UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

LYNK LABS, INC.
Patent Owner

Patent No. 10,506,674

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,506,674

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[1] References to Ex. 1053 are to English translation document page:line numbers. Further, *Oba* (Ex. 1053) is the published priority application relied on by *Oba II* (Ex. 1054, 1), which includes substantially the same specification and figures as *Oba* (Ex. 1053). (Ex. 1053, 1 (verified statement of translator).)

Ex. 1057	U.S. Patent No. 5,293,494 ("*Saito*")
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I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner" or "Samsung") requests *inter partes* review of claims 1-20 ("challenged claims") of U.S. Patent No. 10,506,674 ("the '674 patent") (Ex. 1001) assigned to Lynk Labs, Inc. ("PO"). For the reasons below, the challenged claims should be found unpatentable and canceled.

II. MANDATORY NOTICES

<u>Real Parties-in-Interest</u>: Petitioner identifies the following as the real parties-in-interest: Samsung Electronics Co., Ltd., Samsung Electronics America, Inc.

<u>Related Matter</u>: The '674 patent is at issue in the following matter:

- *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, No. 1-21-cv-02665 (N.D. Ill.) (seeking declaratory judgment of non-infringement as to the '674 patent and also U.S Patent Nos. 10,492,252, 10,499,466, 10,966,298, 11,019,697, 10,492,251, 10,750,583, 10,687,400, and 10,517,149) ("Illinois Litigation").

The '674 patent claims priority to two provisional applications (U.S. Provisional Application Nos. 60/574,653 filed February 25, 2004 and 60/559,867 filed April 6, 2004) to which U.S. Patent No. 8,531,118, which was at issue in IPR2016-01133, also claims priority.

<u>Counsel and Service Information</u>: Lead counsel: Naveen Modi (Reg. No. 46,224), and Backup counsel are (1) Joseph E. Palys (Reg. No. 46,508), (2) Arvind Jairam (Reg. No. 62,759), (3) Howard Herr (*pro hac vice* admission to be requested). Service information is Paul Hastings LLP, 2050 M St., Washington, D.C., 20036, Tel.: 202.551.1700, Fax: 202.551.1705, email: PH-Samsung-LynkLabs@paulhastings.com. Petitioner consents to electronic service.

III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-2613.

IV. GROUNDS FOR STANDING

Petitioner certifies that the ’674 patent is available for review and Petitioner is not barred or estopped from requesting review on the grounds identified herein.

V. PRECISE RELIEF REQUESTED AND GROUNDS

Claims 1-20 should be canceled as unpatentable based on the following grounds:

<u>Ground 1</u>: Claims 1, 3-5, 8-14, 16-18, and 20 are unpatentable under pre-AIA 35 U.S.C. § 103(a) as being obvious over *Oba* (Ex. 1053) and *Gillespie* (Ex. 1071);

<u>Ground 2</u>: Claim 2 is unpatentable under § 103(a) as being obvious over *Oba*, *Gillespie*, and *Hara* (Ex. 1044);

<u>Ground 3</u>: Claims 6 and 15 are unpatentable under § 103(a) as being obvious over *Oba*, *Gillespie*, and *Kikinis* (Ex. 1012); and

<u>Ground 4</u>: Claims 7 and 19 are unpatentable under § 103(a) as being obvious over *Oba*, *Gillespie*, and *Yang* (Ex. 1066).

The '674 patent issued December 10, 2019 from Application No. 16/523,388 filed July 26, 2019, and claims priority via a chain of applications to eight provisional applications. Petitioner does not concede that the priority claim to the foregoing provisional, or any other application in the priority chain, is proper, but for purposes of this proceeding, assumes the critical date for the '697 patent is February 25, 2004, which is the earliest date of one of the provisional applications.

Oba is a PCT application published on January 30, 2003 and thus qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(a).

Kikinis issued July 4, 1995 and *Gillespie* published December 19, 2002, and thus these references qualify as prior art under pre-AIA 35 U.S.C. 102(b).

Yang issued from an application filed May 28, 2003. *Hara* issued from an application filed January 28, 2000. Thus, *Yang* and *Hara* qualify as prior art at least under pre-AIA 35 U.S.C. § 102(e).

None of these references were considered during prosecution. (*See generally* Ex. 1004.)

VI. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art as of the claimed priority date of the ’674 patent (“POSITA”) would have had at least a bachelor’s degree in electrical engineering, computer engineering, computer science, physics, or the equivalent, and two or more years of experience with LED devices and/or related circuit design, or a related field. (Ex. 1002, ¶¶20-21.)[2] More education can supplement practical experience and vice versa. (*Id.*)

VII. OVERVIEW OF THE ’674 PATENT

While the ’674 patent purports to identify an invention directed to an LED device/system having various features (e.g., Ex. 1001, 4:25-10:67, 13:36-14:2), the claims are broadly directed to an apparatus having a combination of known components and features, such as an LED, antenna-based data communications circuit, touch circuit, and power supply (*id.*, 28:15-30:16). While the ’674 patent was allowed on first action during prosecution (Ex. 1004, 34-40), the Examiner’s reasons focused on the claimed “a data communications circuit having an antenna, wherein the data communication circuit is configured to transmit or receive data signals, and wherein the antenna is configured to transmit or receive alternating

[2] Petitioner submits the declaration of R. Jacob Baker, Ph.D., P.E. (Ex. 1002), an expert in the field of the ’674 patent. (Ex. 1002, ¶¶1-19; Ex. 1003.)

signals; a circuit configured to detect tou[c]h via capacitive sensing, the tou[c]h being of a person" (*id.*, 39). But this feature, like all of the other generically claimed features, was already known in the prior art. *See In re Gorman*, 933 F.2d 982, 986 (Fed. Cir. 1991) ("The criterion ... is not the number of references, but what they would have meant to a person of ordinary skill in the field of the invention."). (*Infra* Section IX; Ex. 1002, ¶¶56-58; *see also id.*, ¶¶22-55 (citing, *inter alia*, Exs. 1010, 1021, 1063, 1078, 1080-1087, 1089-1091, 1093-1095), 60-182; *see generally* Ex. 1004; Ex. 1023-1043.)

VIII. CLAIM CONSTRUCTION

The Board only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper No. 11 at 16 (Aug. 14, 2015) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). For purposes of this proceeding, Petitioner believes that no special constructions are necessary to assess whether the challenged claims are unpatentable over the asserted prior art.[3] (Ex. 1002, ¶59.)

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[3] Petitioner reserves all rights to raise claim construction and other arguments, including challenges under 35 U.S.C. §§ 101 or 112, in district court as relevant to those proceedings. *See, e.g.*, *Target Corp. v. Proxicom Wireless, LLC*, IPR2020-00904, Paper 11 at 11–13 (November 10, 2020). A comparison of the claims to any

IX. DETAILED EXPLANATION OF GROUNDS

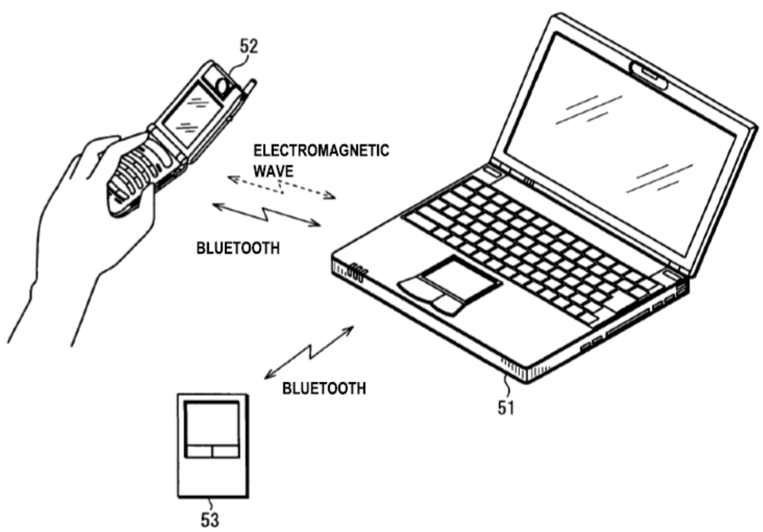
A. Ground 1: Claims 1, 3-5, 8-14, 16-18, and 20 Are Obvious Over *Oba* and *Gillespie*

1. Claim 1

a) An apparatus comprising:

Oba discloses a portable communication device, such as personal computer 51 (also referred to as a "notebook" computer), which is an "apparatus" as claimed. (Ex. 1053, FIGS. 6, 11, 14, 16, 17:22-19:13, 20:9-26:8 (describing details of notebook computer components); Ex. 1002, ¶¶80-81; *see also* Sections IX.A.1(b)-(f).)

FIG. 6



(Ex. 1053, FIG. 6.)

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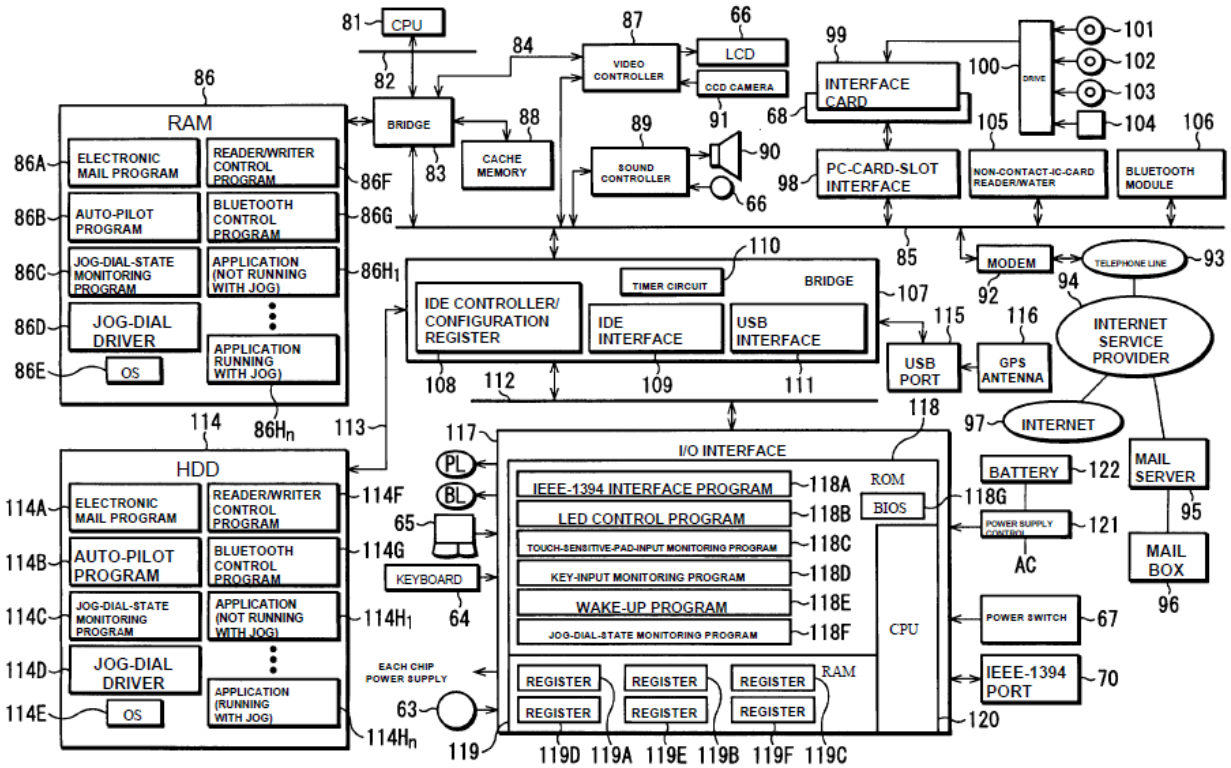
accused products in litigation may raise controversies that are not presented here given the similarities between the references and the patent.

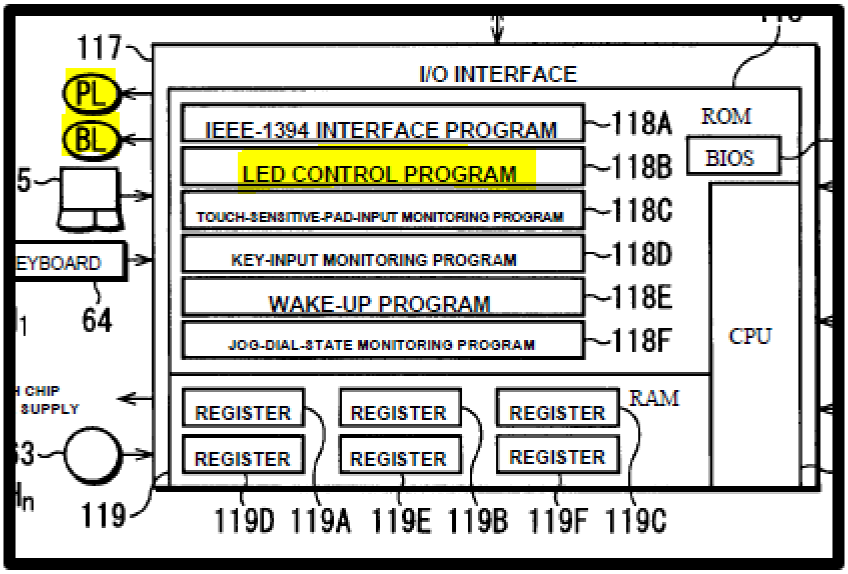
FIG. 11



(*Id.*, FIG. 11.)

b) an LED circuit having at least one LED, wherein the at least one LED is an organic LED;

Oba in combination with *Gillespie* discloses or suggests this limitation. (Ex. 1002, ¶¶82-90.) *Oba*'s notebook computer 51 includes LED lamps, which illuminate in accordance with certain operations. (Ex. 1053, 19:14-18 (explaining that a "power lamp PL, a battery lamp BL, and, if necessary, other LED lamps such as a message lamp ML, are provided"), 24:9-11 ("other LED lamps"), 25:6-10 ("LED-control register" controls "turning-on of the message lamp ML"), 25:16-19 (I/O interface 117 is connected to PL, BL, ML and "other lamps formed of LEDs").)



(*Id.*, FIG. 11 (excerpted/annotated); Ex. 1002, ¶82.) Thus, *Oba* discloses that computer 51 ("apparatus") includes at least one LED. (Ex. 1002, ¶82.)

While *Oba* does not explicitly disclose the use of an *organic* LED (OLED), it would have been obvious in view of *Gillespie* to implement such a feature, to provide for an OLED touch display, as explained below.[4] (*Id.*, ¶83.) *Gillespie* discloses a notebook computer 100 similar to *Oba*'s in that it includes common components of portable computers. (*Id.*; Ex. 1071, FIGS. 1-2, ¶¶[0036]-[0037].)

[4] PO relies on an LED display for this limitation in the Illinois Litigation. (*E.g.*, Ex. 1098, 2, 18, 34-35, 50; Ex. 1099, ¶¶51-52; Ex. 1103, 2, 17, 31-32, 45; *see also* Ex. 1097; Ex. 1102.)

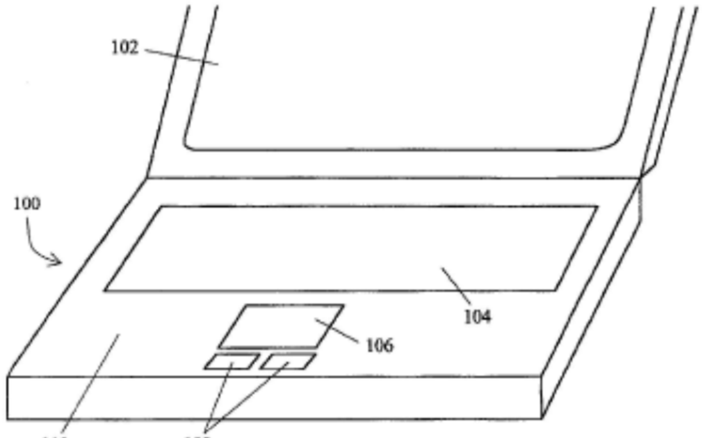


Figure 1

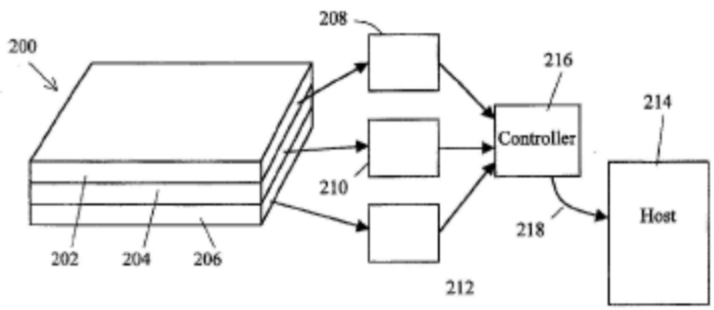


Figure 2

(Ex. 1071, FIGS. 1-2.)

For example, computer 100 includes a display 102 and touch screen 106 positioned similar to *Oba*'s touch pad 65 on computer 51 (Ex. 1053, FIGS. 6-7), and providing a touch control functionality. As shown in Figure 2, touch screen 106 includes an assembly 200 comprising touch sensor 202, display 204, and backlight 206. (Ex. 1071, ¶¶[0014], [0037].) Display 204 can be an "**organic light emitting**

diode (OLED) display," and thus *Gillespie* discloses a display including at least one organic LED. (*Id.*, ¶[0038]; Ex. 1002, ¶84.)[5]

Therefore, *Gillespie* is in the same field of endeavor as *Oba*, which also discloses touch pad functionalities in a notebook computer similar to *Gillespie*. (Ex. 1002, ¶85; Ex. 1071, ¶[0002].) A POSITA would thus have had reason to consider the disclosures of *Gillespie* when contemplating implementing *Oba*'s computer 51. (Ex. 1002, ¶85.)

