Notice of Intent to Issue Ex Parte Reexamination Certificate	Control No.	Patent Under Reexamination	
	90/013,106	5796183	
	Examiner	Art Unit	AIA (First Inventor to File) Status
	HENRY N. TRAN	3992	No

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

1. ☒ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of
   - (a) ☒ Patent owner's communication(s) filed: *07 May 2014*.
   - (b) ☐ Patent owner's failure to file an appropriate timely response to the Office action mailed: _____.
   - (c) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
   - (d) ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated _____
   - (e) ☐ Other: _____.
2. The Reexamination Certificate will indicate the following:
   - (a) Change in the Specification: ☐ Yes ☒ No
   - (b) Change in the Drawing(s): ☐ Yes ☒ No
   - (c) Status of the Claim(s):
     - (1) Patent claim(s) confirmed: _____.
     - (2) Patent claim(s) amended (including dependent on amended claim(s)): _____
     - (3) Patent claim(s) canceled: *18,27 and 35*.
     - (4) Newly presented claim(s) patentable: 40-117.
     - (5) Newly presented canceled claims: _____.
     - (6) Patent claim(s) ☐ previously ☐ currently disclaimed: _____
     - (7) Patent claim(s) not subject to reexamination: 1-17,19-26,28-34 and 36-39.
3. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
4. ☒ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
5. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).
6. ☐ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).
7. ☐ The drawing correction request filed on _____ is: ☐ approved ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All b)☐ Some* c)☐ None of the certified copies have
   - ☐ been received.
   - ☐ not been received.
   - ☐ been filed in Application No. _____.
   - ☐ been filed in reexamination Control No. _____.
   - ☐ been received by the International Bureau in PCT Application No. _____.

   * Certified copies not received: _____.
9. ☐ Note attached Examiner's Amendment.
10. ☐ Note attached Interview Summary (PTO-474).
11. ☐ Other: _____.

All correspondence relating to this reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

/HENRY N TRAN/
Primary Examiner
Art Unit: 3992

cc: Requester (if third party requester)

The present application is being examined under the pre-AIA first to invent provisions.

NOTICE OF INTENT TO ISSUE *EX PARTE* REEXAMINATION CERTIFICATE

INTRODUCTION

1. This Notice of Intent to Issue *Ex Parte* Reexamination Certificate (NIRC) action concerns the *Ex Parte* Reexamination Request (hereinafter "the Request") filed by patent owner on December 24, 2013 for the *Ex Parte* Reexamination Certificate, the U.S. Patent No. 5,786,183 C1, issued on April 29, 2013 to Hourmand et al. (hereinafter "the '183 patent"); and it is responsive to the patent owner's response filed on May 7, 2014 (hereinafter "the response"). The response has been entered. Claims 40-117 are subject to this reexamination; and they are found patentable and/or confirmed.

RESPONSE TO THE RESPONSE

2. Patent owner's proposed amendment to the claims, see pages 2-14, filed with the response is in compliance with 37 CFR 1.530(d)-(j), and it has been entered. See M.P.E.P. § 2250. Claims 18, 27, and 35 are canceled; claims 1-17, 19-26, 28-34, and 36-39 are unamended and they are not subject to reexamination; claims 40-105 were previously added, and of which, claims 40, 41, 56, 66, 67, 71, and 95 are amended; and claims 106-117 are newly added. Thus, claims 40-117 are subject to this reexamination.

3. Patent owner's arguments, see pages 15-141, filed with the response, with respect to the claim rejections under 35 U.S.C. § 305, the prior art references of Boie, Gerpheide, Lee, and Casio, and

the supports for new claims 40-117, have been fully considered and are persuasive. The rejection of claims 18, 27, 40-44, 56-71, and 95-105 under 35 U.S.C. § 305 as recited in the prior Office action mailed on March 27, 2014 has been overcome, and it has been withdrawn.

REFERENCES CITED IN THIS OFFICE ACTION

3. The prior art patents and printed publications (the prior art references) cited in the Request pursuant to C.F.R. § 1.510(b) (3), see the Request page 10, and relied upon are relisted below:

- U.S. Patent No. 5,463,388 issued to Boie et al. on October 31, 1995 ("Boie" or the '388 patent), which was submitted with the request as Exhibit C.
- U.S. Patent No. 5,565,658 issued to Gerpheide et al. on October 15, 1996 ("Gerpheide" or the '658 patent), which was submitted with the request as Exhibit D.
- Casio advertisement entitled "Now... The Invisible Casio Calculator Watch," published in Popular Science by On the Run in 1984 ("Casio"), which was submitted with the request as Exhibit E.
- Lee, thesis entitled "A Fast Multiple-Touch-Sensitive Input Device," and published October 1984 ("Lee"), which was submitted with the IDS filed with the request.

