

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD,
Petitioner,

v.

UUSI, LLC d/b/a NARTRON,
Patent Owner.

Case IPR2016-00908
Patent 5,796,183

Before THOMAS L. GIANNETTI, CARL M. DEFRANCO, and
KAMRAN JIVANI, *Administrative Patent Judges*.

JIVANI, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Samsung Electronics Co., Ltd. (“Petitioner”) sought *inter partes* review of claims 37–41, 43, 45, 47, 48, 61–67, 69, 83–86, 88, 90, 91, 94, 96, 97, 99, 101, and 102 of U.S. Patent No. 5,796,183 (Ex. 1001, “the ’183 patent”), owned by UUSI, LLC d/b/a Nartron (“Patent Owner”). Paper 2 (“Petition” or “Pet.”). Patent Owner filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). Upon consideration of the Petition and Preliminary Response, we instituted an *inter partes* review of claims 40, 41, 43, 45, 47, 48, 61–67, 69, 83–86, 88, 90, 91, 94, 96, 97, 99, 101, and 102 (the “Instituted Claims”) pursuant to 35 U.S.C. § 314. Paper 12 (“Decision on Institution” or “Dec. on Inst.”). We did not institute, however, review of claims 37–39 because we determined Petitioner had not established a reasonable likelihood that it would prevail with respect to those claims. *Id.*

During the trial, Patent Owner filed a Patent Owner Response (Paper 21, “PO Resp.”), and Petitioner filed a Reply thereto (Paper 24, “Reply”). An oral hearing was conducted on June 22, 2017. The record contains a transcript of the hearing (Paper 34, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6. The evidentiary standard is preponderance of the evidence. *See* 35 U.S.C. § 316(e); *see also* 37 C.F.R. § 42.1(d). This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Petitioner has not shown by a preponderance of the evidence that any of the Instituted Claims are unpatentable.

A. *Related Proceedings*

The ’183 patent has been subject to two reexaminations: *Ex Parte* Reexamination Control Nos. 90/012,439, certificate issued April 29, 2013

(“Reexam 1”) and 90/013,106, certificate issued June 27, 2014 (“Reexam 2”). The Instituted Claims were added during Reexam 2. *See generally* Ex. 1006.

The ’183 patent is the subject of ongoing litigation between the parties in the Western District of Michigan: *UUSI, LLC d/b/a Nartron v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.*, Case No. 1:15-cv-00146-JTN, originally filed on February 13, 2015 (W.D. Mich.) (the “District Court litigation”). Pet. 1. The District Court litigation is stayed and administratively closed until resolution of the instant *inter partes* review. Order, Case No. 1:15-cv-00146-JTN, Dkt. No. 62 (filed 05/02/16).

B. The ’183 patent (Ex. 1001)

The ’183 patent relates to a “capacitive responsive electronic switching circuit used to make possible a ‘zero force’ manual electronic switch.” Ex. 1001, 1:6–9. According to the ’183 patent, zero force touch switches have no moving parts and no contact surfaces that directly switch loads. *Id.* at 1:40–41. Instead, such switches detect an operator’s touch and use solid state electronics to switch loads or activate mechanical relays. *Id.* at 1:42–44. “A common solution used to achieve a zero force touch switch has been to make use of the capacitance of the human operator.” *Id.* at 3:12–14. The ’183 patent recites three methods used by capacitive touch switches to detect an operator’s touch, one of which relies on the change in capacitive coupling between a touch terminal and ground. *Id.* at 3:14–15, 3:44–46. In this method, “[t]he touch of an operator then provides a capacitive short to ground via the operator’s own body capacitance that lowers the amplitude of oscillator voltage seen at the touch terminal.” *Id.* at 3:52–56. Significantly, the operator of a capacitive touch switch using this method need not come in

conductive contact with the touch terminal. *Id.* at 3:57–59. Rather, the operator needs only to come into close proximity of the switch. *Id.*

Figure 11 of the '183 patent is reproduced below.