In light of *Oba*'s and *Gillespie*'s disclosures, a POSITA would have appreciated the benefits in implementing *Oba*'s touch pad/panel 65 as a touch screen similar to that described by *Gillespie* (e.g., touch screen with OLED display, *see* Ex. 1071, ¶[0038]) because it would have been a known and foreseeable way to implement useful touch pad/panel features like those disclosed by *Oba* (Ex. 1053, 19:9-12, 25:12-19) and would have allowed the touch pad/panel to display information and provide mechanisms for a user of computer 51 to provide touch input to control functionalities of computer 51 and/or display 66 or the modified touch screen/pad 65, similar to the features described by *Gillespie* (e.g., user friendly ways to input information and control operations of selected functions such as controlling display brightness of touch screen or main display). (Ex. 1002, ¶86.)

[5] Emphasis is added herein unless indicated otherwise.

Indeed, a POSITA would have recognized that using such a display screen to display status information could help "eliminate[] the need for the special dedicated LED … status displays that are typically used in prior art computers," as explained by *Gillespie* and relevant to *Oba*'s status indicator features discussed above. (Ex. 1071, ¶[0053].) In this way, one or more status indicator lamps could be replaced by icons displayed via the OLED-based touch screen similar to that described by *Gillespie*. (Ex. 1002, ¶86.) A POSITA would have appreciated that an OLED display would have been desirable for such a touch screen because it was known that "OLED technology is preferred because of the very small pixel size that can be attained" and because OLEDs were well known for usage in displays. (Ex. 1011, ¶¶[0014], [0076]; Ex. 1002, ¶86.)[6]

Moreover, *Gillespie* explains that touch screen 106 can replace "the conventional touch pad of a computer" or "could be introduced in addition to the other user interface devices of the computer," and thus would have expanded *Oba*'s computer 51's user input capabilities (Ex. 1071, ¶[0036]; *id.*, ¶¶[0043]-[0044]) and thus a POSITA would have considered various ways to implement such functionalities and circuitry within *Oba*'s computer 51. (Ex. 1002, ¶87; *see also* Ex. 1071, claims 1-71.)

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[6] Exhibit 1011 is cited to demonstrate state of the art. (Ex. 1002, ¶86.)

Thus, a POSITA would have found it obvious to configure the touch pad/panel of computer 51 as an OLED-based touch screen. (Ex. 1002, ¶88.) Accordingly, it would have been obvious in view of *Gillespie* to configure *Oba*'s computer to include at least one LED, wherein the at least one LED is an organic LED (OLED). (*Id.*)

A POSITA would have understood that the modified *Oba* computer as described above, which includes at least one OLED, also includes an OLED *circuit* having the at least one OLED. (Ex. 1002, ¶89.) For example, a POSITA would have had this understanding because OLEDs require current, which a POSITA would have known flows in an electrical circuit. (Ex. 1096, 3:24-39; Ex. 1056, ¶[0034]; Ex. 1002, ¶89.)[7]

The above modification of *Oba*'s computer would have been a straightforward application of known technologies and techniques (e.g., use of a touch screen with an OLED display, as taught by *Gillespie*) and thus would have had a reasonable expectation of success implementing such a modification. (Ex. 1002, ¶90.) *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). A POSITA would have been capable of implementing the above modification because a POSITA was

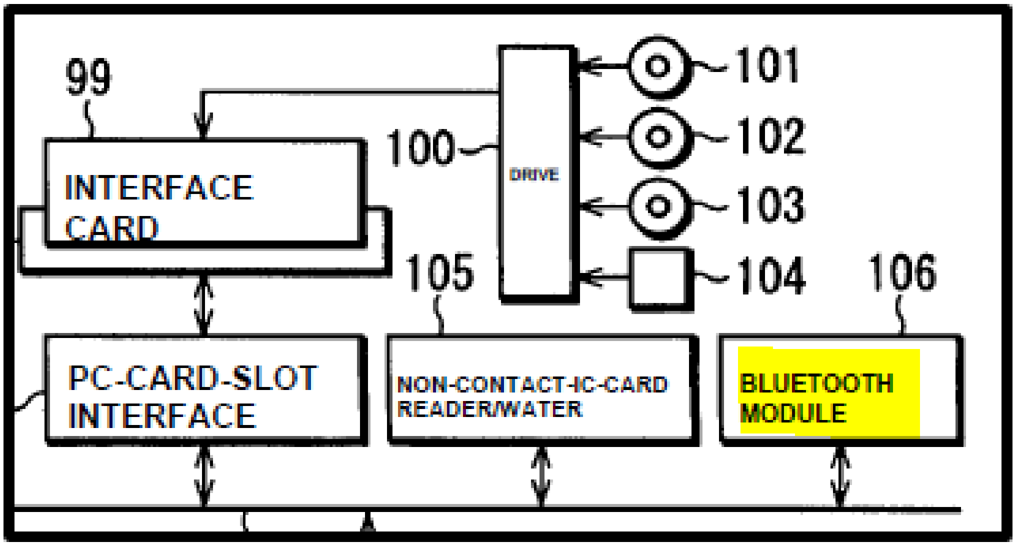
[7] Exhibits 1096 and 1056 are cited to demonstrate state of the art. (Ex. 1002, ¶89.)

skilled in various aspects of circuit design and because OLEDs were well known, as discussed above. (Ex. 1002, ¶90.)

c) a data communications circuit having an antenna, wherein the data communication circuit is configured to transmit or receive data signals, and wherein the antenna is configured to transmit or receive alternating signals;

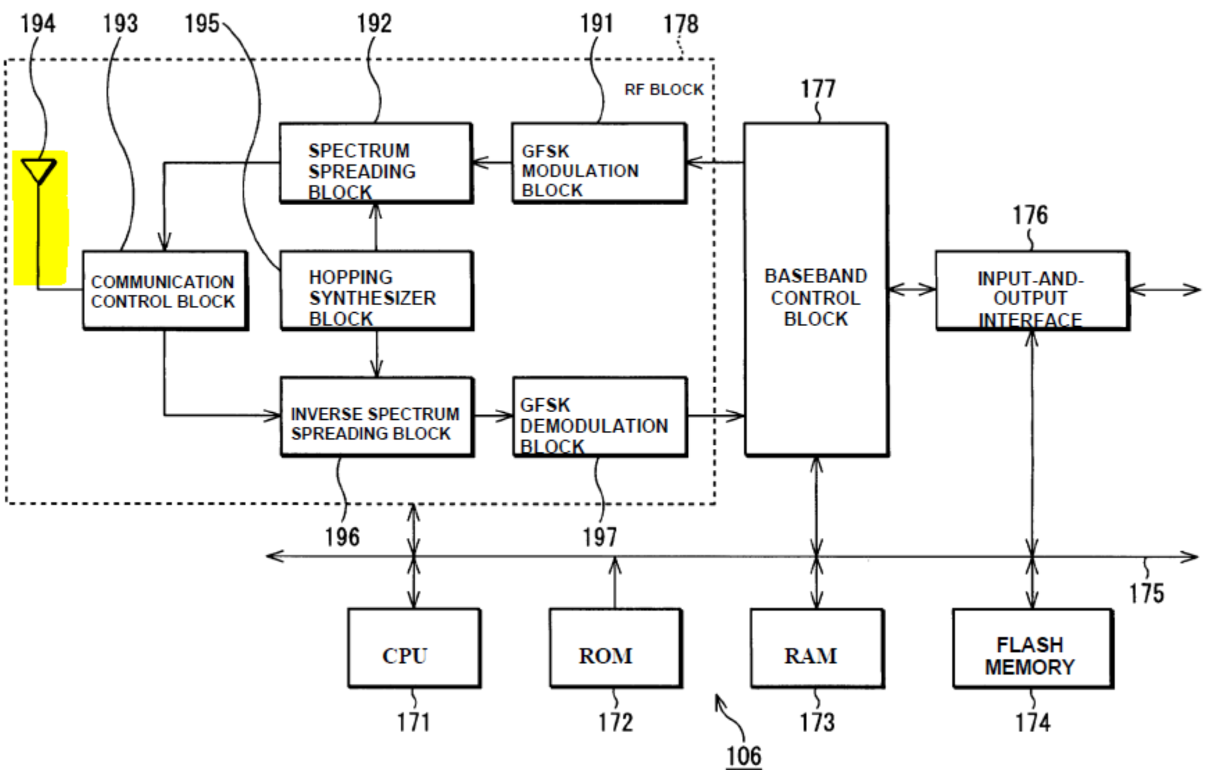
Oba (as modified above) discloses or suggests this limitation.[8] (Ex. 1002, ¶¶91-93.) *Oba* explains that personal computer 51 includes a Bluetooth module 106 that is configured to send and receive data via an antenna 194. (Ex. 1053, FIGS. 11, 13, 20-21, 29:1-20 (describing sending and receiving data via antenna 194 and control block 193), 22:6-8, 26:19-21, 27:18-29:27 (e.g., 29:18-20 ("signal received by the antenna 194")), 38:3-5 (module 106 and module 247 transmitting and receiving data), 39:7-43:17 (describing data communications to/from Bluetooth module 106 regarding Figures 20-21 (below)).)

[8] PO contends that an apparatus supporting Bluetooth connectivity necessarily meets this limitation. (Ex. 1098, 3, 18-19, 35, 51, 69-70; Ex. 1099, ¶52; Ex. 1103, 3, 17-18, 32, 46, 63-64.)



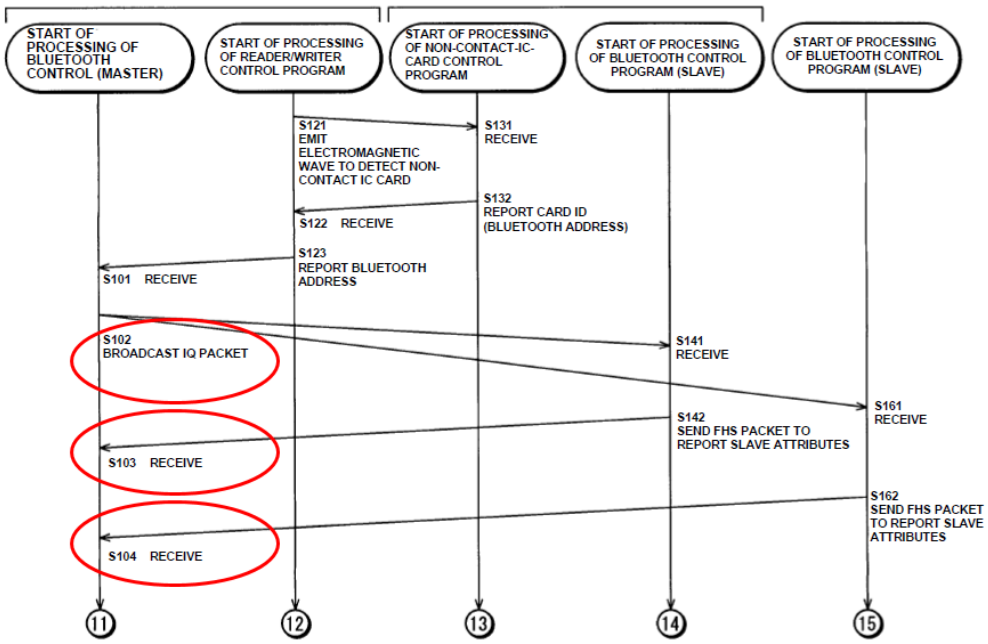
(Ex. 1053, FIG. 11 (excerpted/annotated); Ex. 1002, ¶91.)

FIG. 13



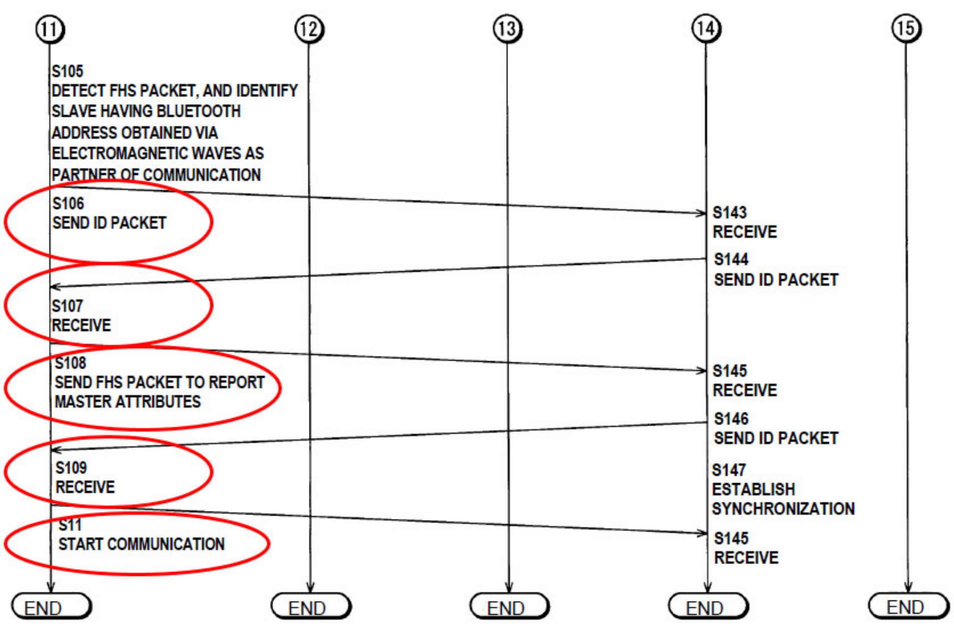
(Ex. 1053, FIG. 13 (annotated); Ex. 1002, ¶91.)

FIG. 20



(Ex. 1053, FIG. 20 (annotated); Ex. 1002, ¶91.)

FIG. 21



(Ex. 1053, FIG. 21 (annotated); Ex. 1002, ¶91.)

Thus, *Oba* discloses that computer 51 ("apparatus") includes a data communications receiver (e.g., Bluetooth module 106) including an antenna 194 that is configured to "transmit or receive data signals," as claimed. (Ex. 1002, ¶92.) A POSITA would have understood that antenna 194 is configured to transmit or receiving *alternating* signals. (*Id.*) For example, *Oba* explains that "communication control block 193 uses the 2.4 GHz band to send a signal to which spectrum spreading has been applied, from an antenna 194." (Ex. 1053, 29:18-29; *see also id.*, 1:12-14 ("Bluetooth is a wireless communication standard standardized by a Bluetooth SIG (special interest group), and uses the 2.4 GHz band (IMS (industrial science medical) band) for communication with other devices having Bluetooth modules.").) A POSITA would have known that 2.4 GHz refers to a frequency of electromagnetic radiation. (Ex. 1009, 3; Ex. 1002, ¶92.)[9] The frequency of the RF radiation is that of a sinusoidal waveform, in particular, the frequency of an alternating current or voltage signal. (Ex. 1002, ¶92.)

While *Oba*'s disclosure of a data communications receiver does not explicitly disclose a data communications "circuit" as in limitation 1(c), a POSITA would have understood that *Oba* necessarily discloses such a data communications circuit because a receiver in an electronic device such as *Oba*'s computer must be

[9] Exhibit 1009 is cited to demonstrate state of the art. (Ex. 1002, ¶92.)

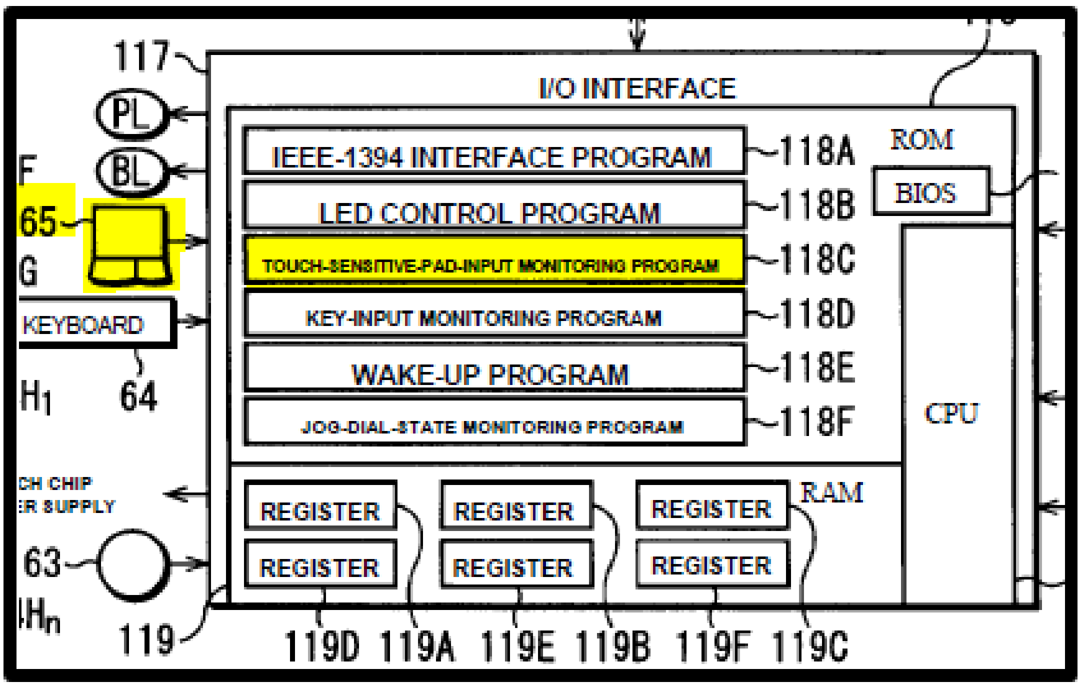
implemented with circuitry in order to supply current (and thus power, which is current multiplied by voltage) to electrical components in the receiver. (Ex. 1002, ¶93.) *Oba* describes "suppl[ying] electric power to the Bluetooth module 106," and a POSITA would have understood electric power (and current) flows in an electrical *circuit*, as that is a fundamental principle of electrical engineering underpinning the operation of all electrical devices. (Ex. 1053, 45:23-25; Ex. 1002, ¶93.) Indeed, without a data communications *circuit*, power would not be provided to components of Bluetooth module 106. (Ex. 1002, ¶93.) Moreover, a POSITA would have understood that an antenna at a receiver (such as antenna 194 shown above in *Oba*'s Figure 13) converts received electromagnetic radiation to electrical signals, and such a skilled person would have understood that such electrical signals require an electrical circuit in order to be used in the manner described in *Oba*. (Ex. 1053, FIG. 13; Ex. 1002, ¶93.)

d) a circuit configured to detect touch via capacitive sensing, the touch being of a person; and

Oba in view of *Gillespie* and the state of the art discloses or suggests this limitation. (Ex. 1002, ¶¶94-98.)[10] As discussed for limitation 1(b) (Section IX.A.1(b)), *Oba* discloses a touch pad 65 (also referred to as touch panel) for sensing

[10] PO relies on a touchscreen for this limitation in the Illinois Litigation. (E.g., Ex. 1098, 3, 19, 36, 51-52; Ex. 1099, ¶¶51-52; Ex. 1103, 3, 18, 33, 46-47.)

touch of a person to facilitate input to control operations of computer 51. (Ex. 1053, FIG. 11, 19:9-12, 19:25-20:2 (touch pad 65 designed to work with jog dial 63 as user-friendly input mechanisms), 24:6-13, 25:6-8, 25:12-19 (touch panel 65 connected to I/O interface 117, which outputs signal corresponding to operation from touch panel 65 and is connected to LED lamps (e.g., lamps PL, BL, ML)).)