ALLOWABLE SUBJECT MATTER

4. New claims 40-117 are patentable.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

5. The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

The '183 patent generally relates to a capacitive responsive electronic switching circuit including an oscillator **200** providing a periodic output signal, a keypad having a plurality of input touch terminals **450** defining areas for an operator to provide inputs by proximity and touch, a microcontroller **500** using the periodic output signal from the oscillator for selectively providing signal output frequencies to the input touch terminals(e.g., touch terminals 57 and 59), and a detector circuit **400** coupled to the oscillator, the input touch terminals, and the microcontroller for providing a control output signal based on the presence of operator's body capacitance to ground coupled to the input touch terminal when in proximity or touched by an operator. An array of touch terminals may be provided in close proximity due to the reduction in crosstalk that may result from contaminants by utilizing an oscillator outputting signal having a frequency of 50 KHz or greater. See, the '183 patent Abstract, and Figures 3, 4 and 11. Each of the new independent claims 45, 56, 72, 84, 95, 106, and 111 identifies the uniquely distinct features that are not taught or suggested by the cited prior art references, either alone or in any reasonable combinations. Specifically,

(i) Independent claim 45 inludes the new limitation of "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies* ***directly*** *to a plurality of small sized input touch terminals of a keypad*"

(ii) Independent claim 56 requires, *inter alia*, the features: "*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, and* ***wherein a peak voltage of the signal output frequencies is greater than a supply voltage****"*;

(iii) Independent claim 72 requires, *inter alia*, the features: "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies directly to a closely spaced array of input touch terminals of a keypad"*, 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 for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touch said second touch terminal after the operator is proximal or touches said first touch terminal"*

(iv) independent claims 84 and 95, each requires, *inter alia*, the features: "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage"*;

(v) Independent claim 106 requires, *inter alia*, the features: "*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 a keypad"*; and

(vi) Independent claim 111 requires, *inter alia*, the features: "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminal, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the plurality of closely spaced array of input touch terminals of a keypad.*".

Whereas, the cited prior art references:

Boie

Boie discloses a computer input device for use as a computer mouse or keyboard comprises a thin, insulating surface covering an array **100** of electrodes arranged in a grid pattern and connected in columns and rows, each column and row is connected to circuitry **401**, which can be selected by multiplexer **402** under control of microcontroller 406. See *id.* at col. 3:56-61. The selected output is forwarded to summing circuit **403**, the output of which is converted by synchronous detector and filter circuit **404** to a signal related to the capacitance of the row or column selected by the multiplexer. See *id.* at col. 3:62-67. The RF oscillator **408** provides an RF signal of, for example ,100 Kilohertz, to circuits **401**, synchronous detector and filter circuit **404** via inverter **410**, and guard plane **411**, which is a substantially continuous plane parallel to array **100** and associated connections, and serves to isolate array **100** from extraneous signals. See *id.* at col. 3:67 - col. 4:5. To measure separate capacitance values for each electrode in array **100** instead of the collective capacitances of subdivided electrode elements connected in rows and columns, a circuit **401** is provided for each electrode in array **100** and multiplexer **402** is enlarged to accommodate the outputs from all circuits **401**. *See id.* at col. 4:14-21. The output of

synchronous detector and filter **404** is converted to digital form by analog-to-digital converter **405** and forwarded to microcontroller **406** so that microcontroller 406 obtains a digital value representing the capacitance seen by any row or column of electrode elements (or electrode if measured separately) selected by multiplexer **402**. *See id.* at col. 4:22-28. Particularly, Boie discloses driving the electrodes of electrode array 100 and guard planes 411 with a single RF signal for minimizing the effects of electrode-to-electrode capacitances, wiring capacitances and other extraneous capacitances. See *id.* at col. 4:58-61.

Thus, Boie does not teach or suggest the microcontroller is used to selectively providing signal output frequencies to input touch terminals of a keypad.

Accordingly, Boie does not teach or suggest the above-identified underlined claimed features.