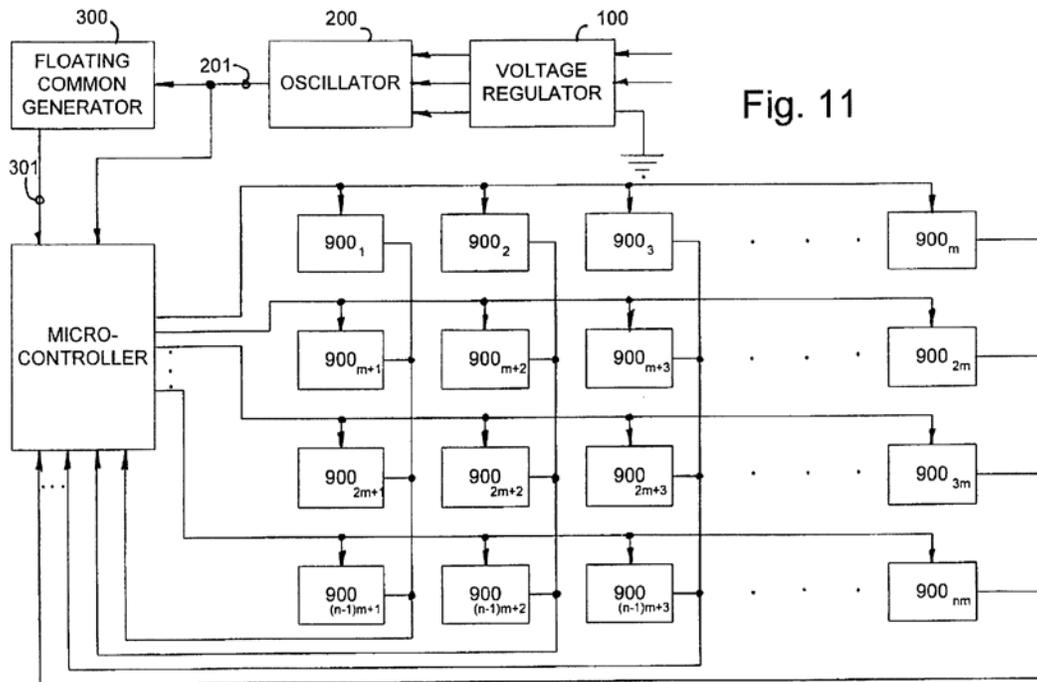


Fig. 11

Figure 11 depicts a “multiple touch pad circuit” including “an array of touch circuits.” *Id.* at 18:34–46. The '183 patent recognizes that placing capacitive touch switches in dense arrays can result in unintended actuations. *Id.* at 3:65–4:3. One method of addressing this problem known in the art involves placing guard rings around each touch pad. *Id.* at 4:4–10. Another known method of addressing this problem is to adjust the sensitivity of the touch pad such that the operator’s finger must entirely overlap a touch terminal. *Id.* at 4:10–14. “Although these methods (guard rings and sensitivity adjustment) have gone a considerable way in allowing touch switches to be spaced in comparatively close proximity, a susceptibility to surface contamination remains as a problem.” *Id.* at 4:14–18.

The '183 patent seeks to overcome the problem of unintended actuation of small capacitive touch switches “by using the method of sensing body capacitance to ground in conjunction with redundant detection circuits.” *Id.* at 5:33–35. Specifically, the '183 patent's touch detection circuit operates at frequencies at or above 50 kHz, and preferably at or above 800 kHz, in order to minimize the effects of surface contamination on the touch pads. Operating at these frequencies also improves sensitivity, allowing close control of the proximity required for actuation of small-sized touch terminals in a close array, such as a keyboard. *Id.* at 5:48–57.

C. Illustrative Claim

Independent claim 40 illustrates the claimed subject matter and is reproduced below.

40. A capacitive responsive electronic switching circuit comprising:
- an oscillator providing a periodic output signal having a predefined frequency;
 - a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a plurality of small sized input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the plurality of small sized input touch terminals of the keypad;
 - the plurality of small sized input touch terminals defining adjacent areas on a dielectric substrate for an operator to provide inputs by proximity and touch; and
 - a detector circuit coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said input touch terminals, said detector circuit being responsive to signals from said oscillator via said microcontroller and a presence of an operator's body capacitance to ground coupled to said touch terminals when

proximal or touched by the operator to provide a control output signal,

wherein said predefined frequency of said oscillator and said signal output frequencies are selected to decrease a first impedance of said dielectric substrate relative to a second impedance of any contaminate that may create an electrical path on said dielectric substrate between said adjacent areas defined by the plurality of small sized input touch terminals, and wherein said detector circuit compares a sensed body capacitance change to ground proximate an input touch terminal to a threshold level to prevent inadvertent generation of the control output signal.

D. Cited References

Petitioner relies on the following references:

1. Ingraham, U.S. Patent No. 5,087,825, issued Feb. 11, 1992, (Ex. 1007, “Ingraham I”) along with portions of Ingraham, U.S. Patent No. 4,731,548, issued Mar. 15, 1988 (Ex. 1008, “Ingraham II”) incorporated by reference.
2. Caldwell, U.S. Patent No. 5,594,222, issued Jan. 14, 1997 (Ex. 1009, “Caldwell”).
3. Gerpheide *et al.*, U.S. Patent No. 5,565,658, issued Oct. 15, 1996 (Ex. 1012, “Gerpheide”).
4. Wheeler *et al.*, U.S. Patent No. 5,341,036, issued Aug. 23, 1994 (Ex. 1015, “Wheeler”).