(*Id.*, FIG. 11 (excerpted/annotated); Ex. 1002, ¶94.) A POSITA would have understood touch pad/panel 65 would necessarily include touch detection circuitry because without such known components, the touch pad/panel 65 would not operate as described (e.g., detect touch for controlling input that is monitored by monitoring program 118C). (Ex. 1002, ¶94; Ex. 1053, 19:9-12, 25:12-19.) Thus, *Oba* necessarily includes a *circuit* configured to detect touch, the touch being of a person, as claimed. (Ex. 1002, ¶94.) *Oba*, however, does not provide details as to how touch detection is accomplished. Nonetheless, in view of *Gillespie* and the state of the art, a POSITA would have found it obvious to configure the touch pad/panel of computer 51 to include a circuit configured to provide *capacitive* touch sensing, as that was one of a finite number of available and known technologies for implementing touch detection at the time, which would predictably facilitate touch detection as required by *Oba*'s computer 51. (*Id.*) *KSR*, 550 U.S. at 421.

Specifically, a POSITA would have found it obvious to configure the touch pad/panel 65 in *Oba*'s modified computer 51 as a capacitive touch display/pad in view of *Gillespie* and the state of the art. (Ex. 1002, ¶95.) As explained for limitation 1(b) (Section IX.A.1(b)), *Gillespie* discloses a notebook computer 100 similar to *Oba*'s in that it includes common components of portable computers. (Ex. 1002, ¶95; Ex. 1071, FIGS. 1-2, ¶¶[0036]-[0037].) (Ex. 1071, FIGS. 1-2.) For example, computer 100 includes a display 102 and touch screen 106 positioned similar to *Oba*'s touch pad on computer 51 (Ex. 1053, FIG. 6). As shown in Figure 2, touch screen 106 includes an assembly 200 comprising a touch sensor 202. (Ex. 1071, ¶¶[0014], [0037], FIG. 2.) *Gillespie* discloses that touch sensor 202 is a "capacitive" touch sensor, which is "ideally suited for use in the present invention due to their sensitivity, low cost, ruggedness, and suitability to small sensing areas." (*Id.*, ¶[0037].)

As discussed for limitation 1(b), a POSITA would have had reason to consider the disclosures of *Gillespie* when contemplating implementing *Oba*'s computer 51 as modified above. (Section IX.A.1(b); Ex. 1002, ¶96.) A POSITA would have appreciated the benefits in implementing *Oba*'s touch pad/panel 65 as a capacitive touch display screen similar to that described by *Gillespie* because as discussed for limitation 1(b) (Section IX.A.1(b)), such an implementation would have allowed the touch pad/panel to display information and provide mechanisms for a user of computer 51 to provide touch input to control functionalities of computer 51 and/or display 66 or the modified touch screen/pad 65, similar to the features described by *Gillespie*. (Ex. 1002, ¶96.) Indeed, a POSITA would have recognized that using such a display screen to display status information could help "eliminate the need for the special dedicated LED status displays that are typically used in prior art computer[s]," as explained by *Gillespie* and relevant to *Oba*'s status indicator features discussed above. (Ex. 1071, ¶[0053].)

In particular, a POSITA would have found it obvious to configure the touch pad/panel of computer 51 as OLED *capacitive* touch circuitry, as that was one of a finite number of available and known technologies for implementing touch detection at the time, which would facilitate touch detection as required by *Oba*'s computer 51. (Ex. 1002, ¶97.) *KSR*, 550 U.S. at 421. Indeed, a POSITA would have appreciated via *Gillespie* that capacitive touch sensors were ideal for use in small sensing areas like *Oba*'s touch pad/panel 65 (Ex. 1071, ¶[0037]) and known via the state of the art that capacitive touch sensing was a common touch-related user input function for computers like *Oba's.* (Ex. 1002, ¶97; Ex. 1058, FIGS. 3A, 9, 1:44-50, 2:17-37, 5:53-4; Ex. 1059, ¶¶[0011]-[0013], FIGS. 1, 8, 9 ¶¶[0014], [0036], [0041] [0052], [0064]; Ex. 1060, ¶¶[0107], [0116], [0132]; Ex. 1008, Title, Abstract, 2:42-46, 12:18-22).)[11] Likewise, such a modification would have been a straightforward implementation of known technologies and techniques (capacitive touch detection circuitry/features demonstrated by *Gillespie* and state of the art) for use in touch pad/panel components (*Oba*) and thus a POSITA would have had a reasonable expectation of success in implementing such a modification in the modified apparatus here. (Ex. 1002, ¶97.) *KSR*, 550 U.S. at 416.

In light of *Oba* and the state of the art, a POSITA would have been motivated, and found it obvious, to configure *Oba*'s touch pad 65 with *capacitive* sensing touch circuitry to provide known touch display/control functionality. (Ex. 1002, ¶98.) This would have been a known and foreseeable way to implement useful touch pad/panel features like those disclosed by *Oba.* (*Id.*; Ex. 1053, 19:9-12, 25:12-19.) Indeed, as demonstrated above, a POSITA would have been well aware of the

[11] Exhibits 1008, 1058, 1059, and 1060 are cited to demonstrate state of art. (Ex. 1002, ¶97.)

various ways touch detection could have been implemented at the time, and thus would have been guided by such understandings in the context of *Oba*'s disclosures of touch pad/panel features to design and implement such input features with known ways of achieving the predictable result of allowing computer 51 to detect human touch to control certain functions/features. (Ex. 1002, ¶98.) A POSITA would have found such a modification to be a straightforward implementation of known technologies and techniques (*capacitive* touch detection circuitry/features demonstrated by state of the art) for use in touch pad/panel components (*Oba*) and also would have had a reasonable expectation of success in implementing such a modification. (*Id.*) *KSR*, 550 U.S. at 416.

e) a power supply configured to increase a power supplied to the LED circuit when the circuit detects the touch; and

The *Oba-Gillespie* combination discloses or suggests this limitation. (Ex. 1002, ¶¶99-103.)

As explained above for limitation 1(d), the *Oba-Gillespie* combination discloses or suggests a touch screen with a display that can be configured as an OLED display. (*See* OLED discussions above in Section IX.A.1(d).) It would have been obvious to configure the modified *Oba-Gillespie* computer 51 such that it includes a power supply configured to increase power supplied to the at least one

LED (e.g., the OLEDs of the OLED display) when the touch sensor circuit detects a touch in view of *Gillespie* and the state of the art.[12] (Ex. 1002, ¶99.)

As explained above for limitation 1(d), *Gillespie* discloses that the touch screen can be configured to operate to display icons and other representations that allow a user to control various functions associated with the notebook computer. (Ex. 1071, ¶¶[0049]-[0060].) Such functions include controlling the brightness of not only the main screen but also the "touch screen." (*Id.*, ¶[0058] (explaining slider controls that may be presented on the touch screen that can adjust system parameters such as "brightness and contrast" of the touch screen); *see also id.*, ¶¶[0069], [0112]-[0113]; Ex. 1002, ¶100.)

In light of such disclosures and suggestions, a POSITA would have been motivated to configure the modified *Oba* computer such that the power supply (e.g., battery 112 and/or power control circuitry 121) is configured to increase power to the OLEDs that illuminate to provide the modified display discussed above to increase the brightness when the user initiates action via the touch pad/panel as modified above in light of *Gillespie* and the state of the art. (Ex. 1002, ¶101.) Such

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[12] PO relies on tap turn on screen features for this limitation in the Illinois Litigation. (*E.g.*, Ex. 1098, 3-4, 7-8, 15-16, 19-20, 36, 52-53; Ex. 1099, ¶¶51-52; Ex. 1103, 3-4, 7, 14-15, 18-19, 33, 47-48.)

a modification would have improved and/or complemented *Oba*'s modified computer by providing a touch pad/screen that can provide information on the touch screen (e.g., status indications, etc.) similar to those described by *Gillespie* while also allowing user control via the touch screen for certain functionalities, including brightness of the main display and touch screen. (*Id.*)

Indeed, as disclosed/suggested by *Gillespie* and *Oba*, and known in the art, the brightness of OLEDs is controlled by the amount of power provided to the OLEDs and it was known that the brightness of portable computer displays could be controlled by increasing/decreasing power to OLED pixels in response to touch sensor inputs, similar to that described by *Gillespie*. (Ex. 1002, ¶102; Ex. 1067 (*Hunter*), ¶¶[0012], [0016]-[0017], [0018]-[0020], [0021], [0022]-[0023], claims 1, 4-5, 7.)[13] Thus, a POSITA would have known that the intensity of light output from an electroluminescent (EL) device such as an OLED "is directly proportional to the current density through the [electroluminescent] device," so a POSITA would have understood that brightness of an OLED is increased by increasing the current (and thus the power, because power is current multiplied by voltage) provided to the OLED. (Ex. 1017 (*Shi*), 2:17-22; *see also id.*, 1:28-38; Ex. 1002, ¶102.)[14]

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[13] Exhibit 1067 demonstrates state of the art. (Ex. 1002, ¶102.)

[14] Exhibit 1017 demonstrates state of the art. (Ex. 1002, ¶102.)

Accordingly, given such guidance, knowledge, and direction provided by *Oba* and *Gillespie* and the state of the art (e.g., *Hunter*, *Shi*), a POSITA would have been motivated to implement the above modification to conserve power used by *Oba*'s computer's OLED-based touch pad/screen display (as modified above) and to provide better readability by the user of information presented therein, and to remind the user of touch pad/screen behavior changes as expressly contemplated by *Gillespie*. (Ex. 1002, ¶103; Ex. 1071, ¶[0113].) Such an implementation would have been a straightforward application of one of a finite number of known, available options (e.g., use of LEDs versus other ways to illuminate the touch pad/screen display of the modified computer) according to known circuit and LED display design techniques that were within the capabilities and knowledge of a POSITA. (Ex. 1002, ¶103.) Thus, a POSITA would have had a reasonable expectation of success in implementing the above modifications in the *Oba* modified computer ("apparatus") to achieve the predictable result of providing an LED-illuminated display for the modified touch pad/screen in *Oba* (e.g., OLED-based touch screen) with selective brightness controls resulting from the increase in power provided to the OLEDs (e.g., make brighter, turn on, etc.) in response to touch input detected on the modified capacitive touch pad/screen 65 from a user, as guided by *Gillespie*, *Oba*, and the state of the art. (*Id.*) *KSR*, 550 U.S. at 416.

f) wherein the apparatus is portable.

Oba (as modified above) discloses this limitation because personal computer 51 is described as a notebook computer, which is portable.[15] (Ex. 1053, FIGS. 6, 7, 19:1-8; Ex. 1002, ¶104.)

2. Claim 3

a) The apparatus of claim 1, wherein the data communications circuit has a continuous DC conductive path.

Oba-Gillespie discloses or suggests this limitation. (Ex. 1002, ¶¶105-107.) Claim 3 does not restrict where the "continuous DC conductive path" has to be relative to the "data communications circuit."[16] As explained for limitation 1(c), *Oba*'s computer includes a data communications circuit. (Section IX.A.1(c).) *Oba* discloses that a "power-supply control circuit 121 is connected to a built-in battery 122 or to AC power, [and] suppl[ies] necessary power to each block" in Figure 11. (Ex. 1053, 25:20-23.) Because the power-supply control circuit supplies power to each block and Bluetooth module 106 is such a block, and because electrical conduction is continuous, a POSITA would have understood that Bluetooth module

[15] PO believes a refrigerator is portable. (Ex. 1098, 91; Ex. 1103, 85.)

[16] Even PO could/did not provide details as to how an apparatus meets this limitation in the Illinois Litigation. (*E.g.*, Ex. 1098, 5, 21, 37, 54.)

106 has a continuous DC conductive path. (Ex. 1002, ¶106.) To the extent *Oba-Gillespie* does not explicitly disclose that the data communications circuit has a "continuous DC path" as claimed, it would have been obvious in view of the state of the art to implement this feature. (Ex. 1002, ¶106.)

It was known that many electronic components require direct current (DC). (Ex. 1064, 1:9-28; Ex. 1065, 1:10-11; Ex. 1002, ¶106.)[17] Therefore, a POSITA would have understood that at least some components of *Oba*'s computer 51 require DC power. (Ex. 1002, ¶106.) A POSITA would have known that it was conventional to include a continuous DC conductive path, to provide DC power to components that require DC power, e.g., using conductors and circuit elements (such as resistors) that permit DC to flow. (Ex. 1065, FIG. 2, 1:31-35; Ex. 1002, ¶106.)

In light of such knowledge regarding the state of the art, it would have been predictable and obvious to configure the data communications circuit of the combined *Oba*-*Gillespie* computer to have a continuous DC conductive path. (Ex. 1002, ¶107.) Such a path would have predictably conducted DC power to components in *Oba*'s computer that require DC power. (*Id.*) Indeed, it was known to use DC power for powering Bluetooth modules, so such a configuration would

[17] Exhibits 1064 and 1065 demonstrate state of the art. (Ex. 1002, ¶106.)

have been conventional and predictable. (Ex. 1046, ¶[0011], FIG. 1; Ex. 1002, ¶107.)[18] A POSITA would have been skilled at circuit design and capable of implementing the above configuration. (Ex. 1002, ¶107.) This would have been a straightforward configuration, given that a continuous DC conductive path relates to fundamental circuit design principles. (*Id.*) Therefore, a POSITA would had a reasonable expectation of success implementing this configuration. (*Id.*)

3. Claim 4

a) The apparatus of claim 3, wherein the apparatus is a signal output device.

Oba (as modified above) discloses this limitation. (Ex. 1002, ¶108.) For instance, as shown below in Figure 6 of *Oba*, *Oba*'s computer 51 emits (outputs) electromagnetic waves, including data, and computer 51 is thus a "signal output device" as claimed. (Ex. 1053, Abstract (describing "a non-[contact] IC card for communicating by means of electromagnetic waves with the reader/writer of a personal computer 51" and "the non-contact IC card receives an electromagnetic wave emitted from the reader/writer"), 18:7-11 ("the portable telephone 52 receives electromagnetic waves emitted by the non-[contact]-IC-card reader/writer 105 of the personal computer 51"), 27:9-17 (explaining that modulation block 132 of non-contact-IC-card reader/writer 105 of computer 51 "**outputs** the generated

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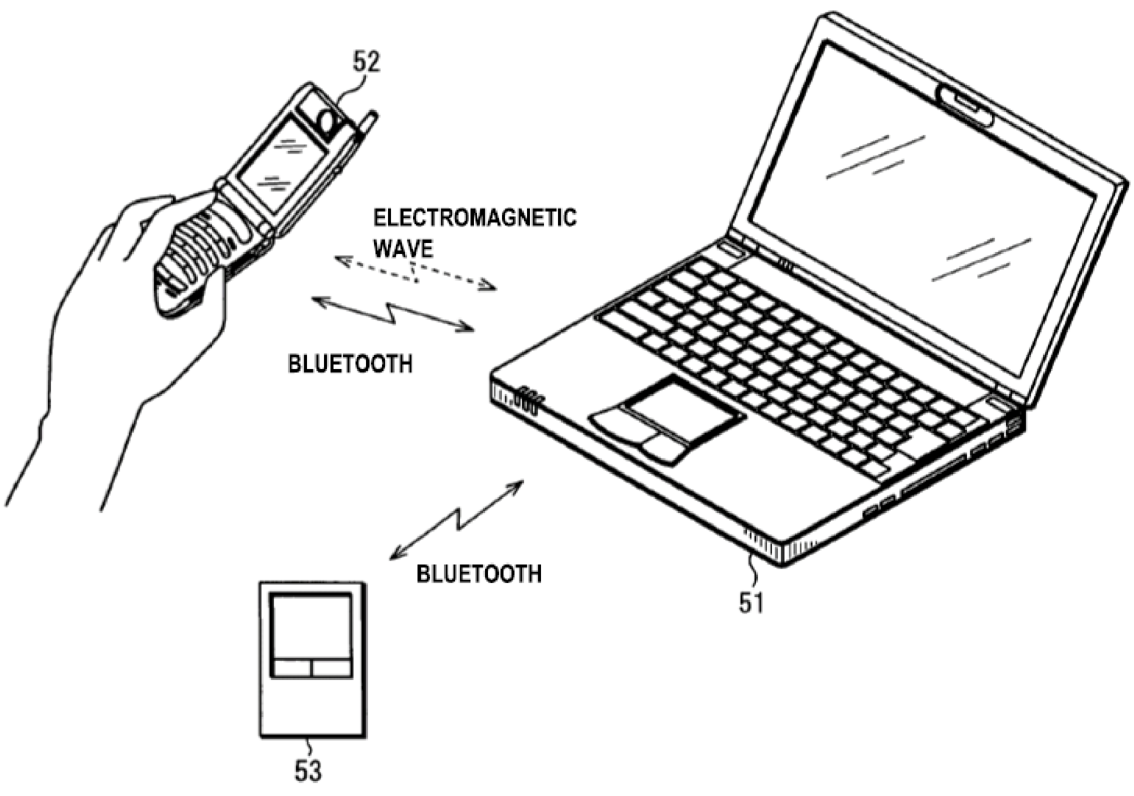
[18] Exhibit 1046 demonstrates state of the art. (Ex. 1002, ¶107.)

modulated wave from an antenna 135 as an electromagnetic wave," "antenna 135 [of computer 51] emits a predetermined electromagnetic wave," and "antenna 135 **sends** and receives various types of **data** to and from the non-contact IC card 246"), FIGS. 6 (below), 12; *see also id.*, 32:26-33:2, 35:14-16, 39:15-18, 45:9-10; Ex. 1002, ¶108.) Also, as shown in Figure 6 below, computer 51 sends (outputs) Bluetooth communications ("signal[s]"), and computer 51 is a "signal output" device for this additional reason. (Ex. 1002, ¶108.)