Gerpheide

Gerpheide teaches a system and method for a capacitance-based proximity sensor with interference rejection. See Abstract. The system **10** comprises an electrode array **12**, a synchronous electrode capacitance measurement unit **14**, a reference frequency generator **16**, and a position locator **18**. See *id.* at Figure 1, and col. 3:52 to col. 4:26. The electrode array consists of multiple X electrodes **20** and Y electrodes **22**. See *id.* at Figures 2A and 2B. The synchronous electrode capacitance measurement unit **14** is connected to the electrode array **12** and the reference frequency generator **16** for producing capacitive measurement signals. See *id.* at Figure 4, and col. 5:50-67. Particularly, Gerpheide teaches that the reference frequency generator **16** includes an oscillator **100** for driving a microcontroller **102** and a divide-by-(M+N) circuit **104**, for providing signal output frequencies and always selecting a reference frequency away from frequencies which have been found to result in measurement interference; wherein, N

is a fixed constant, approximately 50, and M is specified by the microcontroller **102** to be, for example, one of four values in the ranges 61 KHz to 80 KHz as specified by the microcontroller **102**; and wherein, the microcontroller **102** performs the functions of interference evaluation 106 and frequency selection 108. See *id.* at Figure 7, and col. 8:20-43.

Thus, Gerpheide does not teach or suggest the synchronous electrode capacitance measurement unit is responsive to signals from the oscillator via said microcontroller and the presence of an operator's body capacitance to ground.

Accordingly, Gerpheide does not teach or suggest the above-identified underlined claimed features.

Casio

Casio teaches a Casio Calculator Watch, which is a timepiece product employing electro-touch technology. The watch works by reading finger-strokes traced across its face. See *id.*at col. 1. The transparent touch panel construction includes a fiberglass panel having a transparent conductor film pattern (first layer) and a dielectric layer (second layer) overlying the fiberglass. See *id.*at col. 2. The touch panel determines figure and math symbols outlined with finger-strokes traced across the face. See *id.*at col. 1. The touch panel senses the input, and then digitizes it to extract features of the figure or math symbol. See *id.* at col. 2. The watch then outputs the corresponding figure or math symbol on the screen.

Thus, Casio does not teach or suggest the microcontroller is used to selectively providing signal output frequencies to input touch terminals of a keypad.

Accordingly, Casio does not teach or suggest the above-identified underlined claimed features.

Lee

Lee discloses a fast-scanning multiple-touch-sensitive input device comprising: a sensor matrix board, row and column selection registers, A/D converting circuits and a dedicated CPU. *See id.* at Figure 3.4. The row selection registers select one or more rows by setting the corresponding bits to a high state in order to charge up the sensors while the column selection registers select one or more columns by turn on corresponding analog switches to discharge the sensors through timing resistors. The intersecting region of the selected rows and the selected columns represents the selected sensors as a unit. See *id.* at Figure 3.1(a) shows a model of a selected sensor in the sensor matrix, Figure 3.1 (b) shows the timing diagram for discharging time measurement of a selected sensor, and Figure 3.2 illustrates a small section of a sensor matrix. Particularly, Lee describes the interface between the CPU and the sensor matrix as follows: The CPU selects the row or rows of a sensor group, initiating charging of all the associated sensors. After a charging interval, the CPU discharges the selected column or columns corresponding to a sensor group by connecting a group of discharge resistors whose current is summed via a high slew rate operational amplifier. Wherein, the CPU selects or deselects the row(s) by sending binary signals to the selected row(s). See *id.* at Figs. 3.1(a), 3.1(b), and 3.4, and page 3-10. As illustrated by the data bus of Figure 3.4.

Thus, Lee does not teach or suggest sending signal output frequencies to the selected rows and/or column.

Accordingly, Lee does not teach or suggest the above-identified underlined claimed features.

Further, the examiner agrees with the discussion articulated by patent owner that the prior art references, Boie, Gerpheide, Lee, and Casio, either alone or in combinations, fails to teach the above-identified claimed, see the response pages 16-20.

Accordingly, the independent claims 45, 56, 72, 84, 95, 106, and 111 are patentable over the prior art references of Boie, Gerpheide, Lee, and Casio.

Dependent claims 40-44, 46-55, 57-71, 73-83, 85-94, 96-105, 107-110, and 112-117, each is dependent upon one of said independent claims, and it is patentable based on at least the reasons set forth for the independent claim due to its dependency.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

CLAIM RENUMBERS

6. Claims 40-117 are renumbered consecutively in compliance with 37 CFR 1.126 and 37 CFR 1.530(g), see MPEP 608.01(j) and MPEP § 2250, as shown in the table below.