E. Instituted Grounds of Unpatentability

We instituted trial based on two grounds of unpatentability under 35 U.S.C. § 103(a) (Dec. on Inst. 31):

References	Instituted Claims
Ingraham I, Caldwell, Gerpheide	40, 41, 43, 45, 61, 64–67, 69, 83, 85, 86, 88, 90, 91, 94, 96, 97, 99, 101, and 102
Ingraham I, Caldwell, Gerpheide, Wheeler	47, 48, 62, 63, and 84

F. Testimony

Petitioner supports its challenges with a declaration of Dr. Vivek Subramanian (Ex. 1002), filed contemporaneously with the Petition, and a rebuttal declaration of Dr. Subramanian (Ex. 1017), filed contemporaneously with the Reply. Dr. Subramanian testified further by deposition on February 3, 2017, and a transcript of his testimony has been entered into evidence. Ex. 2009.

Patent Owner rebuts Petitioner’s challenges with a declaration of Dr. Darran Cairns (Ex. 2002), filed contemporaneously with the Preliminary Response, and an additional declaration of Dr. Cairns (Ex. 2010), filed contemporaneously with the Patent Owner Response. Dr. Cairns testified further by deposition on April 21, 2017, and a transcript of his testimony has been entered into evidence. Ex. 1018.

II. ANALYSIS

A. Principles of Law

To prevail in its challenges to the Instituted Claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the

claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Citing testimony of its declarant, Dr. Subramanian, Petitioner contends that a person having ordinary skill in the art at the time of the invention would have had a minimum of: (1) a bachelor's degree in electrical engineering, or equivalent thereof; and (2) “two to three years of experience in the relevant field, which includes touch systems technology.” Pet. 3 (citing Ex. 1002 ¶ 19).

Patent Owner's witness, Dr. Cairns, opines that a person of ordinary skill “in the art of capacitive touch sensors would have had at least a bachelor's degree in physics or electrical engineering or equivalent industry experience in the field.” Ex. 2002 ¶ 14.

The levels of ordinary skill proposed by the parties do not differ significantly. Both parties' proposed descriptions require at least an undergraduate degree in electrical engineering or related technical field, and both value industry experience (although Petitioner quantifies this experience as two to three years). We adopt Petitioner's proposed definition

as more representative, but note that our analysis would be the same under either definition. We further find the level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

C. Claim Construction

The '183 patent expired on January 31, 2016. Pet 11; Prelim. Resp. 7. Our review of the claims of an expired patent is “similar to that of a district court’s review,” wherein claim terms are given their ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of the invention, as set forth by the Court in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). *In re Rambus, Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–45 (2016). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Petitioner urges that we need not construe the terms of the Instituted Claims. Pet 12. To the extent we construe a particular term, Petitioner urges that we adopt the constructions it proposed in the District Court litigation. *Id.* In its Preliminary Response, Patent Owner sought construction of three sets of claim limitations, namely:

1. “peak voltage of the signal output frequencies is greater than a supply voltage” as recited in each of independent claims 61, 83, and 94 (hereinafter, the “supply voltage limitation”);
2. “closely spaced array of input touch terminals of a keypad,” as recited in each of independent claims 83 and 94 and “small

sized input touch terminals of a keypad,” as recited in each of independent claims 40 and 61 (collectively, the “input touch terminals limitations”); and

3. “selectively providing signal output frequencies,” as recited in each of independent claims 40, 61, 83, and 94.

Prelim. Resp. 9–19.

We declined to adopt Patent Owner’s constructions of these limitations in our Decision on Institution. Dec. on Inst. 10–12. In so doing, we determined that one of ordinary skill in the art would understand the term “supply voltage” in the supply voltage limitation as referring to a supply voltage of the claimed microcontroller. *Id.* at 10. Contrary to Patent Owner’s contention, we determined the claim language does not restrict the supply voltage to exclude an external commercial power supply. *Id.* We further determined in our Decision on Institution that the input touch terminals limitations do not preclude the presence of physical structures isolating adjacent touch terminals. *Id.* at 10–11. Although we addressed Patent Owner’s proposed constructions of the limitations enumerated above, we did not construe further these limitations because additional construction was not necessary to our analysis on whether to institute a trial. *Id.* at 12.

Neither party contests our construction of each limitation, as set forth in our Decision on Institution. PO Resp. 7; *see generally* Reply. Based on the full record developed during this proceeding, we find no need to depart from our constructions set forth above. We also find no need to construe further any terms of the Instituted Claims because further construction is not necessary to our analysis herein. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (explaining that only claim terms in

controversy need to be construed, and only to the extent necessary to resolve the controversy).

D. Obviousness based on Ingraham I, Caldwell, and Gerpheide

Petitioner asserts each of independent claims 40, 61, 83, and 94 would have been obvious over the combined teachings of Ingraham I, Caldwell, and Gerpheide. Pet. 39–49.

1. Ingraham I (Ex. 1007) and Ingraham II (Ex. 1008)

Ingraham I discloses a capacity response keyboard, which is depicted in Figure 1 reproduced below. Ex. 1007 at 2:19–20.