FIG. 6



(Ex. 1053, FIG. 6.)

4. Claim 5

a) The apparatus of claim 3, wherein the data communications circuit further comprises: a modem.

Oba (as modified above) discloses or suggests this limitation.[19] (Ex. 1002, ¶¶109-113.) Claim 5 does not provide any details regarding how the claimed "modem" relates to any other claimed features. (Ex. 1001, 28:14-25 (claim 1), 28:28-29 (claim 3), 28:32-34 (claim 5).) As explained below, *Oba* discloses the claimed "modem." For example, as discussed above for limitation 1(c), *Oba* discloses a circuit ("the data communications circuit") for implementing Bluetooth module 106 (Section IX.A.1(c)), and Bluetooth module 106 includes a "GFSK (Gaussian frequency shift keying) modulation block 191" that "performs frequency modulation," and further includes a "GFSK demodulation block 197" that "applies GFSK demodulation," as shown below in Figure 13 of *Oba*. (Ex. 1053, 29:10-27.)

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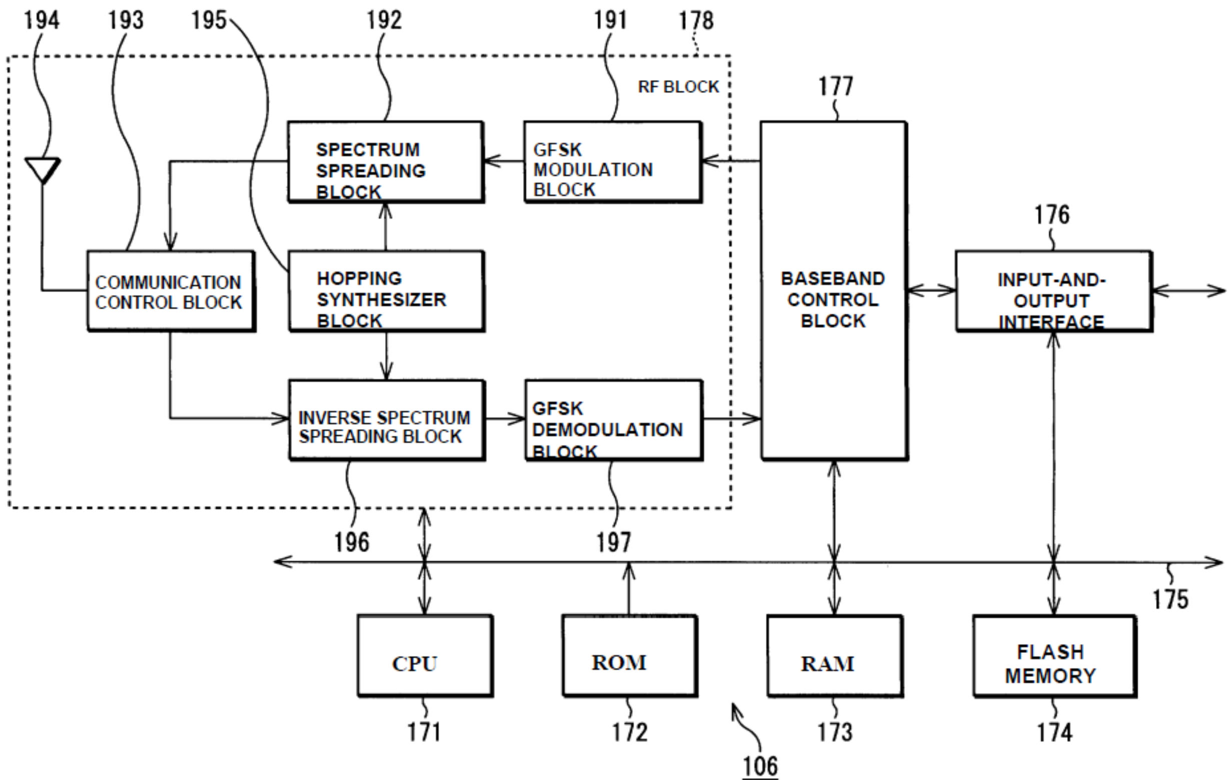
[19] PO has alleged that a data communications circuit supporting mobile connectivity necessarily comprises a modem. (Ex. 1098, 5, 21, 37, 55.)

FIG. 13



(*Id.*, FIG. 13.)

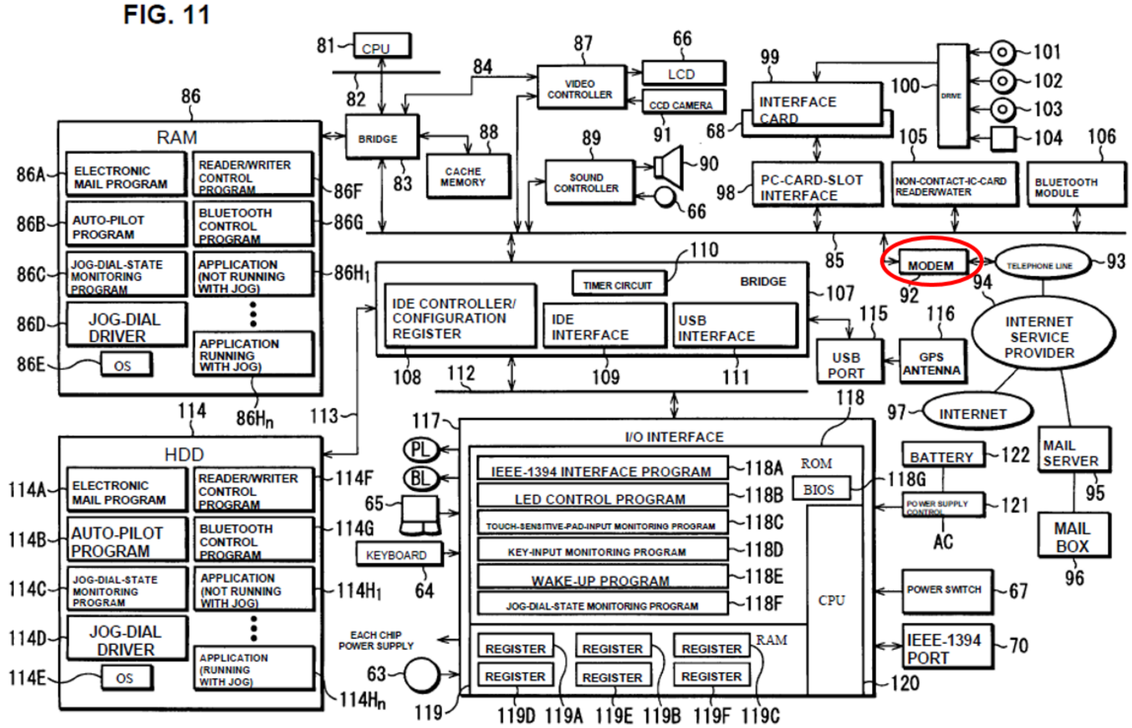
By disclosing a modulation block and a demodulation block, *Oba* discloses that Bluetooth module 106 includes a "modem" as claimed (e.g., RF block 178 (shown above in Figure 13) including modulation block 178 and demodulation block 197), because a POSITA would have known that a modem is a device that performs **mo**dulation and **dem**odulation. (Ex. 1015, 1:25-30; Ex. 1016, Title, 4:67; Ex. 1002, ¶110.)[20]

[20] Exhibits 1015 and 1016 demonstrate state of the art. (Ex. 1002, ¶110.)

Oba's data communications *circuit* comprises the modem because components of a modem, like other electronic components, require power, which flows in a circuit. (Ex. 1002, ¶111.)

To the extent *Oba* does not explicitly disclose that its data communications circuit having two separate blocks for modulation and demodulation (modulation block 191 and demodulation block 197) comprises a *modem* (e.g., a single component including a modulator and demodulator), it would have been obvious to implement this feature. (*Id.*, ¶112.) *Oba* discloses a modem 92 (red below) used for communication.

FIG. 11



(Ex. 1053, FIG. 11 (annotated); *see also id.*, 21:5-7 ("program 84A sends and receives correspondence via a modem 92 from a communication line")), 22:15-17 (describing modem 92); Ex. 1002, ¶112.) Thus, *Oba* discloses a modem as a single component with modulation and demodulation functionalities. (Ex. 1002, ¶112.)

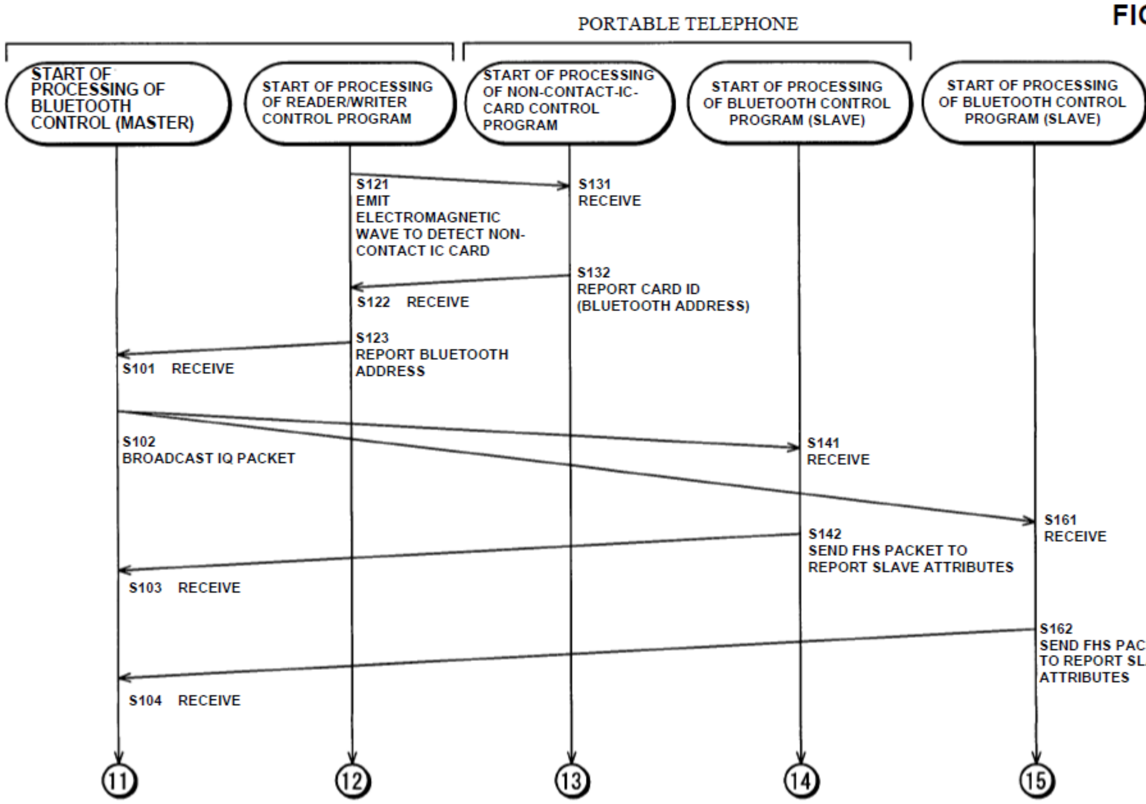
In light of *Oba*'s disclosures regarding modem 92, which is used for communicating data, it would have been predictable and obvious to configure modulation block 191 and demodulation block 197 of *Oba*'s data communications circuit (discussed for limitation 1(c)) as a single component (a modem with a modulator and demodulator). (Ex. 1002, ¶113.) A POSITA would have recognized that placing functionality (such as modulation and demodulation) as part of a single component or multiple components is a simple design choice, and indeed in the context of modulation block 191 and demodulation block 197 would not have affected the functionality of *Oba*. (*Id.*) *Oba* even illustrates modulation block 191 and demodulation block 197 within a common block 178, and thus even within Figure 13 suggests that both blocks may be part of the same component. (*Id.*) Indeed, such a configuration would have been a mere combination of known components and technologies, according to known methods, to produce predictable results. (*Id.*) *KSR*, 550 U.S. at 416. A POSITA would have been skilled at circuits to implement various components and functionalities and would have been knowledgeable about modems (as discussed above in this section), and would have found the above configuration to be reasonably expected to be successful and consistent with *Oba*'s operation. (Ex. 1002, ¶113.)

5. Claim 8

a) A method of operating a portable apparatus, the method comprising:

To the extent the preamble of claim 8 is limiting, *Oba* discloses the limitations therein. (Ex. 1002, ¶114.) As discussed for limitations 1(a) and 1(f), *Oba* discloses a notebook computer 51 ("portable apparatus"). (Sections IX.A.1(a), IX.A.1(f).) *Oba* further discloses a method of operating computer 51, e.g., as described in context of Figure 20 (below) and other portions of *Oba* (discussed above for claim 1, *supra* Section IX.A.1) relating to interactions between computer 51 and another device such as portable telephone 52. (Ex. 1002, ¶114.)

FIG. 20

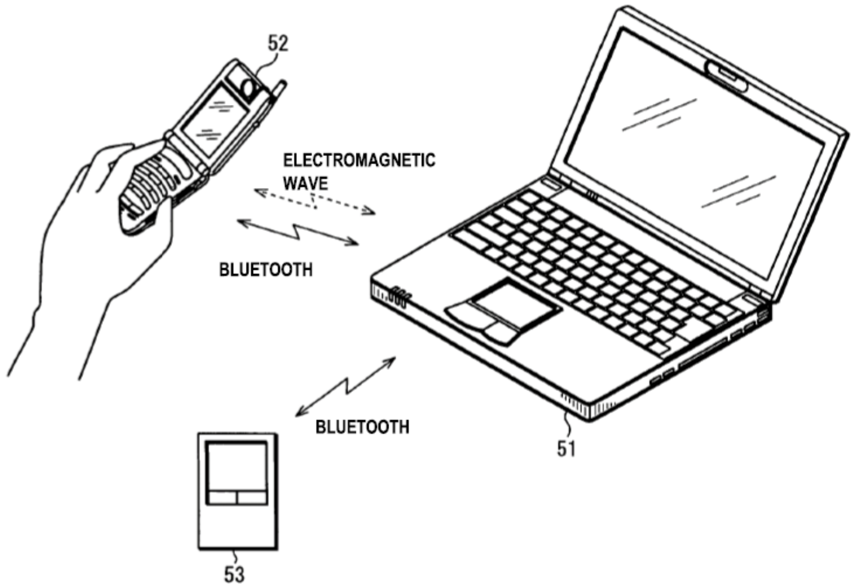


(Ex. 1053, FIG. 20 (showing operations relating to computer 51, labeled "PC" here); *see also infra* Sections IX.A.5(b)-(d); Ex. 1002, ¶114.)

b) transmitting or receiving data signals wirelessly;

Oba discloses this limitation in at least two ways. (Ex. 1002, ¶¶115-116.) First, as shown below in Figure 6 and discussed above for limitation 1(c) (Section IX.A.1(c)), *Oba* discloses that computer 51 includes a Bluetooth module 106 that transmits and receives data signals wirelessly via antenna 194. (Ex. 1002, ¶115.)

FIG. 6



(Ex. 1053, FIG. 6.)