▨ Claims renumbered in the same order as presented by applicant				▨ CPA		▨ T.D.		▨ R.1.47							
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		18		35	50	52	109	69	86	86	103	103		
2	2	19	19	36	36	53	53	110	70	87	87	104	104		
3	3	20	20	37	37	54	54	111	71	88	88	95	105		
4	4	21	21	38	38	55	55	71	72	89	89	40	106		
5	5	22	22	39	39	51	56	73	73	90	90	46	107		
6	6	23	23	45	40	52	57	74	74	91	91	47	108		
7	7	24	24	41	41	53	58	75	75	92	92	48	109		
8	8	25	25	42	42	56	59	76	76	93	93	49	110		
9	9	26	26	43	43	57	60	77	77	94	94	105	111		
10	10		27	44	44	58	61	78	78	96	95	112	112		
11	11	28	28	50	45	59	62	79	79	96	96	113	113		
12	12	29	29	51	46	70	63	72	80	97	97	114	114		
13	13	30	30	52	47	64	64	80	81	98	98	115	115		
14	14	31	31	55	48	65	65	81	82	99	99	116	116		
15	15	32	32	57	49	106	66	82	83	100	100	117	117		
16	16	33	33	58	50	107	67	83	84	101	101				
17	17	34	34	59	51	108	68	85	85	102	102				

CONCLUSION

7. Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

8. Litigation Reminder

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '183

patent throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

9. Correspondence and Inquiry as to Office Actions

All correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 2231

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the data of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry by the patent owner concerning this communication or earlier communications from the Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Henry N Tran/
Patent Reexamination Specialist,
CRU - Art Unit 3992

Conferees:

//
Patent Reexamination Specialist,
CRU - Art Unit 3992

//
Supervisory Patent Examiner, Art Unit 3992

Issue Classification	**Application/Control No.** 90013106	**Applicant(s)/Patent Under Reexamination** 5796183
	Examiner HENRY N TRAN	**Art Unit** 3992

CPC

Symbol				Type	Version
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CPC Combination Sets

Symbol				Type	Set	Ranking	Version
		/					
		/					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 78	
/HENRY N TRAN/ Primary Examiner.Art Unit 3992 (Primary Examiner)	06/03/2014 (Date)	O.G. Print Claim(s) 40	O.G. Print Figure 4

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
307	116	H 0 3 K 17 / 96 (2006.01.01)	
CROSS REFERENCE(S)		H 0 3 K 17 / 94 (2006.01.01)	

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
307	125	139	140	112	113
361	181				

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	78	
/HENRY N TRAN/ Primary Examiner.Art Unit 3992	06/03/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	40	4

U.S. Patent and Trademark Office — Part of Paper No. 20140603

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		18		35	60	52	109	69	86	86	103	103		
2	2	19	19	36	36	53	53	110	70	87	87	104	104		
3	3	20	20	37	37	54	54	111	71	88	88	95	105		
4	4	21	21	38	38	55	55	71	72	89	89	40	106		
5	5	22	22	38	39	61	56	73	73	90	90	46	107		
6	6	23	23	45	40	62	57	74	74	91	91	47	108		
7	7	24	24	4`1	41	63	58	75	75	92	92	48	109		
8	8	25	25	42	42	66	59	76	76	93	93	49	110		
9	9	26	26	43	43	67	60	77	77	84	94	105	111		
10	10		27	44	44	68	61	78	78	94	95	112	112		
11	11	28	28	50	45	69	62	79	79	96	96	113	113		
12	12	29	29	51	46	70	63	72	80	97	97	114	114		
13	13	30	30	52	47	64	64	80	81	98	98	115	115		
14	14	31	31	56	48	65	65	81	82	99	99	116	116		
15	15	32	32	57	49	106	66	82	83	100	100	117	117		
16	16	33	33	58	50	107	67	83	84	101	101				
17	17	34	34	59	51	108	68	85	85	102	102				

NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 78	
/HENRY N TRAN/ Primary Examiner.Art Unit 3992 (Primary Examiner)	06/03/2014 (Date)	O.G. Print Claim(s) 40	O.G. Print Figure 4

U.S. Patent and Trademark Office Part of Paper No. 20140603

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BIB DATA SHEET

CONFIRMATION NO. 9188

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/013,106	12/24/2013 RULE	307	3992	NAR-5796183RX2

APPLICANTS

INVENTORS

5796183, Residence Not Provided;
NARTRON CORPORATION, REED CITY, MI;

**** CONTINUING DATA ***************************

This application is a REX of 08/601,268 01/31/1996 PAT 5796183

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
❑ Yes ☑ No	❑ Yes ☑ No	/HENRY N TRAN/ Examiner's Signature	❑ Initials			~~32~~ 14	~~8~~ 110

ADDRESS

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793
UNITED STATES

TITLE

Capacitive Responsive Electronic Switching Circuit

FILING FEE RECEIVED		
6000	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	❑ All Fees ❑ 1.16 Fees (Filing) ❑ 1.17 Fees (Processing Ext. of time) ❑ 1.18 Fees (Issue) ❑ Other _____ ❑ Credit

BIB (Rev. 05/07).