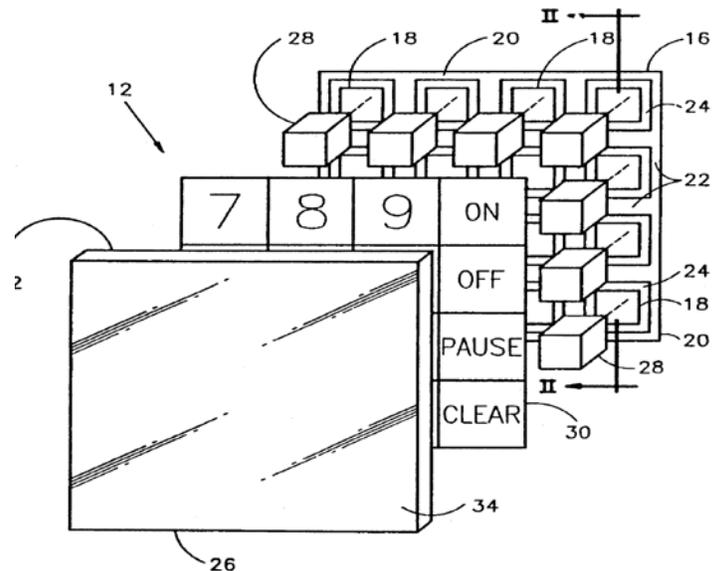


FIG. 1

Figure 1 shows a perspective view of Ingraham I's capacity response keyboard, consisting of switches that respond to the change in capacity from a user touching the switch. Ex. 1007, 1:5–9. Each switch includes a touch plate assembly and a control circuit. *Id.* at 2:28–35, Figs. 2, 3. Each touch plate assembly includes a guard band that reduces interference between the switches. *Id.* at 2:46–49, Abstract. When a keyboard user touches the outer surface of the switch, the capacity-to-ground for the switch's touch plate

increases. *Id.* at 3:1–6, 3:21–47. This increase is detected by the switch’s touch sensing circuit, which sends an output signal to a microcomputer. *Id.*

The ’183 Patent Specification makes several references to Ingraham I, including describing Ingraham I as operating at relatively lower frequencies than the invention of the ’183 Patent. Ex. 1001, 8:11–14; *see also id.* at 3:44–50, 4:3–8, 6:6–16, 18:1–10. According to the ’183 patent:

The specific touch detection method of the present invention has similarities to the devices of U.S. Pat. No. 4,758,735 and U.S. Pat. No. 5,087,825 [Ingraham I]. However, significant improvements are offered in the means of detection and in the development of an overall system to employ the touch switches in a dense array and in an improved zero force palm button. The touch detection circuit of the present invention features operation at frequencies at or above 50 kHz and preferably at or above 800 kHz to minimize the effects of surface contamination from materials such as skin oils and water.

Id. at 5:43–53.

Ingraham I incorporates by reference certain portions of prior art patent Ingraham II, upon which Petitioner relies as meeting certain limitations of the Instituted Claims. Pet. 9 (citing Ex. 1007, 3:21–24 as incorporating Ingraham II’s control circuit 14 (“A detailed description of control circuit 14 is provided in U.S. Pat. No. 4,731,548, issued Mar. 15, 1988 to Ronald Ingraham, the disclosure of which is hereby incorporated herein by reference.”)).

2. *Caldwell (Ex. 1009)*

Caldwell discloses a touch pad system, including a touch sensor that detects user contact, for use in kitchens. Ex. 1009, 1:6–9, 1:42–44, 2:45–48. Caldwell’s touch pad includes “an active, low impedance touch sensor

attached to only one side of a dielectric substrate.” *Id.* at 2:22–23. Figure 6 of Caldwell is reproduced below.