Second, as shown above in Figure 6, *Oba*'s computer transmits and sends electromagnetic waves, and as discussed above for claim 4 (Section IX.A.3), *Oba* explains that data signals are transmitted and received wirelessly using the electromagnetic waves. (Section IX.A.3; Ex. 1053, 27:9-17 (explaining that modulation block 132 of non-contact-IC-card reader/writer 105 of computer 51 "outputs the generated modulated wave from an antenna 135 as an electromagnetic wave," "antenna 135 [of computer 51] emits a predetermined electromagnetic wave," and "antenna 135 **sends and receives various types of data** to and from the non-contact IC card 246"), FIGS. 6 (above), 12 (showing antenna 135 of computer 51); *see also id.*, 32:26-33:2, 35:14-16, 39:15-18, 45:9-10; Ex. 1002, ¶116.)

c) detecting touch via capacitive sensing, the touch being of a person; and

Oba in combination with *Gillespie* discloses or suggests this limitation. (Ex. 1002, ¶¶117-119.) As discussed for limitation 1(d) (Section IX.A.1(d)), *Oba* discloses touch pad 65 for detecting (sensing) touch of a person. To the extent *Oba* does not explicitly disclose detecting touch of a person via *capacitive* sensing, it would have been obvious in view of *Gillespie* to implement that feature for at least the reasons discussed for limitation 1(d). (Section IX.A.1(d); Ex. 1002, ¶117.) As discussed for limitation 1(d), it would have been obvious to configure the touch pad/panel 65 of computer 51 in the modified *Oba* process as a capacitive OLED touch screen in view of *Gillespie* and the state of the art.[21] (Section IX.A.1(d).) As discussed for limitation 1(d) (*id.*), *Gillespie* discloses detecting touch with a touch sensor 202 that is a "capacitive" touch sensor, which is "ideally suited for use in the present invention due to their sensitivity, low cost, ruggedness, and suitability to small sensing areas." (Ex. 1071, ¶[0037].)

It would also have been obvious to configure the touch pad/panel 65 of computer 51 in the modified *Oba* process as a capacitive LED-backlit touch screen in view of *Gillespie* and the state of the art. (Ex. 1002, ¶118.) For example, it would have been obvious to implement *Oba*'s touch pad to be an LED-backlit touch screen

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[21] *See also* Ex. 1098, 7, 40, 56-57; Ex. 1099, ¶¶51-52; Ex. 1103, 6, 36, 51-52.

(as opposed to an OLED touch screen) in view of the *Oba-Gillespie* combination above and the state of the art. (*Id.*) *Gillespie* describes backlight 206 to "enhance readability in all lighting conditions." (Ex. 1071, ¶[0039].) While the above *Oba-Gillespie* combination does not expressly disclose an "LED" backlight, it would have been obvious to configure the touch screen in the combined *Oba-Gillespie* combination to use LEDs to provide the illumination for backlighting a touch screen (similar to that described by *Gillespie*) because it would have been one of a finite number of known ways to provide illumination for backlit displays similar to that described by *Gillespie* and incorporated into the modified *Oba* computer. (Ex. 1002, ¶118; Ex. 1068, 4:53-7:14, 6:8-52, 7:35-60; Ex. 1069, Abstract, FIGS. 4-5, 1:45-55, 2:61-3:7, 3:54-65, 4:40-5:55; Ex. 1070, Abstract, 3:6-35, 4:5-14, 4:38-5:4.)[22]

Accordingly, it would have been predictable and obvious to configure *Oba*'s process (which detects touch of a person, as discussed above) to detect touch via *capacitive* sensing, which was a known technique for sensing touch as discussed above. (Ex. 1002, ¶119.) Such an implementation would have been a straightforward application of known technologies and techniques (e.g., use of LEDs as opposed to another light source to provide backlighting for display), and thus a

[22] Exhibits 1068, 1069, and 1070 are cited to demonstrate the state of the art. (Ex. 1002, ¶118.)

POSITA would have had a reasonable expectation of success in such an implementation. (*Id.*) *KSR*, 550 U.S. at 416.

d) increasing a level of power to an LED circuit comprising at least one LED in the portable apparatus upon detection of the touch.

The *Oba-Gillespie* combination discloses or suggests this limitation in at least two ways. (Ex. 1002, ¶¶120-126.)

First, as explained above for claim 1, the *Oba-Gillespie* combination discloses or suggests a touch screen with a display that can be configured as an OLED display. (*See* OLED discussions above in Section IX.A.1.) In that configuration, it would have been obvious to configure the modified *Oba-Gillespie* process to include increasing a level of power supplied to the OLEDs of the OLED display ("at least one LED") upon detection of the touch in view of *Gillespie* and the state of the art, for the reasons discussed above regarding limitation 1(e). (Section IX.A.1(e); Ex. 1002, ¶121.) For example, as discussed for limitation 1(e), it was known to increase a level of power to an OLED (*see, e.g.*, Ex. 1067, ¶¶[0012], [0016]-[0017], [0018]-[0023], claims 1, 4-5, 7; Ex. 1017, 2:17-22; *see also id.*, 1:28-38), and it would have been obvious to implement increasing a power supplied to *Oba*'s LED circuit comprising at least one OLED ("an LED circuit comprising at least one LED").[23] (Section IX.A.1(e).) Increasing a power supplied to the LED circuit discloses increasing a *level of* power to the LED circuit. (Ex. 1002, ¶121.) Limitation 8(d) additionally recites "in the portable apparatus," and the *Oba-Gillespie* combination discloses that feature, too, because as explained for limitation 1(b), *Oba*'s OLEDs are in computer 51 ("the portable apparatus"). (Section IX.A.1(b); Ex. 1002, ¶121.)

Second, as explained for limitation 8(c), the *Oba-Gillespie* combination in view of the state of the art also discloses or suggests the use of an LED-backlit touch screen for *Oba*'s touch pad/panel 65. (*See* discussions regarding reasons to incorporate an LED-backlit touch screen in Section IX.A.5(c).) In this configuration, too, it was known to increase a level of power to an LED (*see* Section IX.A.1(e)) and it would have been obvious to configure the modified *Oba-Gillespie* process to include increasing a level of power to an LED circuit comprising at least one LED (e.g., LEDs providing backlighting) upon detection of the touch in view of *Gillespie* and the state of the art. (Ex. 1002, ¶122.) The computer in the modified *Oba-Gillespie* process includes an LED *circuit* comprising the LEDs for similar reasons as those discussed above regarding limitation 1(b), e.g., because an LED

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[23] Exhibits 1017 and 1067 demonstrate state of the art. (*See also* Ex. 1098, 7, 40, 57-58; Ex. 1099, ¶¶51-52; Ex. 1103, 7, 36, 52-53.)

requires current, which flows in an electrical circuit. (Section IX.A.1(b); Ex. 1002, ¶122.)

As explained above for claim 1, *Gillespie* discloses that the touch screen can be configured to operate display icons and other representations that allow a user to control various functions associated with the notebook computer. (Ex. 1071, ¶¶[0049]-[0060].) Such functions include controlling the brightness of not only the main screen but also the "touch screen." (*Id.*, ¶¶[0057]-[0058] (explaining slider controls that may be presented on the touch screen that can adjust system parameters such as "brightness and contrast" of the touch screen).) *Gillespie* also discloses that "[b]acklights draw more power than the other components" and it is "advantageous to switch the back light off when it is not needed" or when the touch screen is not used after a "certain amount of time," and "[s]imilarly, the backlight could be **switched on whenever the touch screen is in the activated state**." (*Id.*, ¶ [0112]; *see also id.*, ¶[0113] ("[s]witching on the backlight when the touch screen is activated has the **added benefit** of reminding the user that the behavior of the touch screen has changed").) *Gillespie* explains that "**finger taps** are interpreted as a signal to enter or toggle the activated state of the touch screen," and thus a POSITA would have understood that touch detection is used to turn on the backlight. (*Id.*,

¶[0069]; Ex. 1002, ¶123.)[24] Turning on the backlight requires increasing power to the LED that provides the backlight, because an LED requires power to emit light. (Ex. 1002, ¶123.) Accordingly, *Gillespie* discloses advantages of increasing the brightness of the touch screen, based on input from the touch sensors in the touch assembly including the LED-based display. (*Id.*)

In light of such disclosures and suggestions, a POSITA would have been motivated to configure the modified *Oba* process to increase a level of power to the LEDs that illuminate to provide the modified display discussed above (e.g., whether as an OLED display or an LED-backlit display) to increase the brightness when the user initiates action via the touch pad/panel as modified above in light of *Gillespie* and the state of the art. (Ex. 1002, ¶124.) Such a modification would have improved and/or complemented *Oba*'s modified computer by providing a touch pad/screen that can provide information on the touch screen (e.g., status indications, etc.) similar to those described by *Gillespie* while also allowing user control via the touch screen

[24] PO relies on "tap to wake" features for this limitation in the Illinois Litigation. (Ex. 1098, 3-4, 7, 15-16, 19-20, 23, 31, 36, 40, 47-48, 52-53, 57-58, 65-66, 83-84, 94-95; Ex. 1099, ¶¶51-52; Ex. 1103, 3-4, 7, 14-15, 18-19, 21, 28-29, 33, 36, 42-43, 47-48, 52-53, 59-60, 77-78, 88-89.)

for certain functionalities, including brightness of the main display and touch screen. (*Id.*)

Indeed, as disclosed/suggested by *Gillespie* and *Oba*, and known in the art, the brightness of LEDs/OLEDs is controlled by the amount of power provided to the LEDs/OLEDs, and it was known that the brightness of portable computer displays could be controlled by increasing/decreasing power to backlight circuitry and/or LED pixels in response to touch sensor inputs, similar to that described by *Gillespie*. (Ex. 1002, ¶125; Ex. 1067 (*Hunter*), ¶¶[0012], [0016]-[0017], [0018]-[0020], [0021], [0022]-[0023], claims 1, 4-5, 7; Ex. 1057 (*Saito*), FIGS. 1-2, 9A-9B, 2:27, 4:1-7, 13:63-67, 6:3-11; *id.*, 9:24-10:3, 10:3-8, 13:53-14:4.) *Saito*'s (Ex. 1057) disclosures of stopping power via touch panel input are equally applicable to the turning on of power in response to input from the touch pad. (Ex. 1057, 10:3-8; Ex. 1002, ¶125.)[25]

Accordingly, given such guidance, knowledge, and direction provided by *Oba* and *Gillespie* and the state of the art (e.g., *Hunter, Saito*), a POSITA would have been motivated to implement the above modification, e.g., to conserve power used by *Oba*'s computer's LED-based touch pad/screen display (as modified above) and to provide better readability by the user of information presented therein, and to

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[25] Exhibits 1057 and 1067 are cited to demonstrate state of art. (Ex. 1002, ¶125.)

remind the user of touch pad/screen behavior changes as expressly contemplated by *Gillespie*. (Ex. 1002, ¶126; Ex. 1071, ¶[0113].) Such an implementation would have been a straightforward application of one of a finite number of known, available options (e.g., use of LEDs versus other ways to illuminate the touch pad/screen display of the modified computer) according to known circuit and LED display design techniques that were within the capabilities and knowledge of a POSITA. (Ex. 1002, ¶126.) Thus, a POSITA would have had a reasonable expectation of success in implementing the above modifications in the *Oba* modified process to achieve the predictable result of providing an LED-illuminated display for the modified touch pad/screen in *Oba* (e.g., LED backlight) with selective brightness controls resulting from the increase in power provided to the LED light source (e.g., make brighter, turn on, etc.) in response to touch input detected on the modified capacitive touch pad/screen 65 from a user, as guided by *Gillespie*, *Oba*, and the state of the art. (*Id.*) *KSR*, 550 U.S. at 416.

6. Claim 9

a) The method of claim 8 further comprising: decreasing the level of power to the LED circuit when a user of the portable apparatus controls a switch.

The *Oba*-*Gillespie* combination discloses or suggests this feature in two ways. (Ex. 1002, ¶¶127-128.)

First, *Oba* discloses that notebook computer 51 includes a "power switch 67 operated to turn on or off the power," and a POSITA would have understood that when the notebook computer's power is turned off, any display thereof, and any associated backlighting, are turned off. (Ex. 1053, 25:22-23; *id.*, 19:9-12 ("power switch 67"); Ex. 1002, ¶127.) In the *Oba-Gillespie* combination, the OLED touch screen and LED backlight discussed for limitation 8(d) would have been turned off, and thus the level of power to the LED circuit would have been decreased, when a user of computer 51 ("the portable apparatus") controls power switch 67 (red below). (Ex. 1002, ¶127.)

FIG. 7

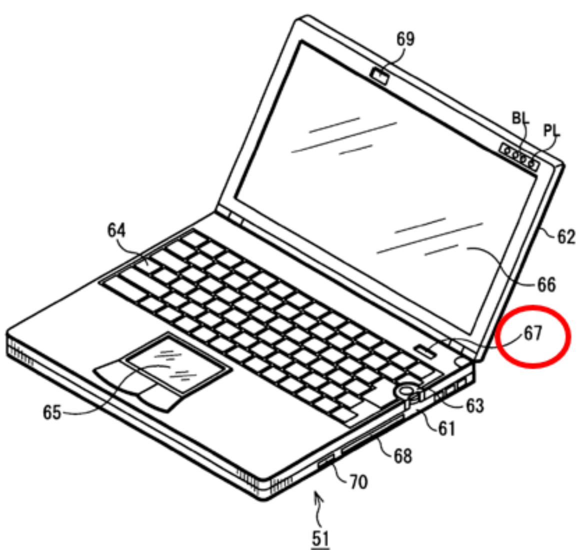
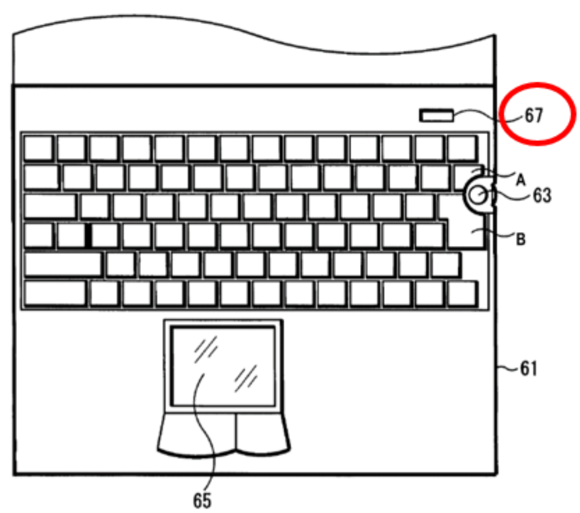
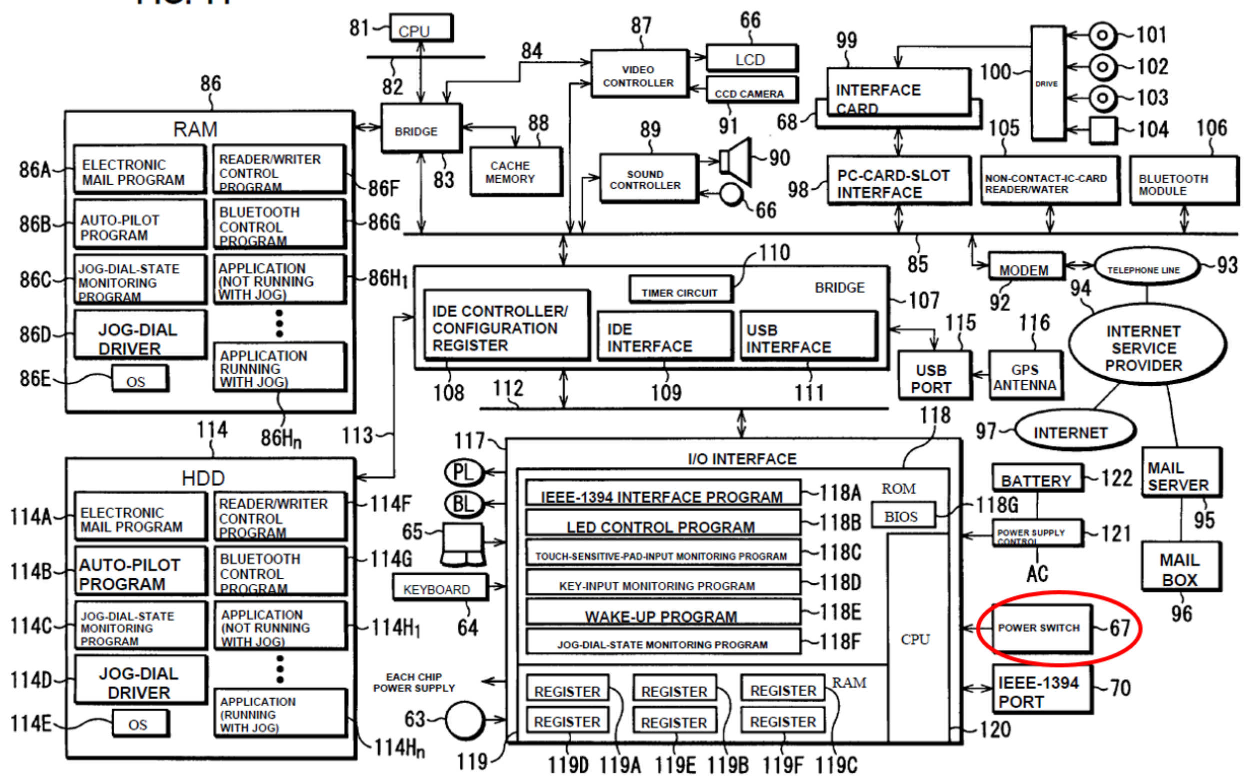


FIG. 8



(Ex. 1053, FIGS. 7-8 (annotated); Ex. 1002, ¶127.)

FIG. 11



(Ex. 1053, FIG. 11 (annotated); Ex. 1002, ¶127.)