Reexamination	**Application/Control No.** 90013106	**Applicant(s)/Patent Under Reexamination** 5796183
	Certificate Date 04/29/2013	**Certificate Number** 5796183C1

Requester Correspondence Address: ☒ **Patent Owner** ☐ **Third Party**
SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793

LITIGATION REVIEW ☒	/HT/ (examiner initials)	01/26/2014 (date)
Case Name		Director Initials
1:06cv 1777 - CLOSED		
2:03cv75169 - CLOSED		
1:10cv691 - CLOSED		
2:06cv500 -CLOSED		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
1. NONE	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
307	112,113,116,125,139,140,157	6/2/2014	HT
361	181	6/2/2014	HT

SEARCH NOTES		
Search Notes	Date	Examiner
Review of patented file's prosecution history	03/102014/	HT
Review of patented file's prosecution history	05/30 & 06/02/14	HT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
307	112,113,116,125,139,140,157	6/2/14	HT
361	181	6/2/14	HT

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014	06/03/2014							
1	1	N	N							
2	2	N	N							
3	3	N	N							
4	4	N	N							
5	5	N	N							
6	6	N	N							
7	7	N	N							
8	8	N	N							
9	9	N	N							
10	10	N	N							
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13	13	N	N							
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16	16	N	N							
17	17	N	N							
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19	19	N	N							
20	20	N	N							
21	21	N	N							
22	22	N	N							
23	23	N	N							
24	24	N	N							
25	25	N	N							
26	26	N	N							
	27	✓	-							
28	28	N	N							
29	29	N	N							
30	30	N	N							
31	31	N	N							
32	32	N	N							
33	33	N	N							
34	34	N	N							
	35	-	-							
36	36	N	N							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014	06/03/2014							
37	37	N	N							
38	38	N	N							
39	39	N	N							
45	40	✓	=							
41	41	✓	=							
42	42	✓	=							
43	43	✓	=							
44	44	✓	=							
50	45	=	=							
51	46	=	=							
52	47	=	=							
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57	49	=	=							
58	50	=	=							
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68	61	✓	=							
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107	67	✓	=							
108	68	✓	=							
109	69	✓	=							
110	70	✓	=							
111	71	✓	=							
71	72	=	=							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014	06/03/2014							
73	73	=	=							
74	74	=	=							
75	75	=	=							
76	76	=	=							
77	77	=	=							
78	78	=	=							
79	79	=	=							
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104	104	✓	=							
95	105	✓	=							
40	106		=							
46	107		=							
47	108		=							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014	06/03/2014							
48	109		=							
49	110		=							
105	111		=							
112	112		=							
113	113		=							
114	114		=							
115	115		=							
116	116		=							
117	117		=							

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(12) EX PARTE REEXAMINATION CERTIFICATE (10211th)

United States Patent

Hourmand et al.

(10) Number: US 5,796,183 C2

(45) Certificate Issued: Jun. 27, 2014

(54) **CAPACITIVE RESPONSIVE ELECTRONIC SWITCHING CIRCUIT**

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(73) Assignee: **Nartron Corporation**, Reed City, MI (US)

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No. 90/013,106, Dec. 24, 2013

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Filed: **Jan. 31, 1996**

Reexamination Certificate C1 5,796,183 issued Apr. 29, 2013

Certificate of Correction issued May 11, 1999
Certificate of Correction issued Oct. 11, 2011

(51) **Int. Cl.**
H03K 17/96 (2006.01)
H03K 17/94 (2006.01)

(52) **U.S. Cl.**
USPC **307/116**; 307/125; 307/139; 307/140; 307/112; 307/113; 361/181

(58) **Field of Classification Search**
USPC 307/112, 113, 116, 125, 139, 140, 157; 361/181
See application file for complete search history.