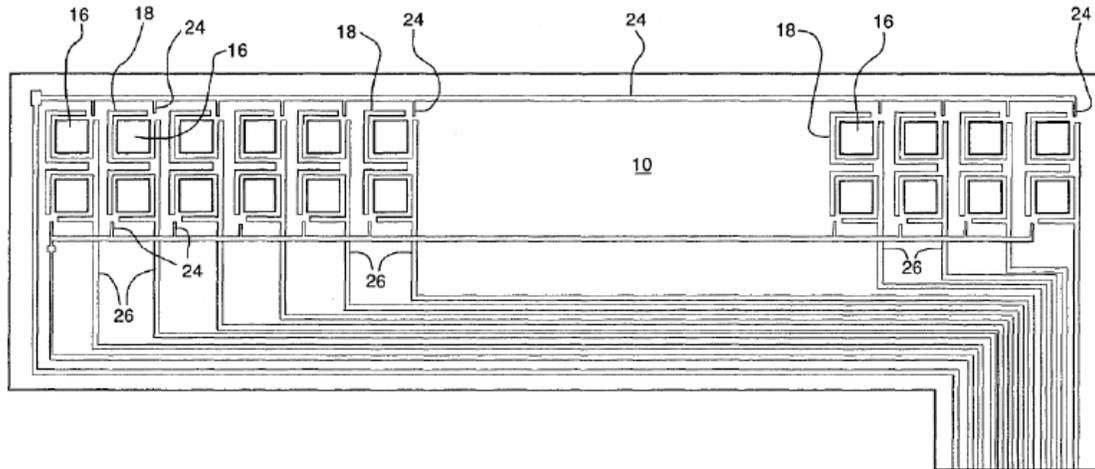


FIG - 6

Figure 6 of Caldwell shows a matrix of touch pads comprising a touch panel. *Id.* at 5:60–61. To monitor the touch pads, Caldwell’s system sequentially provides an oscillating square wave signal to a row or column of touch pads and then sequentially selects columns or rows of sense electrodes 24 to sense the signal output from the touch pad. *Id.* at 4:39–51, 6:40–63.

3. *Gerpheide (Ex. 1012)*

Gerpheide discloses a capacitive touch responsive system that detects the location of a touch in a single point input device, such as those used to provide data input in lieu of a mouse or stylus. Ex. 1012, 1:10–14, 1:19–20, 2:61–3:12. Figure 2b of Gerpheide is reproduced below.

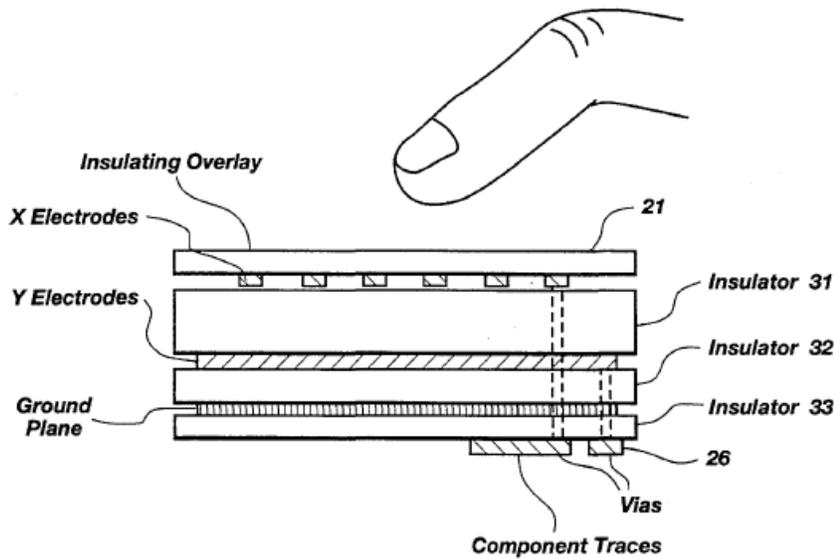


Fig. 2b

Figure 2b illustrates a cross-sectional view of a touch pad. *Id.* at 4:56–57. Gerpheide seeks to solve the problem of reducing electrical interference in single point touch pads that use measurements of true capacitance to determine location. *Id.* at 2:21–34. To reduce electrical interference regardless of its frequency, Gerpheide varies the oscillator signal frequency provided to the touch pad. *Id.* at Figs. 4, 7, 3:13–18, 6:5–8, 6:19–26, 8:22–9:33. More specifically, Gerpheide describes varying frequencies in a lookup table, selecting a frequency, sending that frequency to the entire touchpad thirty-two times in succession, and then selecting a new frequency based on an electrical interference measure. *Id.* at 9:18–33.

4. *Rationale for Combining Ingraham I, Gerpheide, and Caldwell*

With respect to independent claim 40, Petitioner asserts the combination of Ingraham I’s microcomputer using Caldwell’s sequential scanning to selectively provide each of Gerpheide’s signal

output frequencies as meeting the claimed “microcontroller selectively providing signal output frequencies to a plurality of small sized input touch terminals of a keypad.” Pet. 39. More specifically, Petitioner contends that Ingraham I’s microcomputer 80 meets the claimed microcontroller and input portions 13 meet the claimed “small sized input touch terminals of a keypad.” *Id.*; *see also id.* at 19–20. Relying on Dr. Subramanian’s testimony, Petitioner contends that it would have been readily apparent to one of ordinary skill to modify the microcomputer and input portions of Ingraham I given the teachings of Caldwell such that “rows of input portions 13 would be selected sequentially and the oscillator signal provided to the selected row.” *Id.* at 24 (citing Ex. 1002 ¶ 64; Ex. 1009, 6:40–63). According to Petitioner, a system so modified would selectively provide the oscillator signal frequency to the input touch terminals of a keypad, thereby meeting the claimed “selectively providing a signal output frequency to each row of the plurality of small sized input touch terminals of the keypad.” *Id.* at 26, 39. The same oscillator signal would be sequentially provided to each row of Ingraham I’s input portions 13 until all rows are scanned. *Id.* at 55 (citing Ex. 1009, 6:40–63, 8:20–23; Ex. 1002 ¶ 132).

