Deposition; ITC hearing Closed 2012-13
64.	Matter Description Law Firm Client Testimony Status Dates	SST Corp. v. eSilicon Corp Misappropriation of trade secrets/contract dispute Fenwick eSilicon Deposition Closed 2012
65.	Matter Description Law Firm Client Testimony Status Dates	I-V vs Hynix Patent Infringement Weil Gotshal Intellectual Ventures Deposition Closed 2011-12
66.	Matter Description Law Firm Client Testimony Status Dates	Samsung v Apple Patent infringement Wilmer Hale Apple Deposition Closed 2012
67.	Matter Description Law Firm Client Testimony Status Dates	Brown v TPL Misappropriation of trade secrets GCA Law Brown Deposition and trial Closed 2011-12

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68.	Matter	Richtek v. uPI
	Description	Misappropriation of trade secrets
	Law Firm	Alston Bird
	Client	Richtek
	Testimony	Deposition and ITC hearing
	Status	Closed
	Dates	2011
69.	Matter	Freescall v. ChipMos
	Description	Patent/contract
	Law Firm	Jones Day
	Client	Freescall
	Testimony	Deposition
	Status	Closed
	Dates	2011
70.	Matter	Rambus v Freescall, et al
	Description	Patent infringement
	Law Firm	K&L Gates
	Client	ST Microelectronics
	Testimony	Deposition
	Status	Closed
	Dates	2011
71.	Matter	Nuance v Vlingo
	Description	Patent infringement
	Law Firm	Irell Manella
	Client	Nuance
	Testimony	Deposition and trial
	Status	Closed
	Dates	2011
72.	Matter	Panasonic v Freescall
	Description	Patent infringement
	Law Firm	White Case
	Client	Panasonic
	Testimony	Deposition
	Status	Closed
	Dates	2010
73.	Matter	Volterra v Primarion
	Description	Patent Infringement
	Law Firm	Farella Braun
	Client	Volterra
	Testimony	Deposition and Trial
	Status	Closed
	Dates	2010

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74.	Matter Description Law Firm Client Status Dates	Scratch DJ LLC v Activision Publishing Misappropriation of trade secrets; source code copying Duffy Sweeney Scratch DJ Closed 2010
75.	Matter Description Law Firm Client Testimony Status Dates	2kDirect v. Azoogole Ads Contract dispute Cotchett, Pitre & McCarthy 2kDirect Deposition Closed 2010
76.	Matter Description Law Firm Client Testimony Status Dates	Red Bend Software v Google Patent Infringement Bingham McCutchen Google Deposition Closed 2009
77.	Matter Description Law Firm Client Status Dates	On Semi v Hynix, Elpida, and Nanya Patent Infringement Perkins Coie On Semic Closed 2009-10
78.	Matter Description Law Firm Client Status Dates	LSI Logic/Agere vs Xilinx, Inc Patent Infringement Jones Day Xilinx Closed 2009-10
79.	Matter Description Law Firm Client Status Dates	Data Treasury v Wells Fargo, et al Patent Infringement Andrews Kurth Bancorp South (defendant) Closed 2009

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80.	Matter Description Law Firm Client Status Dates	Toshiba Medical v. Stubitsch Misappropriation of trade secrets Ford Marrin Esposito Ford Marrin Esposito Closed 2009
81.	Matter Description Law Firm Client Status Dates	Spansion v Samsung Patent Infringement King & Spalding Spansion Closed 2009
82.	Matter Description Law Firm Client Status Dates	Ricoh v Synopsys Patent Infringement Wilson Sonsini Synopsys Closed 2008-09
83.	Matter Description Law Firm Client Testimony Status Dates	On Semiconductor v Samsung Patent infringement Jones Day On Semiconductor Deposition Closed 2007-2008
84.	Matter Description Law Firm Client Testimony Status Dates	Web.com v Go Daddy Patent infringement Wilson Sonsini Go Daddy Markman tutorial Closed 2008
85.	Matter Description Law Firm Client Status Dates	Sandisk v various Flash memory manufacturers Patent infringement Wilson Sonsini Sandisk Closed 2008