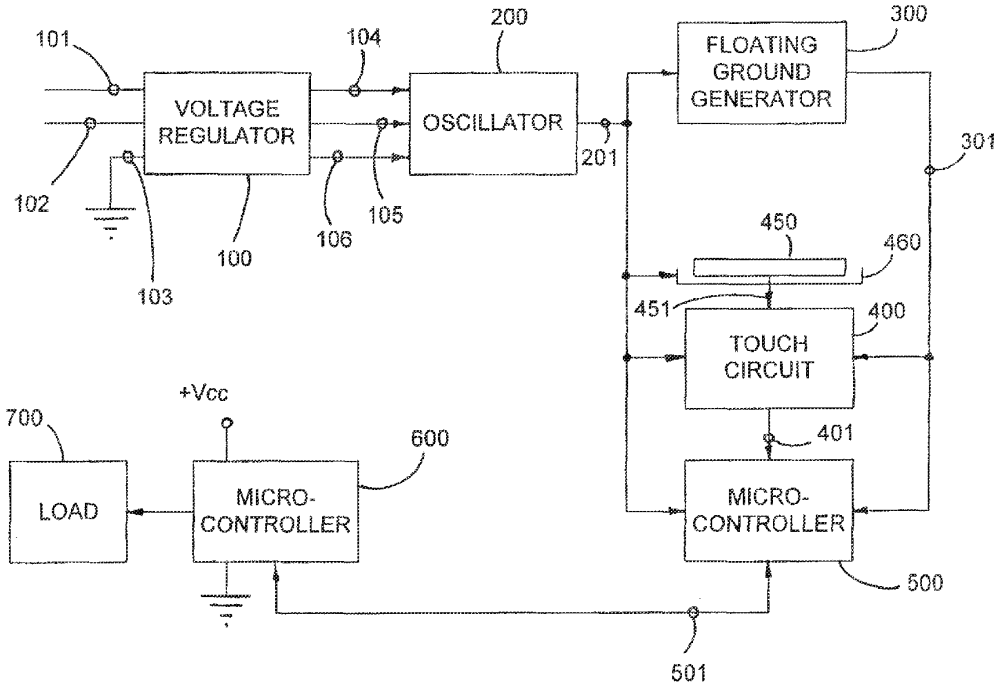
(56) **References Cited**

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/013,106, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

Primary Examiner — Henry N Tran

(57) **ABSTRACT**

A capacitive responsive electronic switching circuit comprises an oscillator providing a periodic output signal having a frequency of 50 kHz or greater, an input touch terminal defining an area for an operator provide an input by proximity and touch, and a detector circuit coupled to the oscillator for receiving the periodic output signal from the oscillator, and coupled to the input touch terminal. The detector circuit being responsive to signals from the oscillator and the presence of an operator's body capacitance to ground coupled to the touch terminal when in proximity or touched by an operator to provide a control output signal. Preferably, the oscillator provides a periodic output signal having a frequency of 800 kHz or greater. An array of touch terminals may be provided in close proximity due to the reduction in crosstalk that may result from contaminants by utilizing an oscillator outputting a signal having a frequency of 50 kHz or greater.



EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **18**, **27** and **35** are cancelled.

New claims **40-117** are added and determined to be patentable.

Claims **1-17**, **19-26**, **28-34** and **36-39** were not reexamined.

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.

41. The capacitive responsive electronic switching circuit as defined in claim 40, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad is selected from a plurality of Hertz values.

42. The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

43. The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

44. The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

45. The capacitive responsive electronic switching circuit as defined in claim 40, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad has a same Hertz value.

46. The capacitive responsive switching circuit as defined in claim 40, wherein said oscillator provides a periodic output signal having a frequency of 800 kHz or greater.

47. The capacitive responsive electronic switching circuit as defined in claim 40, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

48. The capacitive responsive electronic switching circuit as defined in claim 40, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

49. The capacitive responsive electronic switching circuit as defined in claim 40, wherein the detector circuit comprises a plurality of touch circuits, and wherein the microcontroller selectively provides the signal output frequencies to the plurality of small sized input touch terminals of the keypad via the plurality of touch circuits.

50. 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 directly to a plurality of small sized input touch terminals of a 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.

51. The capacitive responsive electronic switching circuit as defined in claim 50, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and

wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

52. The capacitive responsive electronic switching circuit as defined in claim 50, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

53. The capacitive responsive electronic switching circuit as defined in claim 50, wherein a peak voltage of the signal output frequencies is greater than a supply voltage.

54. The capacitive responsive electronic switching circuit as defined in claim 53, wherein the supply voltage is a battery supply voltage.

55. The capacitive responsive electronic switching circuit as defined in claim 53, wherein the supply voltage is a voltage regulator supply voltage.

56. The capacitive responsive electronic switching circuit as defined in claim 50, wherein the signal output frequencies have a same Hertz value.

57. The capacitive responsive electronic switching circuit as defined in claim 50, wherein each signal output frequency is selected from a plurality of Hertz values.

58. The capacitive responsive electronic switching circuit as defined in claim 57, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

59. The capacitive responsive electronic switching circuit as defined in claim 57, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

60. The capacitive responsive electronic switching circuit as defined in claim 57, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

61. 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, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;

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.

62. The capacitive responsive electronic switching circuit as defined in claim 61, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

63. The capacitive responsive electronic switching circuit as defined in claim 61, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

64. The capacitive responsive electronic switching circuit as defined in claim 61, wherein the supply voltage is a battery supply voltage.