Petitioner relies on Gerpheide as teaching varying the oscillator signal frequency provided to an electrode array in order to account for electrical interference. *Id.* at 28 (citing Ex. 1012, 6:5–8, 6:19–26, 8:22–9:33, Figs. 4, 7; Ex. 1006, 329–30, 333–34). Again relying on Dr. Subramanian, Petitioner alleges, “one of ordinary skill in the art would have been motivated to incorporate interference negating

functionality similar to that described by Gerpheide in the above discussed Ingraham I-Caldwell system.” *Id.* at 28 (citing Ex. 1002, ¶ 72). Thus, Petitioner contends the system of Ingraham I–Caldwell–Gerpheide selectively provides signal output frequencies, as opposed to only a single frequency. *Id.* at 29, 40.

In its Preliminary Response, Patent Owner asserted that one of ordinary skill in the art would not be motivated to combine the teachings of Gerpheide with those of Ingraham I and Caldwell. According to Patent Owner, “Gerpheide is single touch and therefore is concerned about sensing the entire single touch pad, it does not sense any individual rows or seek to determine interference between multiple touch pads.” Prelim. Resp. 44. Patent Owner’s witness, Dr. Cairns, testified that Dr. Subramanian’s testimony on this point is erroneous because Gerpheide “is a single touch device that could not be combined with either [cited reference] to make a working device.” Ex 2002 ¶ 102.

In our Decision on Institution, we determined Dr. Cairns’ testimony conflicted directly with Dr. Subramanian’s testimony on this issue. Dec. on Inst. 23. We, therefore, resolved in Petitioner’s favor at that stage of the proceeding the genuine issue of material fact as to whether one of ordinary skill in the art would have looked to Gerpheide to combine its teaching of selectively providing frequencies with Ingraham I and Caldwell. *Id.* (citing 37 C.F.R § 42.108(c)).

Having completed trial in the matter, Petitioner must show by a preponderance of the evidence that a person of ordinary skill in the art

would have been motivated to combine Gerpheide with Ingraham I and Caldwell with a reasonable expectation of success. We determine Petitioner has failed to carry this burden for the reasons that follow.

a) Reasons to Combine Ingraham I, Gerpheide, and Caldwell

During trial, Patent Owner argues that an artisan of ordinary skill would not look to Gerpheide when addressing the problem faced by the '183 patent because Gerpheide “does not disclose a keypad, is not compatible with keypads, and was directed to reducing electrical interference on a single-point touchpad.” PO Resp. 23 (citing Ex. 2010 ¶¶ 96–106). Patent Owner and Dr. Cairns direct our attention to additional reference U.S. Patent No. 4,639,720 (“Rympalski”),¹ which disparages single point touch pads because they “suffer from a lack of versatility (they are capable of locating only one coordinate point at a time) and consume considerable power and involve complex hardware, thereby reducing their cost effectiveness and practical utility.” *Id.* at 24 (citing Ex. 2012, 2:7–17; Ex. 2010 ¶¶ 96–101).

Petitioner replies that a person of skill in the art would be motivated to combine Gerpheide with Ingraham I and Caldwell because Gerpheide addresses capacitive touch responsive systems. Reply 5–6 (citing Ex.1002 ¶¶ 70–71). Petitioner contends that Patent Owner’s reliance on Rympalski is misplaced because Rympalski “was filed in 1981, more than a decade before *Gerpheide*’s filing date.” *Id.* at 6–7 (citing Ex.1017 ¶¶ 5–6). Petitioner reiterates that, according to

¹ Dr. Cairns identifies that Gerpheide cites U.S. Patent No. 5,305,017 (“Gerpheide '017”), which in turn cites Rympalski. Ex. 2010 ¶ 98.

Dr. Subramanian, an ordinarily skilled artisan would have looked to Gerpheide “for its teachings regarding electrical interference nullification in touch systems by measuring interference and adjusting the oscillator output frequency based on the measured interference.” *Id.* (citing Pet. 27–29; Ex. 1002 ¶¶ 69–72). Petitioner states, “a POSITA would have looked to the inter-related teachings of all three references regardless of whether they are single-point touch pads or not to create a capacitive touch responsive system given the advantages of the combined Ingraham I-Caldwell-Gerpheide system.” *Id.* at 8 (citing Ex. 1002 ¶¶ 61, 65, 66, 70, 72; Ex. 1017 ¶ 8).