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86.	Matter Description Law Firm Client Status Dates	Variphy, Inc. et al, v Clarus Systems, Inc. Misappropriation of trade secrets; source code copying Bergeson, LLP Clarus Closed 2--7
87.	Matter Description Law Firm Client Status Dates	HP v Acer Patent infringement Dechert Acer Closed 2007
88.	Matter Description Law Firm Client Testimony Status Dates	BHE Group v MTS Products Contract dispute Miller Barondess BHE Group Deposition and trial Closed 2007
89.	Matter Description Law Firm Client Status Dates	Shareholders v Magma Provided technical consulting service to plaintiff's counsel to explain the scope and nature of the Defendants acts. Millberg Weiss Shareholders Closed 2007
90.	Matter Description Law Firm Client Status Dates	Panpacifics v Tradebeam Independent expert to assist the arbitration panel with technology issues -- -- Closed 2007
91.	Matter Description Law Firm Client Status Dates	Shore Venture Group v Authentidate Source code analysis Buchanan Ingersol Shore Venture Group Closed 2007

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92.	Matter Description Law Firm Client Status Dates	Silvaco vs BindKey, et al Misappropriation of trade secrets; source code copying Dechert Silvaco Closed 2006
93.	Matter Description Law Firm Client Testimony Status Dates	Matsushita v. MediaTek Patent infringement McDermott Will & Emery Matsushita Deposition Closed 2006-2007
94.	Matter Description Law Firm Client Status Dates	ST vs SanDisk Patent infringement Jones Day SanDisk Closed 2006
95.	Matter Description Law Firm Client Testimony Status Dates	Benedict v Mediatrac Expert testimony regarding standard level of care relating to IT practices. Greenan, Peffer Mediatrac Deposition and trial Closed 2006
96.	Matter Description Law Firm Client Status Dates	Microsoft vs BWT Industry Technology Provided expert opinion regarding alleged pirating of Microsoft products. Gordon Rees BWT Industry Technology Closed 2006
97.	Matter Description Law Firm Client Status Dates	iSmart International v I-Docsecure Contract dispute regarding software source code Paul Hastings I-Docsecure Closed 2006

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- | | | |
|------|---|--|
| 98. | Matter
Description
Law Firm
Client
Status
Dates | Apple Resellers et al v. Apple Computer
Served as Technology Neutral
--
--
Closed
2006 |
| 99. | Matter
Description
Law Firm
Client
Testimony
Status
Dates | Matsushita v. MediaTek
Patent infringement
Dewey Ballantine
Matsushita
Markman Tutorial and Deposition
Closed
2006 |
| 100. | Matter
Description

Law Firm
Client
Status
Dates | LiveOps v. Teleo
Misappropriation of trade secrets; source code copyright
infringement
Gordon Rees
LiveOps
Closed
2006 |
| 101. | Matter
Description
Law Firm
Client
Status
Dates | FIS v. CalAmp
Misappropriation of trade secrets
Gordon Rees
CalAmp
Closed
2006 |
| 102. | Matter
Description

Law Firm
Client
Status
Dates | Experian v. I-Centrix
Source code copying; copyright infringement; and misappropriation
of trade secrets
Jones Day
Experian
Closed
2005-06 |
| 103. | Matter
Description

Law Firm
Client
Status
Dates | Experian v. I-Centrix
Source code copying; copyright infringement; and misappropriation
of trade secrets
Jones Day
Experian
Closed
2005-06 |