65. The capacitive responsive electronic switching circuit as defined in claim 61, wherein the supply voltage is a voltage regulator supply voltage.

66. The capacitive responsive electronic switching circuit as defined in claim 61, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad has a same Hertz value.

67. The capacitive responsive electronic switching circuit as defined in claim 61, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad is selected from a plurality of Hertz values.

68. The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

69. The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

70. The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

71. A capacitive responsive electronic switching circuit for a controlled keypad device 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 directly to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or

touches said second touch terminal after the operator is proximal or touches said first touch terminal.

72. The capacitive responsive electronic switching circuit as defined in claim 71, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

73. The capacitive responsive electronic switching circuit as defined in claim 71, wherein the signal output frequencies have a same Hertz value.

74. The capacitive responsive electronic switching circuit as defined in claim 71, wherein each signal output frequency is selected from a plurality of Hertz values.

75. The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

76. The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

77. The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

78. The capacitive responsive electronic switching circuit as defined in claim 71, wherein said detector circuit is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.

79. The capacitive responsive electronic switching circuit as defined in claim 71, further comprising an indicator for indicating the detector circuit has determined that the operator is proximal or touches said second touch terminal.

80. The capacitive responsive electronic switching circuit as defined in claim 71, wherein a peak voltage of the signal output frequencies is greater than a supply voltage.

81. The capacitive responsive electronic switching circuit as defined in claim 80, wherein the supply voltage is a battery supply voltage.

82. The capacitive responsive electronic switching circuit as defined in claim 80, wherein the supply voltage is a voltage regulator supply voltage.

83. A capacitive responsive electronic switching circuit for a controlled keypad device 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 closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein a peak voltage of the signal output frequencies is greater than a supply voltage;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

84. The capacitive responsive electronic switching circuit as defined in claim 83, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

85. The capacitive responsive electronic switching circuit as defined in claim 83, wherein the signal output frequencies have a same Hertz value.

86. The capacitive responsive electronic switching circuit as defined in claim 83, wherein each signal output frequency is selected from a plurality of Hertz values.

87. The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

88. The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

89. The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

90. The capacitive responsive electronic switching circuit as defined in claim 83, wherein the supply voltage is a battery supply voltage.

91. The capacitive responsive electronic switching circuit as defined in claim 83, wherein the supply voltage is a voltage regulator supply voltage.

92. The capacitive responsive electronic switching circuit as defined in claim 83, wherein said detector circuit is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.

93. The capacitive responsive electronic switching circuit as defined in claim 83, further comprising an indicator for indicating the detector circuit has determined that the operator is proximal or touches said second touch terminal.

94. A capacitive responsive electronic switching circuit for a controlled keypad device 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 closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad, the input touch terminals comprising first and second input touch terminals, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or

touches said second touch terminal after the operator is proximal or touches said first touch terminal.

95. The capacitive responsive electronic switching circuit as defined in claim 94, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

96. The capacitive responsive electronic switching circuit as defined in claim 94, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad has a same Hertz value.

97. The capacitive responsive electronic switching circuit as defined in claim 94, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad is selected from a plurality of Hertz values.

98. The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

99. The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

100. The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

101. The capacitive responsive electronic switching circuit as defined in claim 94, wherein the supply voltage is a battery supply voltage.

102. The capacitive responsive electronic switching circuit as defined in claim 94, wherein the supply voltage is a voltage regulator supply voltage.

103. The capacitive responsive electronic switching circuit as defined in claim 94, wherein said detector circuit is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.

104. The capacitive responsive electronic switching circuit as defined in claim 94, further comprising an indicator for indicating the detector circuit has determined that the operator is proximal or touches said second touch terminal.

105. A capacitive responsive electronic switching circuit for a controlled keypad device 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 closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

106. The capacitive responsive electronic switching circuit as defined in claim 105, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad has a same Hertz value.

107. The capacitive responsive electronic switching circuit as defined in claim 105, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad is selected from a plurality of Hertz values.

108. The capacitive responsive electronic switching circuit as defined in claim 107, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

109. The capacitive responsive electronic switching circuit as defined in claim 107, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

110. The capacitive responsive electronic switching circuit as defined in claim 107, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

111. The capacitive responsive electronic switching circuit as defined in claim 105, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

112. The capacitive responsive electronic switching circuit as defined in claim 105, wherein said first and second touch terminals are adapted to be mounted on different surfaces of the controlled keypad device.

113. The capacitive responsive electronic switching circuit as defined in claim 105, wherein said first and second touch terminals are adapted to be mounted on non-parallel planar surfaces of the controlled keypad device.