On this evidentiary record, we are not persuaded one of ordinary skill in the art would have combined Gerpheide with Ingraham I and Caldwell to arrive at claim 40. Gerpheide is related to a single point input device, such as those used to provide data input in lieu of a mouse or stylus. Ex. 1012, 1:10–14, 1:19–20, 2:61–3:12. Like the ’183 patent, Ingraham I and Caldwell disclose capacitive response keypads. Ex. 1007. 1:5–9, 2:19–20; Ex. 1009, 1:6–9, 1:42–44, 2:45–48. The ’183 patent describes monitoring electrical interference across a single electrode and varying the frequency of an oscillator frequency based on an interference measurement. Ex. 1001, 6:13–18, 8:22–9:33. Conversely, the ’183 patent describes “a multiple touch pad circuit” including “an array of touch circuits.” *Id.* at 18:34–46. The ’183 patent seeks to overcome the problem of unintended actuation of these touch circuits when such circuits are placed in dense arrays. *Id.* at 3:65–4:3. Recognizing guard rings and sensitivity adjustments “have gone a considerable way in allowing

touch switches to be spaced in comparatively close proximity,” the ’183 patent addresses the remaining problem of surface contamination across the keypad. *Id.* at 4:14–18. The considerations described in the ’183 patent, Ingraham I, and Caldwell related to the close proximity of touch circuits in a keypad are wholly absent from Gerpheide.

Petitioner relies on Dr. Subramanian’s testimony that an ordinarily skilled artisan would have looked to Gerpheide “for its teachings regarding electrical interference nullification in touch systems by measuring interference and adjusting the oscillator output frequency based on the measured interference.” Reply 7.

Dr. Subramanian’s testimony, however, is conclusory on this point. *See* Ex. 1002 ¶¶ 69–72. The relevant portion of Dr. Subramanian’s testimony offers only that one would have found incorporating Gerpheide “to be a predictable and common sense implementation to allow the combined Ingraham I-Caldwell system to reject electrical interference regardless of its frequency without expensive nulling circuitry.” Ex. 1002 ¶ 72. It is not sufficient to demonstrate that each of the components in a challenged claim is known in the prior art. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.”). Although Petitioner has identified in Gerpheide “teachings regarding electrical interference nullification in touch systems” (Reply 7), Petitioner and Dr. Subramanian fail to address fully—in the face of Petitioner’s evidence to the contrary, including

Dr. Cairn’s testimony and Rypalski—why an ordinarily skilled artisan would look to such teachings in Gerpheide with a reasonable expectation of success for combining them with Ingraham I and Caldwell.

Petitioner’s contention that one “would have looked to the inter-related teachings of all three references regardless of whether they are single-point touch pads or not” is similarly insufficiently supported by Dr. Subramanian’s testimony. Reply 8 (citing Ex. 1002 ¶¶ 61, 65, 66, 70, 72; Ex. 1017 ¶ 8). The majority of Dr. Subramanian’s testimony cited by Petitioner is unrelated to Gerpheide. Ex. 1002 ¶¶ 61, 65, 66. As discussed above, the relevant portion of Dr. Subramanian’s testimony offers only that one would have found incorporating Gerpheide “to be a predictable and common sense implementation.” Ex. 1002 ¶ 72; *see also* Ex. 1017 ¶ 8.

Responding to Petitioner’s position, Patent Owner offers the testimony of Dr. Cairns that the combination is not predictable and not one that would have been made by a skilled artisan. Ex. 2010 ¶¶ 102–103. Dr. Cairns relies on the ’183 Patent’s statements that its detection circuit “operates at a higher frequency than prior art touch sensing circuits,” which “is not a benign choice” relative to the prior art detection circuits. *Id.* ¶ 103 (quoting Ex. 1001, 8:9–14).

Dr. Cairns further relies on the ’183 Patent’s description of testing required to identify ideal frequency ranges as further evidence that the combination of prior art elements is not predictable and not one that would have been made by a skilled artisan. *Id.* ¶¶ 103–104. We credit the testimony of Dr. Cairns on this point over the testimony of

Dr. Subramanian because Dr. Cairns' testimony is more fully developed and is supported by record evidence. For instance, Dr. Subramanian offers no explanation of why one would have found incorporating Gerpheide's monitoring of oscillator frequencies, calculation of new frequencies, and use of newly-calculated frequencies "to be a predictable and common sense implementation." Ex. 1002 ¶ 72; *see also* Ex. 1017 ¶ 8. Rather, Dr. Subramanian recites a potential benefit of the combination—namely "to allow the combined Ingraham I-Caldwell system to reject electrical interference regardless of its frequency without expensive nulling circuitry." *Id.* Conversely, Dr. Cairns proffers the testing described in the '183 patent as evidence that identifying the ideal frequency ranges for use in the claimed invention was not a predictable combination of prior art elements. Ex. 2010 ¶¶ 103–104.