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104.	Matter	Keywords vs ISE
	Description	Source code copying and copyright infringement
	Law Firm	ISE
	Client	Dechert
	Status	Closed
	Dates	2005
105.	Matter	Synopsys vs Magma
	Description	Misappropriation of trade secrets and patent infringement
	Law Firm	Dechert/Wilson Sonsini
	Client	Synopsys
	Status	Closed
	Dates	2005
106.	Matter	Berry vs Fleming, et al.
	Description	Source code copyright/misappropriation of trade secrets
	Law Firm	Kirkland
	Client	Flemming and other Defendants
	Status	Closed
	Dates	2005
107.	Matter	Siliconix vs AATI
	Description	Patent infringement
	Law Firm	Dechert LLP
	Client	AATI
	Status	Settled
	Dates	2004-05
108.	Matter	Tera Systems vs InTime Software
	Description	Patent infringement
	Law Firm	McDermott
	Client	InTime Software
	Status	Closed
	Dates	2004
109.	Matter	HCL vs eKomas
	Description	Literal source code copying
	Law Firm	Dechert
	Client	HCL
	Status	Closed
	Dates	2003-2004
110.	Matter	Aprés v Ho
	Description	Misappropriation of trade secrets
	Law Firm	Law offices of Al Reynaldo
	Client	Aprés
	Testimony	Trial
	Status	Closed
	Dates	2003

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|------|-------------|---|
| 111. | Matter | Synopsys vs Nassda |
| | Description | Patent infringement; misappropriation of software trade secrets |
| | Law Firm | Dechert LLP |
| | Client | Synopsys |
| | Testimony | Deposition |
| | Status | Closed |
| | Dates | 2001-04 |
| | | |
| 112. | Matter | IRS v Taxpayer |
| | Description | Analysis for tax purposes of software valuation and associated royalty streams. |
| | Law Firm | FTI Teklicon |
| | Client | IRS |
| | Status | Closed |
| | Dates | 2001-2002 |
| | | |
| 113. | Matter | Silvaco v CSI |
| | Description | Misappropriation of software trade secrets |
| | Law Firm | Dechert, LLP |
| | Client | Silvaco |
| | Testimony | Depositions, Arbitration, Trial |
| | Status | Closed |
| | Dates | 2001-03 |
| | | |
| 114. | Matter | Sequence Design vs various defendants |
| | Description | Patent infringement – pre-litigation investigation |
| | Law Firm | Thelen Reid |
| | Client | Sequence Design |
| | Status | Closed |
| | Dates | 2000-02 |

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Employment History

- | | | |
|-----------|---------|--|
| From: | 2001 | Brass Rat Group, Inc. |
| To: | Current | Woodside, CA |
| Position: | | <i>CEO</i> |
| | | Brass Rat Group is a successful Silicon Valley based consulting organization specializing in litigation consulting and business consulting related to hardware and software design. |
| From: | 2000 | Knowledge Networks |
| To: | 2001 | Menlo Park, CA |
| Position: | | <i>Chief Technology Officer</i> |
| | | Knowledge Networks is a pre-IPO market research company that is leveraging internet technology to revolutionize the market research industry. KN recruited a panel of over 50,000 consumers to be interviewed on a variety of topics weekly. Dr. Walker managed KN's engineering group, which designed and created automated systems to create surveys, conduct interviews, process data, and manage the panel. He also managed the IT group which was responsible for high-availability web-based systems for fielding the interviews as well as the internal systems required to analyze the data and produce real-time reports. |
| From: | 1995 | Sequence Design (Formerly Frequency Technology) |
| To: | 2000 | |
| Position: | | <i>Founder, Founding CEO, Director & CTO</i> |
| | | Sequence Design, formerly Frequency Technology, is the leader in the EDA segment called Design Closure. Sequence's products and services, consisting of pre- and post-layout optimization based on accurate layout extraction, enable designers to bring higher performance, lower-power integrated circuits quickly to tape out. Dr. Walker: |
| | | <ul style="list-style-type: none">• Developed business plan and raised over \$9MM in financing;• Hired staff and led development, including defining technical product definition; Personally developed many of the basic algorithms, which resulted in five issued patents;• Led initial marketing efforts;• Wrote numerous technical articles advancing the company's technical position;• Served as chief technical spokesman for the company. |