Second, to the extent the *Oba-Gillespie* combination does not explicitly disclose this limitation, it would have been obvious in view of the state of the art to implement such features. (Ex. 1002, ¶¶127-128.) As explained for limitation 1(e) (Section IX.A.1(e)), *Gillespie* discloses a slider for adjusting brightness and it was known that intensity of light output from an OLED increases as the current density through the device increases, so a POSITA would have understood that brightness of an OLED is decreased by decreasing the current (and thus the power, because power is current multiplied by voltage) provided to the OLED. (Section IX.A.5(d);

Ex. 1017, 1:28-38, 2:17-22; Ex. 1071, ¶[0058]; Ex. 1002, ¶127.)[26] [27] And as explained for limitation 8(d), in light of *Gillespie*'s disclosure that a backlight draws power (Ex. 1071, ¶[0112]) and a POSITA's knowledge that an LED requires power to emit light, a POSITA would have understood that brightness of an LED that provides backlighting is decreased by decreasing the current (and thus the power) provided to the LED. (Section IX.A.5(d); Ex. 1002, ¶127.) It was well known to implement a *switch* for enabling a user to control the brightness of a display, e.g., of a portable electronic device such as a portable computer. (Ex. 1018, FIG. 1 (switch 31), 3:61-67, 4:1-5; Ex. 1019, FIG. 2 (brightness control 62), 7:46-49; Ex. 1020, Abstract, FIG. 1, 4:12-16; Ex. 1002, ¶127.)[28]

In light of the teachings of *Oba* and *Gillespie* and the knowledge of a POSITA regarding the state of the art, a POSITA would have been motivated to, and found it predictable and obvious to, modify the combined *Oba*-*Gillespie* process to decrease the level of power to the LED circuit (discussed for limitation 8(d)) when a user of the modified *Oba* computer ("the portable apparatus") controls a switch. (Ex. 1002,

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[26] Exhibit 1017 demonstrates state of the art. (Ex. 1002, ¶127.)

[27] PO asserts a brightness slider meets this limitation. (Ex. 1098, 8, 23-24, 41, 58-59, 84-85; Ex. 1103, 7-8, 22, 37, 53-54, 78-79.)

[28] Exhibits 1018, 1019, and 1020 demonstrate state of the art. (Ex. 1002, ¶127.)

¶128.) For example, as discussed above, in both the OLED touch display configuration and LED-backlit display configuration, decreasing the level of power to the LED circuit comprising the OLED/LED would have predictably decreased display brightness, and a POSITA would therefore have sought to implement the above modification (e.g., using a brightness slider) in order to enable the user to control the display brightness, which would have promoted convenience to the user and enabled the user to control power consumption (e.g., to extend the time before running out of power). (*Id.*) A POSITA would have been skilled at circuit design and would have known how to increase/decrease a level of power to a circuit, and would have been familiar with implementing a switch in various contexts, including for adjusting a portable computer's display, as discussed above. (*Id.*) In light of a POSITA's knowledge regarding using a switch to facilitate user control of display brightness, the above modification would have been straightforward and feasible, and a POSITA would have had a reasonable expectation of success implementing this modification. (*Id.*) *KSR*, 550 U.S. at 416.

7. Claim 10

a) The method of claim 9, wherein the switch is a dimmer switch.

To the extent the *Oba-Gillespie* combination does not explicitly disclose the switch is a dimmer switch, it would have been obvious in view of the state of the art to implement this feature. (Ex. 1002, ¶¶129-132.) As discussed for limitation 1(e)

(Section IX.A.1(e)), *Gillespie* discloses controlling the brightness of not only the main screen but also the "touch screen." (Ex. 1002, ¶129; Ex. 1071, ¶[0058] (explaining slider controls that may be presented on the touch screen that can adjust system parameters such as "brightness and contrast" of the touch screen.) A POSITA would have understood that *Gillespie*'s slider control that adjusts brightness (e.g., decreases and thus dims brightness) operates as or like a dimmer switch as known in the art. (Ex. 1002, ¶129.) A POSITA would have thus found it obvious to configure the combined apparatus to provide the brightness control functionalities (e.g., which is dimming) via a switch that operated similar to or in response to the slider control mechanisms like those discussed by *Gillespie*. Thus, the slider brightness control features described by *Gillespie* would have been configured to be replaced by, work with, or control a switch that provides the appropriate signals for directing the amount of power to the LED circuits that results in a controlled decrease in the brightness (dimming) of the LEDs as discussed above in the combined *Oba-Gillespie* apparatus. (*Id.*)

A POSITA would have been motivated to implement such a modification given it was known that an increase (or decrease) in current causes an increase (or decrease) in LED/OLED brightness and that switches were conventional mechanisms for controlling the current to an LED light source, such as the LED display brightness controls disclosed by *Gillespie*. (Section IX.A.1(e); Ex. 1002,

¶130; *see also* Ex. 1020, Abstract, FIG. 1 (brightness control 24), 4:12-16 (display brightness controls implemented via "multiposition **switches**, sliders, or the like").)[29] Such knowledge coupled with the disclosures of *Oba* and *Gillespie* would have motivated a POSITA to implement a dimmer switch in the combined apparatus to selectively reduce LED/OLED brightness of the display, e.g., to comport with user preferences regarding brightness or power conservation (less power needed for less brightness). (*See* Sections IX.A.1(d), IX.A.1(e) (touch screen brightness); Ex. 1071, ¶[0058] (slider controlled "brightness and contrast" of touch screen); Ex. 1002, ¶131.)

A POSITA would have been skilled at designing and implementing various electrical components, including a switch for controlling the brightness (e.g., dimming) of the LED(s) in the display(s) of the combined *Oba-Gillespie* apparatus, and would have been capable of making necessary technical adaptations to achieve such features in a working version of the modified *Oba* computer. (Ex. 1002, ¶132.) A POSITA would have had a reasonable expectation of success implementing the switch of the *Oba*-*Gillespie*-combination to be a dimmer switch, especially given the modification would have involved a combination/implementation of known components and technologies according to known methods to produce the

[29] Exhibit 1020 demonstrates state of the art. (Ex. 1002, ¶130.)

predictable result of providing dimming controls for the LED-based display(s) in the combined apparatus discussed above. (*Id.*) *KSR*, 550 U.S. at 416.

8. Claim 11

a) The apparatus of claim 9, wherein the switch is a 3-way switch.

While not explicitly disclosed, it would have been obvious to implement the switch of the modified *Oba*-*Gillespie* computer discussed for claim 9 to be a 3-way switch. (Ex. 1002, ¶¶133-137; Section IX.A.6.) The '674 patent does not associate any criticality with respect to the use of a three-way switch (*see generally* Ex. 1001) and three-way switches were known mechanisms to control circuits/signals. (Ex. 1002, ¶133; Ex. 1006, FIG. 8 (three-way switch 270), ¶¶[0009], [0048]-[0049] (wireless communication device); Ex. 1022, FIGS. 1, 5, 7, 5:43-46, 6:46-56, 7:15-27.) Similarly, three-way switches in the context of a portable device and LED circuits were known (*see, e.g.*, Ex. 1005, FIG. 15D, ¶[0075]; Ex. 1026, 7:53-57, FIGS. 9-10, 9:59-61) as well as in OLED circuit arrangements (Ex. 1056, FIG. 2 (switch 235), ¶[0032]). (Ex. 1002, ¶133.)[30] Additionally, controlling the power level supplied to a light source was known (Ex. 1045, Abstract, 4:47-52), as was the

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[30] Exhibits 1005-1006, 1022, 1026, 1056 demonstrate state of the art. (Ex. 1002, ¶133.)

use of a switch to adjust LED illumination level in a computing device like *Oba*'s computer (Ex. 1079, 41:53-64).[31] (Ex. 1002, ¶¶134-135.)

Thus, given the state of the art knowledge and the teachings of *Gillespie*, it would have been obvious to implement a three-way switch in *Oba*'s modified computer (discussed for claims 8-9) to provide versatility in controlling one or more circuit components to achieve a decreased level of LED power and thus brightness (Ex. 1002, ¶136.)

A POSITA would have recognized benefits of using three-way switch design concepts known in the art (demonstrated above) to implement the control of LED brightness (and thus power) in the combined *Oba*-*Gillespie* computer, such as providing user control for display brightness to conserve power and viewing preference. (*Id.*, ¶137.) Given the disclosures of *Oba-Gillespie* and the knowledge of such known switch control circuits, a POSITA would have had a reasonable expectation of success in implementing such a modification. (*Id.*) Indeed, such a design would have involved the use of known technologies and techniques (e.g., known three way switch designs) to produce the predictable result of providing an LED circuit with a variable level of power/brightness as discussed above. (*Id.*; Sections IX.A.5(d), IX.A.6.) *KSR*, 550 U.S. at 416.

[31] Exhibit 1045 and 1079 demonstrate state of the art. (Ex. 1002, ¶¶134-135.)

9. Claim 12

a) An apparatus comprising:

Oba discloses this limitation for the reasons discussed for limitation 1(a). (Section IX.A.1(a); Ex. 1002, ¶138; *see also infra* Sections IX.A.9(b)-(f).)

b) an LED circuit having at least one LED;

Oba-*Gillespie* discloses or suggests this limitation for the reasons discussed above regarding limitations 1(b) and 8(d). (Sections IX.A.1(b), IX.A.5(d); Ex. 1002, ¶139.) For example, *Oba* in combination with *Gillespie* discloses or suggests an LED circuit having at least one OLED ("at least one LED") in an OLED touch display for the reasons discussed for limitation 1(b), and *Oba* in combination with *Gillespie* discloses or suggests an LED circuit having at least one LED that provides backlighting in a display for the reasons discussed for limitation 8(d). (Ex. 1002, ¶139.)

c) a data communications circuit having an antenna, wherein the data communication circuit is configured to transmit or receive data signals, and wherein the antenna is configured to transmit or receive alternating signals;

Oba (as modified above) discloses or suggests this limitation for the reasons discussed for limitation 1(c).[32] (Section IX.A.1(c); Ex. 1002, ¶140.)

d) a switch configured to control the at least one LED circuit; and

Oba-Gillespie in view of the state of the art discloses or suggests this limitation for at least the reasons discussed above regarding claims 9-11. (Sections IX.A.6-8; Ex. 1002, ¶141.)

First, *Oba* (as modified) discloses a power switch 67 configured to control the LED circuit, e.g., by cutting off the supply of power when the power switch is turned off. (Section IX.A.6; Ex. 1053, 19:9-12, 25:22-23, FIGS. 7-8, 11; Ex. 1002, ¶141.)

Second, as discussed for claim 9, it would have been obvious to implement a switch that controls the level of power to the *Oba-Gillespie* LED circuit to be decreased. (Section IX.A.6.) As discussed for claims 9-11, switches were well known for controlling circuit components/functionality. (Sections IX.A.6-8.) In light of the knowledge of a POSITA regarding the state of the art, it would have been predictable and obvious to implement a switch as in limitation 12(d). (Ex. 1002, ¶141.) As discussed for claim 9, a POSITA would have been capable of

[32] PO asserts that an apparatus supporting Bluetooth connectivity necessarily meets this limitation. (Ex. 1098, 9-10, 25, 42, 69-70; Ex. 1099, ¶¶51-52; Ex. 1103, 9, 23, 38, 63-64.)

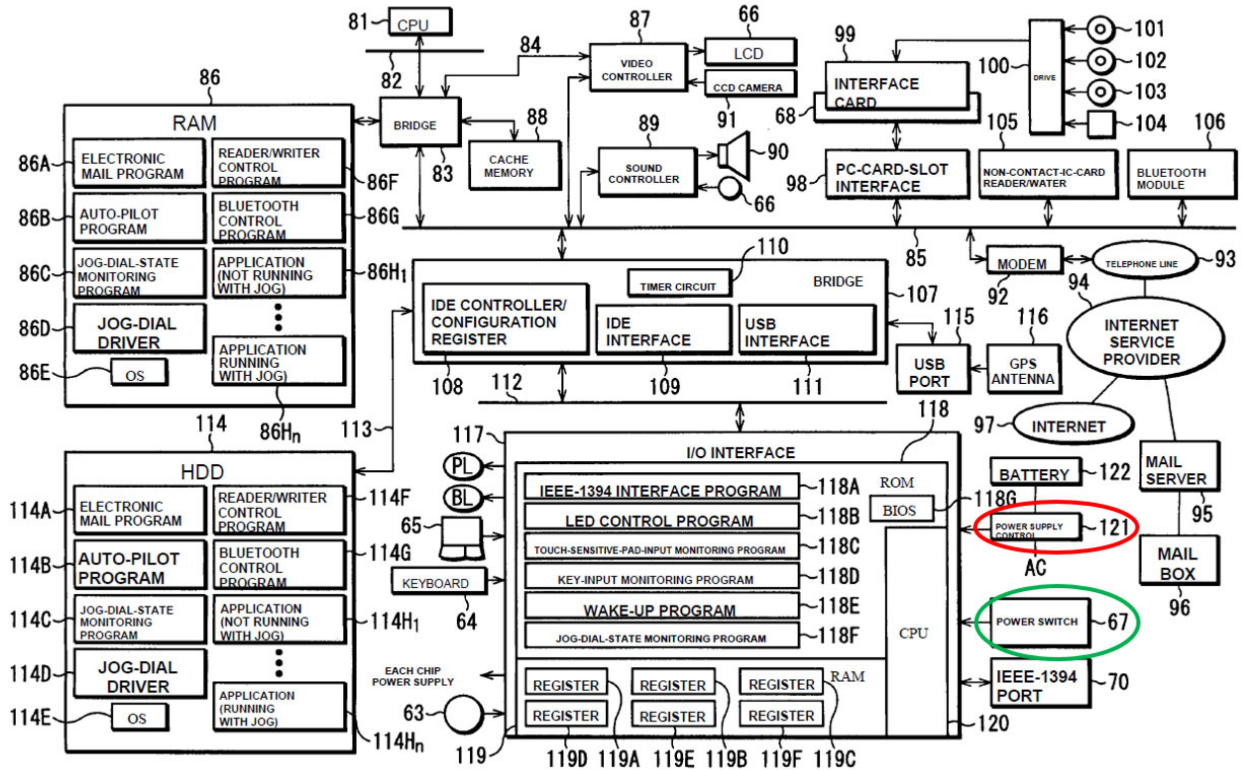
implementing a switch to control a circuit, and would have had a reasonable expectation of success regarding such an implementation, as this would have been a mere combination of known components and technologies, according to known methods, to produce predictable results. (*Id.*) *KSR*, 550 U.S. at 416.

e) a power supply configured to decrease or turn off power to the LED circuit when a user of the apparatus controls the switch; and

The *Oba-Gillespie* combination discloses or suggests this limitation in at two ways, for similar reasons as those discussed for limitation 1(e) and claim 9. (Sections IX.A.1(e), IX.A.6; Ex. 1002, ¶142-144.)

First, *Oba* discloses a "**power-supply** control circuit 121 ... supplying necessary power to each block" and "a **power switch** 67 operated to turn on or off the power." (Ex. 1053, 25:20-23; *id.*, 25:18-19 ("power-supply control circuit 121"), FIG. 11 (below); Ex. 1002, ¶143.) Thus, *Oba-Gillespie* discloses a power supply configured to decrease or turn off power to the LED circuit when a user of computer 51 ("the apparatus") controls switch 67 ("the switch"). (Ex. 1002, ¶143.)

FIG. 11



(Ex. 1053, FIG. 11 (annotated); Ex. 1002, ¶143.)

Second, as explained for limitation 1(e), it would have been obvious to implement in the combined *Oba*-*Gillespie* computer a power supply configured to *increase* power supplied to the computer's LED circuit when a touch sensor circuit detects a user's touch. (Section IX.A.1(e).) And as explained for claim 9, it would have been obvious to *decrease* the level of power to the computer's LED circuit when a user controls a switch. (Section IX.A.6.) Also as discussed above, it was well known that increasing/decreasing power to an LED/OLED increases/decreases its brightness (Sections IX.A.1(e), IX.A.5(d), IX.A.6-8), and it was known to implement a switch in various contexts, including for adjusting LED brightness

(Sections IX.A.6-8). Switches for "turning on and off" light sources were also known, conventional, and widespread. (Ex. 1088, Abstract ("A notebook computer with an LCD display monitor ... having ... a **toggle switch to enable a user to cut power to the LCD display**..."), ¶¶[0012], [0036]); Ex. 1002, ¶143.)[33]

In light of such state of the art knowledge coupled with the teachings of *Oba-Gillespie*, a POSITA would have been motivated, and found obvious, to configure the *Oba-Gillespie* computer with a power supply configured to decrease or turn off power to the LED circuit when a user controls the switch (as discussed for limitation 12(d)) for similar reasons as those discussed above for claim 9. (Ex. 1002, ¶144; Section IX.A.6.) For example, a POSITA would have had the same motivation, knowledge, appreciation (e.g., of benefits regarding enabling the user to control brightness and/or power consumption), and reasonable expectation of success like that discussed for claim 9 to configure the modified *Oba-Gillespie* computer discussed above for claim 12 to enable a user to decrease brightness of the LED(s) in the LED-based display of the modified computer. (Sections IX.A.6, IX.A.9(a)-(d); Ex. 1002, ¶144.)

f) wherein the apparatus is portable.

Oba (as modified above) discloses this limitation for the reasons discussed for

[33] Exhibit 1088 demonstrates state of the art. (Ex. 1002, ¶143.)

limitations 1(f) and 8(a). (Sections IX.A.1(f), IX.A.5(a); Ex. 1002, ¶145.)

10. Claim 13

a) The apparatus of claim 12, wherein the switch is a dimmer switch.

Oba-Gillespie discloses or suggests this limitation for similar reasons as those discussed for claim 10, applicable to the combination discussed for claim 12. (Sections IX.A.7, IX.A.9; Ex. 1002, ¶146.)