Patent Owner's position is further supported by Rypalski, which disparages single point touch pads, thereby demonstrating a distinction recognized in the art between single point and multi point capacitive touch responsive systems. Petitioner counters that Rypalski is not contemporaneous with Gerpheide, as Patent Owner contends, because it "was filed in 1981, more than a decade before *Gerpheide's* filing date" and thus is not reflective of the state of the art at time of filing the '183 patent. Reply 6. This assertion, however, supports Patent Owner's argument that the art evinces a long-standing distinction between single point and multi point capacitive touch responsive systems. Petitioner offers no evidence that this distinction

and the shortcomings of single point touch pads described by Rympalski were mitigated before the time of filing the '183 patent.

b) Reasonable Expectation of Success

Petitioner argues a person of skill in the art reasonably would have expected to combine successfully Gerpheide with Ingraham I and Caldwell because “utilizing a varying oscillator frequency to nullify electrical interference without expensive nulling circuitry was certainly a benefit that would have motivated a POSITA to modify the combined Ingraham I-Caldwell system using Gerpheide.” *Id.* at 14 (citing Ex. 1002 ¶¶ 70–72). Petitioner further asserts that one would reasonably have expected to combine successfully Gerpheide with Ingraham I and Caldwell because Gerpheide states its “interference evaluation function 106 is not based on position signals.” *Id.* at 13 (quoting Ex. 1012, 8:22–9:33; citing Pet. 28, Ex. 1002 ¶ 71).

Patent Owner contends a person of ordinary skill in the art reasonably would not have expected to combine successfully Gerpheide with Ingraham I and Caldwell because Gerpheide ties all electrodes together to form a single electrode. PO Resp. 30 (citing Ex. 1012, 6:13–18; Ex. 2010 ¶¶ 115–118). Dr. Cairns adds that such a single electrode would not work with multiple individual touch pads, and that Gerpheide’s specific interference algorithm relying on drift in position would not work with Ingraham I and Caldwell “because Caldwell has an array of pads, not just one pad.” Ex. 2010 ¶¶ 115–118.

We are not persuaded by Petitioner’s arguments that one of ordinary skill in the art reasonably would have expected to combine

successfully Gerpheide with Ingraham I and Caldwell. Petitioner’s contention regarding removal of expensive nulling circuitry does not address why one reasonably would have expected the combination allowing removal of nulling circuitry to function correctly. *See* Reply 14. *See Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1335 (Fed. Cir. 2013) (“An invention is not obvious just ‘because all of the elements that comprise the invention were known in the prior art;’ rather, a finding of obviousness at the time of invention requires a ‘plausible rational[e] as to why the prior art references would have worked together.’” (quoting *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1351 (Fed. Cir. 2010))). Petitioner’s reliance on Dr. Subramanian’s testimony is of little assistance in this regard. Reply 13–14 (citing Ex. 1002 ¶¶ 70–73; Ex. 1017 ¶ 14). As discussed above, Dr. Subramanian offers little persuasive evidence of reasonable expectation of success. Rather, the few paragraphs of testimony upon which Petitioner relies summarily state one of ordinary skill would have found incorporating Gerpheide “to be a predictable and common sense implementation.” Ex. 1002 ¶¶ 70–73; *see also* Ex. 1017 ¶ 14.

Petitioner’s additional argument that Gerpheide’s “interference evaluation function 106 is not based on position signals” is insufficiently developed. Reply 13. Neither Petitioner nor Dr. Subramanian explains how this statement reasonably indicates Gerpheide’s interference algorithm—which functions in the context of having all electrodes tied together to form a single electrode and calculates drift in position across the electrode—would function

successfully in a multi touch keypad based on Ingraham I and Caldwell. *Id.*; Ex. 1017 ¶ 14.

On balance, we determine Petitioner's evidence insufficiently supports its rationale for combining Gerpheide's teaching of varying frequencies based on electrical interference with the cited teachings of Ingraham I and Caldwell. Consequently, for the foregoing reasons, we are not persuaded Petitioner has met its burden of proving claim 40 unpatentable by a preponderance of the evidence. Petitioner's arguments regarding all other Instituted Claims rely on the same rationale for combining Gerpheide with Ingraham I and Caldwell as discussed above in the context of claim 40.² For the foregoing reasons, we similarly are not persuaded Petitioner has met its burden of proving each of the remaining Instituted Claims unpatentable by a preponderance of the evidence.

III. SUMMARY

We conclude Petitioner has not shown by a preponderance of the evidence that the Instituted Claims are unpatentable.

² Although Petitioner's analysis of dependent claims 47, 48, 62, 63, and 84 includes the additional reference Wheeler, Petitioner's reliance on Gerpheide and its rationale for combining Gerpheide with Ingraham I and Caldwell remain unchanged from the positions set forth with respect to claim 40. *See* Pet. 57–60 (citing Ex. 1002 ¶¶ 137–144).

IV. ORDER

It is, therefore,

ORDERED that Petitioner has not demonstrated by a preponderance of the evidence that claims 40, 41, 43, 45, 47, 48, 61–67, 69, 83–86, 88, 90, 91, 94, 96, 97, 99, 101, and 102 of U.S. Patent No. 5,796,183 are unpatentable; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Patent 5,796,183

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