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- From: 1990
To: 1995
Position: **Symmetry Design Systems**
Los Altos, CA
Founder, Director & Executive Vice President
- Symmetry, a self-funding enterprise, was a service and product business specializing in the analog simulation EDA market. Products included simulation-model libraries, modeling tools, and special-purpose analog simulators. Dr Walker was responsible for a joint venture in Beijing China, where new products were developed. Symmetry was acquired by Analogy, Inc.
- Initiated Japanese and European marketing activities.
 - Developed conceptual framework and user-interface model for the Sun OpenLook-based product.
 - Served as technical spokesman in customer and industry forums.
 - Conducted sales training in the US, Asia, and Europe.
- From: 1983
To: 1990
Position: **Analog Design Tools**
Sunnyvale, CA
Founder, Director, Founding CEO & Chief Scientist
- ADT's first product, the Analog WorkBench, pioneered the market for Analog CAE workstations, including such fundamental concepts as multiple window CAE systems, and simulated test instruments as a paradigm for CAE user interface. ADT, which had grown to \$16MM in annual sales and 150 employees, was acquired by Cadence.
- Formulated original business plan and presented concept to venture investors. Raised initial venture financing. Led fund-raising activities through the series C round.
 - Served as President during formative stage. Director and Chief Scientist (CTO) from the founding through acquisition. Set the product direction. Drove the technology development.
 - Formulated ADT's initial marketing strategy. The international distribution strategy focused primarily on Japan.
 - Developed the Japanese market for ADT's products. Responsible for establishing and maintaining our distributor relationship, negotiating contracts, supporting customers, and building sales that amounted to 20% of the installed base.
- From: 1980
To: 1983
Position: **COMSAT**
Palo Alto, CA
Director, Microwave Systems
- Managed a Navy sponsored program to develop high productivity techniques for manufacturing of microwave components. Developed amicrowave circuit-synthesis product.

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From: 1973 **Watkins-Johnson**
To: 1980 Palo Alto, CA
Position: *Member of the Technical Staff*
Developed GaAsMESFET-based microwave amplifiers, components, and tuners. Designed and produced the world's first GaAsMESFET amplifiers to be delivered in production quantities.

Patents

<u>Patent Number</u>	<u>Date Issued</u>	<u>Title</u>
6,643,831	2003	Method and system for extraction of parasitic interconnect impedance including inductance
	2002	Method and system for extraction of parasitic interconnect impedance including inductance
6,381,730		
5,901,063	1999	System and method for extracting parasitic impedance from an integrated circuit layout

Education

<u>Year</u>	<u>College/University</u>	<u>Degree</u>
1987	AEA/Stanford Executive Institute	Completed w/distinction
1979	Stanford University, Stanford, CA	Ph.D., Electrical Engineering
1976	Stanford University, Stanford, CA	MS, Electrical Engineering
1973	Massachusetts Institute of Technology, Boston, MA	BS, Electrical Engineering

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Publications

Over fifty articles in the fields circuit design and design automation, including technical papers in peer-reviewed journals, an invited article in the IEEE Spectrum, and various conference proceedings. I have organized seminars, which were designed to enhance the technical credibility of my companies, and written numerous opinion pieces published in journals such as EETimes that served to establish and promote our corporate position. Some more recent publications are listed below.

Martin G. Walker, Modeling the Wiring of Deep Submicron ICs, IEEE Spectrum Vol 37, No. 3, March 01, 2000 at pp. 65-71.

Martin G. Walker, Keh-Jeng (KJ) Chang, Christopher J. Bianchi, SIPP's Why Do We Need a New Standard for Interconnect Process Parameters? VLSI: Systems on a Chip, Kluwer Academic Publishers, December, 1999.

Martin Walker, Timing Errors Haunt Interconnects, Electronic Engineering Times No. 1021, August 17, 1998.

Martin Walker, Interconnect Analysis Must Move to 3-D, Electronic Engineering Times No. 980, November 10, 1997.

Martin G. Walker, The Guardband Crisis, Electronic Engineering Times No. 929 November 25, 1996 at p. 43.

In addition to the foregoing, I also submitted opinion pieces to Integrated Systems Design (May 1997), Electronic Business (April 1998), and EE Times (June, July, and September 1998).

Professional Associations and Achievements

- 1999 Fortune Magazine "Cool Company" for Frequency Technology.
 - 1984 Electronic Products New Product of the Year award for the Analog Workbench
 - 1976 IEEE Microwave Applications award recognizing contributions to the design of GaAs FET amplifiers
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