11. Claim 14

a) The apparatus of claim 12, wherein the switch is a 3-way switch.

Oba-Gillespie discloses or suggests this limitation for similar reasons as those discussed for claim 11, applicable to the combination discussed for claim 12. (Sections IX.A.8-9; Ex. 1002, ¶147.)

12. Claim 16

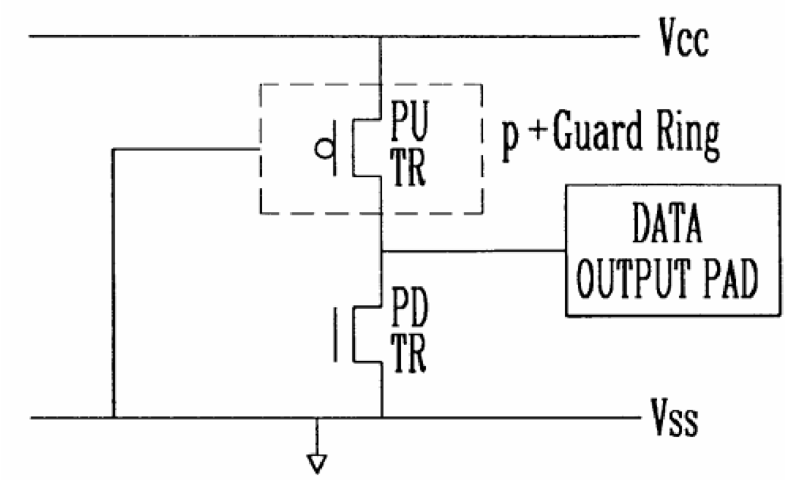
a) The apparatus of claim 12 further comprising: a ground switch.

To the extent not explicitly disclosed, it would have been obvious to configure the *Oba-Gillespie* computer ("apparatus") to comprise a ground switch.[34] (Ex. 1002, ¶¶148-149.) Claim 16 does not specify how the "ground switch" relates to other

[34] PO does not provide any details regarding this limitation in its infringement contentions. (Ex. 1098, 12, 28-29, 44, 62, 72, 79, 91, 99, 104-105.)

claimed features, which is unsurprising given a ground switch was a known component that would have been predictable to implement.

FIG. 4



(Ex. 1055 (*Lee*), FIG. 4, 3:13-16 (showing NMOS transistor ("PD") that couples data output pad to ground (Vss) upon a logical high voltage ('1') applied to the gate of the transistor, consistent with the '674 patent's descriptions of a "ground switch"); Ex. 1001, FIG. 53 (2090), 24:23-27; Ex. 1002, ¶148; Ex. 1048, 4:43-48.)[35]

Thus, a POSITA would have been motivated, and found obvious, to implement a ground switch in the modified *Oba-Gillespie* computer to conditionally couple a circuit component to ground. (Ex. 1002, ¶149.) Such a person would have recognized (as demonstrated above by *Lee*) the known use of a ground switch in

[35] Exhibits 1048 and 1055 demonstrate state of the art. (Ex. 1002, ¶148.)

circuits to, for example, control a node voltage by pulling it down to ground (e.g., logic '0'). (*Id.*) Indeed, such a circuit component was a fundamental building block for various digital logic circuits, as it enabled the voltage of a given node (and other nodes in a circuit dependent on the given node) to be controlled. (*Id.*) A POSITA would have been capable of implementing a ground switch in *Oba*'s computer, and found such an implementation beneficial to control the voltage of nodes in a commonly used manner. (*Id.*) Indeed, a POSITA would have expected a ground switch to be present in virtually any electronic device of substantial complexity, because the ability to dissipate a node's voltage by connecting it to ground conditionally was recognized as a beneficial and practical feature for circuit designs at the time. (*Id.*) Given a POSITA's knowledge and the simplicity and widespread usage of ground switches, a POSITA would have had a reasonable expectation of success implementing the above modification in the *Oba-Gillespie* computer, particularly because it would have involved a combination of known components and technologies, according to known methods, to produce predictable results discussed above. (*Id.*) *KSR*, 550 U.S. at 416.

13. Claim 17

a) The apparatus of claim 12 further comprising: an electret.

While not explicitly disclosed, it would have been obvious to configure the *Oba-Gillespie* computer ("apparatus") to comprise an electret. (Ex. 1002, ¶¶150-

153.) Claim 17 provides no details regarding how the claimed "electret" relates to any other claimed features and the '674 patent provides no criticality to the single mention of "electret" (Ex. 1001, 22:21-24). This is unsurprising given it was known that "[e]lectrets are dielectric materials capable of permanent charge storage, and are electrical analog of magnets" (Ex. 1052, 2:48-52; *id.*, 4:18-20) and an electret was commonly used to transduce sound (e.g., in the form of pressure waves) to current. (Ex. 1049, ¶[0005]).[36] (Ex. 1002, ¶150.) Indeed, an electret was known for implementing a microphone, e.g., in a laptop computer (Ex. 1050, 2:46-49, 6:25-38, 8:26-27) and for implementing a finger tap sensor for handheld electronic devices (Ex. 1051, 10:3-23, FIG. 9).[37] (Ex. 1002, ¶151.)

In view of the state of the art and *Oba-Gillespie*, a POSITA would have been motivated to implement an electret in the combined *Oba-Gillespie* computer to implement such known input mechanisms. (Ex. 1002, ¶152.) For example, a POSITA would have recognized benefits of using common electrical components, such as an electret, to implement functionality relating to a microphone or finger tap sensor (or similar mechanism) particularly because *Oba*'s computer 51 includes a microphone 66 and other input mechanisms (e.g., touch pad/panel, keyboard, jog

[36] Exhibits 1049 and 1052 demonstrate state of the art. (Ex. 1002, ¶150.)

[37] Exhibits 1050-1051 demonstrate state of the art. (Ex. 1002, ¶151.)

dial, etc.). (Ex. 1053, FIG. 11 (microphone 66), 19:10, 20:9, 21:12-17, 22:12-14, 24:13-14.) Thus, a POSITA implementing *Oba*'s computer 51 would have sought to implement *Oba*'s microphone 66 and found it predictable, beneficial, and conventional to leverage a known technology to implement microphone 66 or add additional an input mechanism such as an input sensor, using an electret. (Ex. 1002, ¶152; *see also* Ex. 1051, 10:3-5 (state of art recognition that a finger tap sensor was "relatively low cost and easy to manufacture").)

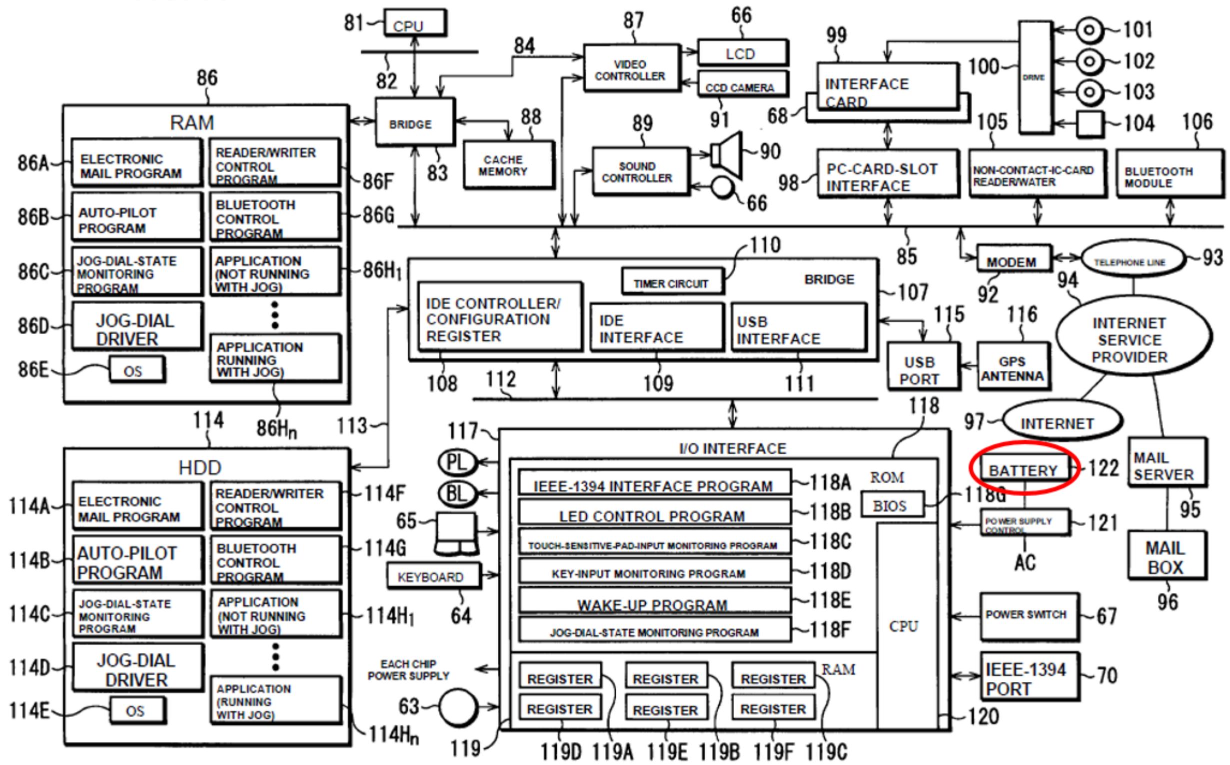
Given the conventional and known use of electrets in such applications and the skills of a POSITA, such a person would have been capable of implementing an electret in the *Oba-Gillespie* computer to achieve the above modification and would have had a reasonable expectation of success in doing so. (Ex. 1002, ¶153.) Indeed, this would have been a straightforward implementation of known components and technologies according to known circuit design methods to achieve the predicable applications noted above. (*Id.*) *KSR*, 550 U.S. at 416.

14. Claim 18

a) The apparatus of claim 12 further comprising a battery.

Oba (as modified above) discloses this limitation. (Ex. 1002, ¶154.) For instance, *Oba* discloses that computer 51 includes a battery 122 that provides power for personal computer 51. (Ex. 1053, FIGS. 6, 11, 19:14-16 ("battery" lamp BL), 25:20-22.)

FIG. 11



(Ex. 1053, FIG. 11 (annotated); Ex. 1002, ¶154.)

15. Claim 20

a) An apparatus comprising:

Oba discloses this limitation for the reasons discussed for limitation 1(a). (Section IX.A.1(a); Ex. 1002, ¶155; *see also infra* Sections IX.A.15(b)-(f).)

b) an LED circuit having at least one LED, wherein the at least one LED has a substrate which is one of either gallium nitride, silicon or sapphire substrate;

Oba in combination with *Gillespie* and the state of the art discloses or suggests this limitation. (Ex. 1002, ¶¶156-159.) *Oba-Gillespie* discloses or suggests an LED circuit having at least one OLED ("at least one LED") in an OLED touch display for the reasons discussed for limitation 1(b), and *Oba-Gillespie* discloses or suggests an LED circuit having at least one LED that provides backlighting in a display for the reasons discussed for limitation 8(d). (Sections IX.A.1(b), IX.A.5(d); Ex. 1002, ¶156.) To the extent *Oba-Gillespie* does not explicitly disclose that the at least one LED (either OLED or LED providing backlighting) has a substrate which is one of either gallium nitride, silicon or sapphire substrate, it would have been obvious to implement this feature. (Ex. 1002, ¶156.)

It was known to implement OLEDs on a silicon substrate. (*Id.*, ¶157.) For example, *Strite* describes state of the art knowledge that "[a]n OLED, OLED arrays or an OLED display may either b[e] grown directly on ... a Si substrate carrying Si devices, or it may be fabricated separately and flipped onto the Si substrate later." (Ex. 1014, 13:55-58; *id.*, 1:5-8, 14:25-52, 9:31-34, FIGS. 9 (below), 10; Ex. 1002, ¶157.)[38]

[38] Exhibit 1014 demonstrates state of the art. (Ex. 1002, ¶157.)

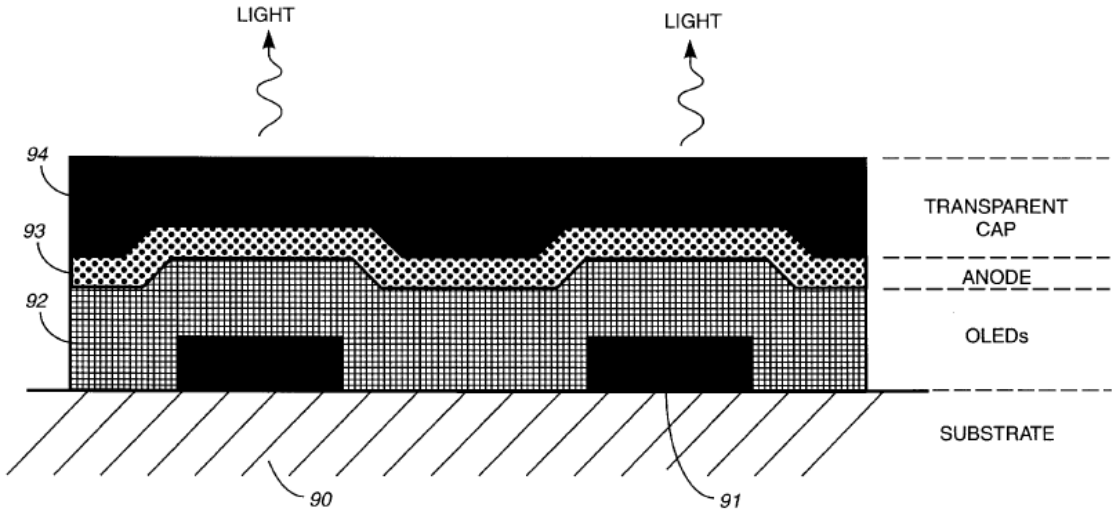


FIG. 9

(Ex. 1014, FIG. 9 (silicon substrate 90).)

Similarly, it was known to implement LEDs on gallium, nitride, silicon, and sapphire substrates. (Ex. 1061, Title, 1:5-8, 2:3-10, 3:16-19, FIG. 2 (silicon substrate 26); Ex. 1062, ¶¶[0008]-[0011], [0021]-[0022], [0090]-[0091],[0118], FIGS. 1-2; Ex. 1002, ¶158.)[39]

A POSITA would have thus been aware of such substrate types for LED/OLED implementations when designing/implementing the *Oba-Gillespie* computer. (Ex. 1002, ¶159.) Accordingly, a POSITA would have been motivated to configure (or source) the at least one OLED/LED of the *Oba-Gillespie* computer with such a substrate because it would have enabled the design/configuration to

[39] Exhibits 1061-1062 demonstrate state of the art. (Ex. 1002, ¶158.)

leverage existing technologies (e.g., known substrate materials or LED/OLED components) to provide an OLED/LED display that performed as intended by the combination. Given the known use of such substrates for OLED/LEDs, a POSITA would have found the above implementation to be a straightforward application of known components and technologies, according to known design/implementation methods, to produce the predictable result of providing an LED/OLED display as discussed for the *Oba-Gillespie* combination, and had a reasonable expectation of success in doing so. (*Id.*) *KSR*, 550 U.S. at 416.

c) a data communications circuit having an antenna, wherein the data communication circuit can transmit or receive data signals, and wherein the antenna can transmit or receive alternating signals;

Oba (as modified above) discloses or suggests this limitation for the reasons discussed above regarding limitation 1(c). (Section IX.A.1(c); Ex. 1002, ¶160.)

d) a circuit configured to detect the touch of a person via capacitive sensing; and

The *Oba-Gillespie* combination discloses or suggests this limitation for the reasons discussed above regarding limitations 1(d) and 8(c). (Sections IX.A.1(d), IX.A.5(c); Ex. 1002, ¶161.) The analysis for limitations 1(d) and 8(c) explains why and how it would have been obvious to implement a capacitive touch detection circuit in the modified *Oba* computer to work with either a capacitive OLED touch screen (Section IX.A.1(d)) or a capacitive LED-backlit touch screen (Section

IX.A.5(c)) in view of *Gillespie* and the state of the art, which are applicable for the *Oba-Gillespie* combination here addressing claim 20. (Ex. 1002, ¶161.)

e) a power supply, wherein the power supply is configured to increase the power to the LED circuit when the circuit detects the touch of a person; and

Oba-*Gillespie* in view of the state of the art discloses or suggests this limitation for at least the reasons discussed above regarding limitations 1(e) (analysis regarding the OLED touch screen of the combined *Oba*-*Gillespie* computer) and 8(d) (analysis regarding the OLED touch screen and LED-backlit display of the combined *Oba*-*Gillespie* computer). (Sections IX.A.1(e), IX.A.5(d); Ex. 1002, ¶162.)

f) wherein the apparatus is portable.

Oba (as modified above) discloses this limitation for the reasons discussed above regarding limitations 1(f) and 8(a). (Sections IX.A.1(f), IX.A.5(a); Ex. 1002, ¶163.)

B. Ground 2: Claim 2 Is Obvious Over *Oba*, *Gillespie*, and *Hara*

1. Claim 2

a) The apparatus of claim 1, wherein the data communications circuit has no continuous DC conductive path.

To the extent *Oba-Gillespie* does not explicitly disclose that the data communications circuit (discussed for limitation 1(c)) has no continuous DC conductive path, it would have been obvious in view of *Hara* to implement this feature. (Ex. 1002, ¶¶164-170.)[40] *Hara* "relates to an information processing device that is capable of being operated by battery, and in more particular, to the mounting and power-supply configuration of the battery for a notebook type personal computer," and thus is in the same or similar technical field as *Oba*, which describes a notebook computer. (Ex. 1044, 1:7-12; *see also* Section IX.A.1(a) (citations and analysis regarding *Oba*'s notebook computer 51); Ex. 1053, FIG. 6 (showing notebook computer 51); Ex. 1002, ¶166.) Therefore, a POSITA would have had reason to consider the teachings of *Hara* when implementing *Oba*'s computer. (Ex. 1002, ¶166.)

Hara discloses the known concept of providing a capacitor between a battery ground and electronic circuits of a portable device for filtering purposes. (Ex. 1044, Abstract, FIGS. 1-3, 7-8, 18, 2:9-21, 2:24-34, 2:39-42, 3:54-65, 4:8-57, 5:9-33, 5:65-6:2, 7:10-36; Ex. 1002, ¶167.)

FIG.1

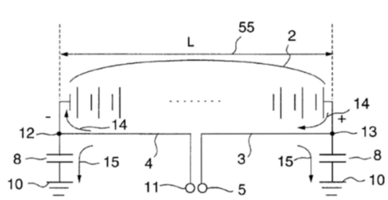
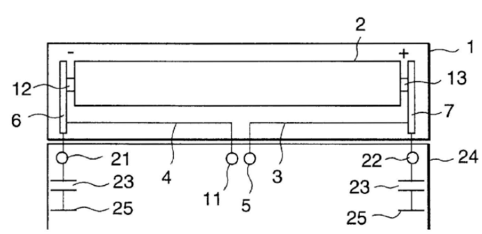


FIG.2



[40] PO asserts that "DC voltage" or "rectified AC voltage" may be provided to LEDs in accused products). (*Compare* Ex. 1092, ¶46 *with id.*, ¶58.)

FIG.18

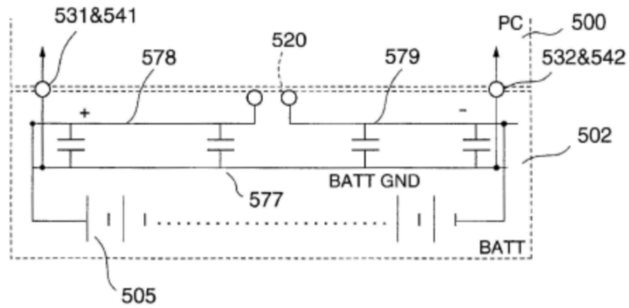
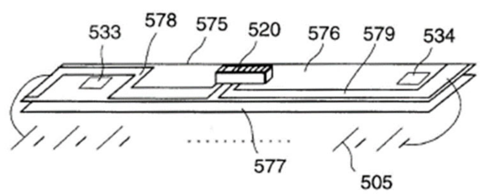


FIG.17



(Ex. 1044, FIGS. 1, 2, 18; *id.*, FIG. 17.) *Hara* describes "at least one capacitive element (for example a capacitor) mounted in the proximity of the terminals of the ... battery" and discloses that "[a]t least the terminal of the positive pole of the battery or the terminal of the negative pole of the battery may be connected electrically to the ground of the information processing device through this capacitive element." (*Id.*, 1:52-64.)

A POSITA would have understood that a capacitor blocks DC, and thus does not provide a continuous DC conductive path across the capacitor. (Ex. 1073, 12:46-48 ("Capacitance is formed between the electrode plates 624 and 626 forming a conventional DC blocking or series capacitor"), 12:56-59 ("capacitor 620 of FIG. 22

effectively decouples or blocks DC signals through the device"), FIG. 26, Abstract ("DC blocking capacitor"); Ex. 1072, 3:17-21 ("[T]he device may be coupled to the power source **without requiring any direct connection between the respective conductive elements** of the device and the supporting surface."), FIG. 8 (capacitor C_A); Ex. 1002, ¶168.)

In light of the knowledge of a POSITA and *Hara*'s disclosures, a POSITA would have been motivated, and found obvious, to implement the data communications circuit of the combined *Oba-Gillespie* computer to have no continuous DC conductive path. (Ex. 1002, ¶169.) For example, a POSITA would have found it useful and beneficial to implement a capacitor coupled between ground and other circuitry, similar to that described in *Hara*, to serve as a filter capacitor that provides a reservoir of charge that smooths the flow of current (and power) after rectification from AC. (*Id.*) *Oba* discloses that a "power-supply control circuit 121 is connected to a built-in battery 122 or to **AC power**, [and] suppl[ies] necessary power to each block" in Figure 11 of *Oba*. (Ex. 1053, 25:20-23.) It was well known that many electronic components require direct current (DC), so a POSITA would have sought to convert the AC power (described in *Oba*) to DC power via rectification. (Ex. 1064, 1:9-28; Ex. 1065, 1:10-11; Ex. 1002, ¶169.)[41] A POSITA

[41] Exhibits 1064 and 1065 demonstrate state of the art. (Ex. 1002, ¶169.)

would have known that a typical way to convert AC power to DC power is by using a rectifier, which is pulsating and can be further smoothed using a filter capacitor, which smooths the DC power after rectification. (Ex. 1065, FIG. 2, 1:31-35; Ex. 1074, ¶[0014]; Ex. 1002, ¶169.)[42]

A POSITA would have understood that with such an implementation, the data communications circuit would have no continuous DC conductive path, because as discussed above, capacitors block DC. (Ex. 1002, ¶170.) A POSITA would have been skilled at circuit design and been capable of achieving the above implementation in a working system. (*Id.*) This would have been a predictable, straightforward usage of a capacitor, which was a basic circuit element used in numerous circuits, and thus a POSITA would have had a reasonable expectation of success regarding the above implementation. (*Id.*) *KSR*, 550 U.S. at 416.

C. Ground 3: Claims 6 and 15 Are Obvious Over *Oba*, *Gillespie*, and *Kikinis*

1. Claim 6

a) The apparatus of claim 3 further comprising: a heat sink.

While the *Oba*-*Gillespie* combination does not explicitly disclose a heat sink, this feature would have been obvious in view of *Kikinis*. (Ex. 1002, ¶¶171-175.)

[42] Exhibit 1074 demonstrates state of the art. (Ex. 1002, ¶169.)

The use of heat sinks in circuit design and computing systems was known and conventional. (Ex. 1002, ¶¶172-175.)[43] Indeed, *Kikinis* describes "computer systems, such as laptop [and] notebook" computers and mechanisms for "dissipating heat generated by high-power profile microprocessors in such systems." (Ex. 1012, 1:5-12; *id.*, Title, Abstract; Ex. 1002, ¶172.) Specifically, *Kikinis* "addresses future needs for heat dissipation within the closed environments of portable general-purpose computers" such as in a notebook computer similar to *Oba*'s computer. (Ex. 1012, 4:4-6; *id.*, 3:14-17; Ex. 1002, ¶172.)

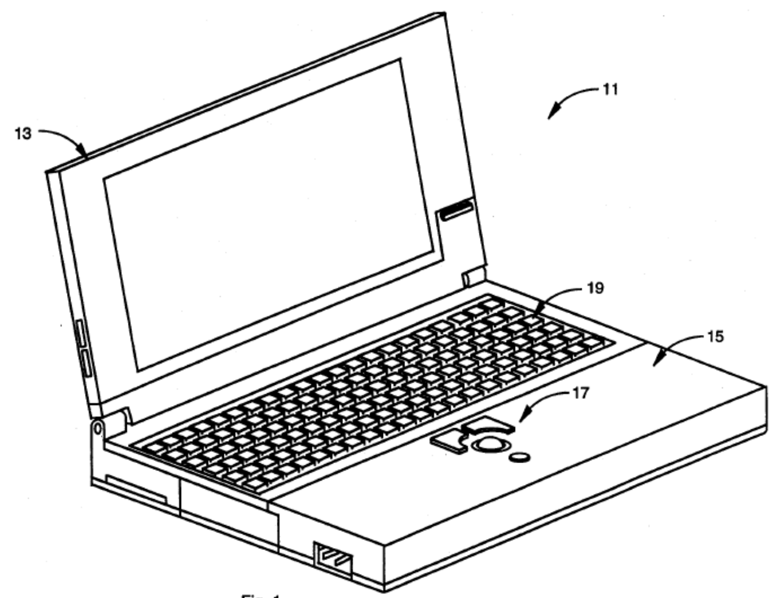


Fig. 1

(Ex. 1012, FIG. 1.)

[43] PO asserts that "all...[products|devices]" like accused products "include[] a heat sink." (Ex. 1098, 5, 21, 38, 55; Ex. 1103, 5, 20, 34, 49.)

Kikinis confirms the state of art knowledge that "microprocessors ... generate a considerable amount of waste heat [in portable computers]" (Ex. 1012, 1:14-19) and that such computers "must be engineered to dissipate heat passively to cool their components" (*id.*, 1:31-33). (*See also id.*, 1:59-61.) To this end, *Kikinis* describes the known use of a "heat sink[]" for addressing the thermal issue in notebook computers. (*Id.*, 2:26-30; *see also id.*, 5:58-63, 6:1-4; Ex. 1002, ¶¶173-174.)

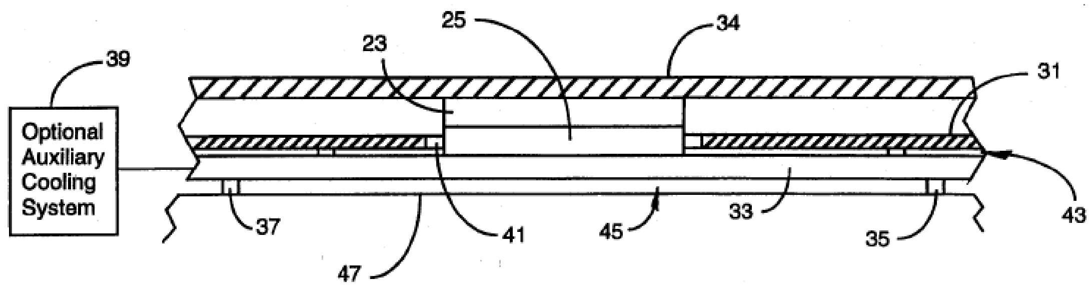


Fig. 4

(Ex. 1012, FIG. 4.)

In light of *Kikinis*' disclosures and the state of the art, a POSITA would have been motivated, and found it obvious, to configure the combined *Oba-Gillespie* computer to include a heat sink to dissipate heat generated during operation. (Ex. 1002, ¶175.) A POSITA would have found it desirable to implement a heat sink to mitigate the known deleterious effects of heat buildup and promote system performance. (*Id.*) Given the known and conventional use of heat sinks in systems like *Oba*'s computer, a POSITA would have found it feasible and practical to leverage such existing technology in implementing the *Oba-Gillespie* computer, and would have had a reasonable expectation of success in doing so. (Ex. 1007, 10:14-18, Ex. 1013, Title, Abstract, 2:6-11, 3:23-32, FIG. 1; Ex. 1002, ¶175.)[44] Indeed, the above implementation would have been a straightforward application of known components and technologies, according to known methods, to produce the predictable result of providing heat dissipation features in *Oba*'s modified computer. (Ex. 1002, ¶175.) *KSR*, 550 U.S. at 416.

2. Claim 15

a) The apparatus of claim 12 further comprising: a heat sink.

Oba in combination with *Gillespie* and *Kikinis* discloses this limitation for the same reasons above for claim 6. (Section IX.C.1; *see also* Section IX.A.9; Ex. 1002, ¶176.)

D. Ground 4: Claims 7 and 19 Are Obvious Over *Oba*, *Gillespie*, and *Yang*

1. Claim 7

a) The apparatus of claim 3, wherein the at least one LED is mounted on a glass substrate.

Oba in combination with *Gillespie* and *Yang* discloses or suggests this limitation. (Ex. 1002, ¶¶177-181.) As explained for claim 1, the combined *Oba*-*Gillespie* computer includes an OLED capacitive touch display. (Section IX.A.1.)

[44] Exhibit 1007 demonstrates state of the art. (Ex. 1002, ¶175.)

A POSITA would have been motivated to configure the *Oba-Gillespie* computer to mount at least one of the LEDs forming the OLED touch display on a glass substrate in light of *Yang*. (Ex. 1002, ¶178.)

Yang explains that OLED displays were known and provided "high brightness," "fast response," and "full color" for "portable information products" including a "notebook" computer. (Ex. 1066, 1:15-26.) *Yang* further confirms it was known that "[c]onventional OLED display structures [were] built on glass substrate[s]" (*id.*, 1:27-28; *id.*, FIG. 2, 1:40-43), consistent with the knowledge of a POSITA. (Ex. 1002, ¶179; *see also* Ex. 1075, FIG. 8, 3:8-11, 4:15-16, 8:12-21, 8:32-33, claim 8; Ex. 1008, 1:53-2:12, 3:11-12, 3:33-34, 6:64-7:4, FIGS. 1, 9; Ex. 1047, FIG. 13, 1:46-2:45, 12:64-13:5, 16:22-17:5; Ex. 1002, ¶179).[45]

In light of such knowledge (as demonstrated by *Yang*), a POSITA would have known how to configure and implement an OLED display (like that described by *Gillespie* as discussed for limitation 1(e), *supra* Section IX.A.1(e)) and its related circuitry/arrangement to operate as the capacitive touch display in the modified *Oba-Gillespie* apparatus. (Ex. 1002, ¶180.) In doing so, a POSITA would have been motivated to mount the OLEDs in the touch display on a glass substrate consistent with that known in the art as demonstrated by *Yang*. (*Id.*) Such an implementation

[45] Exhibits 1008, 1047, and 1075 demonstrate state of the art. (Ex. 1002, ¶179.)

would have provided a known way of providing an OLED display, such as the capacitive touch display implemented in the *Oba*'s modified computer explained for limitation 1(e). (*Id.*; Section IX.A.1(e).)

A POSITA would have had the knowledge/skills to consider design tradeoffs associated with such an implementation, and to successfully implement the use of a touch display with glass-mounted OLEDs with *Oba*'s modified computer using known engineering and design techniques. (Ex. 1002, ¶181.) Accordingly, in light of *Yang*, *Gillespie*, and *Oba*, and a POSITA's knowledge of the art, a POSITA would have found the above implementation to be a predictable application of known technologies/techniques to achieve the foreseeable result of configuring the modified capacitive touch display for the *Oba*-*Gillespie* combination, and thus would have also had a reasonable expectation of success in such an implementation. (*Id.*) *KSR*, 550 U.S. at 416.

2. Claim 19

a) The apparatus of claim 12, wherein the at least one LED is mounted on a glass substrate.

Oba in combination with *Gillespie* and *Yang* discloses or suggests this limitation for the reasons discussed above at claim 7. (Section IX.D.1; Ex. 1002, ¶182.)

X. DISCRETIONARY DENIAL IS NOT APPROPRIATE HERE

An evaluation of the factors under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential), favors institution notwithstanding the concurrent Illinois Litigation (Section II).

The **first *Fintiv* factor** favors institution. Petitioner will seek a stay of the Illinois Litigation upon institution. At minimum, the Board should not speculate regarding the likelihood of stay, particularly because courts routinely issue stays after institution. *Western Digital Corp. et al v. Kuster*, IPR2020-01391, Paper 10 at 8-9 (PTAB Mar. 11, 2021; *Samsung Elec. Am., Inc. v. Snik LLC*, IPR2020-01427, Paper 10 at 10 (PTAB Mar. 9, 2021).

The **second and third *Fintiv* factors** also favor institution. The Illinois Litigation is at an early stage.[46] A trial date has not been set, and there has not been significant resource investment by the court and the parties, particularly compared to the resource expenditures leading up to a trial. (Exs. 1076, 1101.) Moreover, any trial (if it occurs) would likely only occur at least 102 weeks after the service of the complaint—and thus after a final written decision in this IPR. (Ex. 1077, 1-2 (document available at Northern District of Illinois website, estimating "Case Ready

[46] Although PO moved to transfer the Illinois Litigation to Texas, that motion was denied. (Ex. 1100.)

for Trial" 102 weeks after complaint served); Ex. 1076, 5 (Dkt. #16 showing summons returned May 19, 2021).)

The **fourth *Fintiv* factor** similarly favors institution. In the Illinois Litigation, PO has asserted claims 1, 6-9, 12, 15, and 19-20 of the '674 patent, while this Petition challenges all 20 claims, so the Illinois Litigation will not resolve all disputed validity issues. (Section IX; Ex. 1102, 2-5; Ex. 1103, 2-99.) Furthermore, Petitioner stipulates it will not pursue in the Illinois Litigation invalidity based on any instituted IPR grounds in this proceeding.

Finally, the **sixth *Fintiv* factor** favors institution. Petitioner diligently filed this Petition **within one week of PO's amended infringement contentions** in the Illinois Litigation (Ex. 1102), with strong unpatentability grounds. (Section IX.) Institution is consistent with the significant public interest against "leaving bad patents enforceable." *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020). Moreover, this Petition is the ***sole*** challenge to the '674 patent before the Board—a "crucial fact" favoring institution. *Google LLC v. Uniloc 2017 LLC*, IPR2020-00115, Paper 10 at 6 (May 12, 2020).

XI. CONCLUSION

Accordingly, Petitioner requests institution of IPR for the challenged claims based on the specified grounds.

Respectfully submitted,

Dated: September 7, 2021 By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,506,674 contains, as measured by the word-processing system used to prepare this paper, 13,987 words. This word count does not include the items excluded by 37 C.F.R. § 42.24 as not counting towards the word limit.

Respectfully submitted,

Dated: September 7, 2021

By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on September 7, 2021, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,506,674 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on PAIR:

K&L Gates LLP-Chicago
P.O. Box 1135
Chicago IL 60690

By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)