114. The capacitive responsive electronic switching circuit as defined in claim 105, wherein said first and second touch terminals are adapted to be mounted on perpendicular planar surfaces of the controlled keypad device.

115. The capacitive responsive electronic switching circuit as defined in claim 105 and further including an indicator for indicating when said detector circuit determines that the operator is proximal or touches said first touch terminal.

116. The capacitive responsive electronic switching circuit as defined in claim 105 and further including an indicator for indicating when said detector circuit determines that the operator is proximal or touches said second touch terminal.

117. The capacitive responsive electronic switching circuit as defined in claim 105, wherein the detector circuit comprises a plurality of touch circuits, and wherein the microcontroller selectively provides the signal output frequencies to the closely spaced array of input touch terminals of the keypad via the plurality of touch circuits.

* * * * *

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90/013,106	12/24/2013	5796183	NAR-5796183RX2	9188

25962 7590 06/11/2014

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EXAMINER	
TRAN, HENRY N	
ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
06/11/2014	PAPER

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

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

Notice of Intent to Issue Ex Parte Reexamination Certificate	Control No.	Patent Under Reexamination	
	90/013,106	5796183	
	Examiner	Art Unit	AIA (First Inventor to File) Status
	HENRY N. TRAN	3992	No

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

1. ☒ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of
   (a) ☒ Patent owner's communication(s) filed: *07 May 2014*.
   (b) ☐ Patent owner's failure to file an appropriate timely response to the Office action mailed: _____.
   (c) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
   (d) ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated _____
   (e) ☐ Other: _____.
2. The Reexamination Certificate will indicate the following:
   (a) Change in the Specification: ☐ Yes ☒ No
   (b) Change in the Drawing(s): ☐ Yes ☒ No
   (c) Status of the Claim(s):
      (1) Patent claim(s) confirmed: _____.
      (2) Patent claim(s) amended (including dependent on amended claim(s)): _____
      (3) Patent claim(s) canceled: *18,27 and 35*.
      (4) Newly presented claim(s) patentable: 40-117.
      (5) Newly presented canceled claims: _____.
      (6) Patent claim(s) ☐ previously ☐ currently disclaimed: _____
      (7) Patent claim(s) not subject to reexamination: 1-17,19-26,28-34 and 36-39.
3. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
4. ☒ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
5. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).
6. ☐ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).
7. ☐ The drawing correction request filed on _____ is: ☐ approved ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All b)☐ Some* c)☐ None of the certified copies have
   ☐ been received.
   ☐ not been received.
   ☐ been filed in Application No. _____.
   ☐ been filed in reexamination Control No. _____.
   ☐ been received by the International Bureau in PCT Application No. _____.

   * Certified copies not received: _____.
9. ☐ Note attached Examiner's Amendment.
10. ☐ Note attached Interview Summary (PTO-474).
11. ☐ Other: _____.

All correspondence relating to this reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

	/HENRY N TRAN/ Primary Examiner, Art Unit 3992

cc: Requester (if third party requester)

The present application is being examined under the pre-AIA first to invent provisions.

NOTICE OF INTENT TO ISSUE *EX PARTE* REEXAMINATION CERTIFICATE

INTRODUCTION

1. This Notice of Intent to Issue *Ex Parte* Reexamination Certificate (NIRC) action concerns the *Ex Parte* Reexamination Request (hereinafter "the Request") filed by patent owner on December 24, 2013 for the *Ex Parte* Reexamination Certificate, the U.S. Patent No. 5,786,183 C1, issued on April 29, 2013 to Hourmand et al. (hereinafter "the '183 patent"); and it is responsive to the patent owner's response filed on May 7, 2014 (hereinafter "the response"). The response has been entered. Claims 40-117 are subject to this reexamination; and they are found patentable and/or confirmed.

RESPONSE TO THE RESPONSE

2. Patent owner's proposed amendment to the claims, see pages 2-14, filed with the response is in compliance with 37 CFR 1.530(d)-(j), and it has been entered. Claims 18, 27, and 35 are canceled; claims 40, 41, 56, 66, 67, 71, and 95 of the previously added new claims 40-105 are amended; and claims 106-117 are newly added. Claims 1-17, 19-26, 28-34, and 36-39 are not subject to reexamination. Thus, only claims 40-117 are subject to this reexamination.

3. Patent owner's arguments, see pages 15-141, filed with the response, with respect to the claim rejections under 35 U.S.C. § 305, the prior art references of Boie, Gerpheide, Lee, and Casio, and the supports for new claims 40-117, have been fully considered and are persuasive. The

rejection of claims 18, 27, 40-44, 56-71, and 95-105 under 35 U.S.C. § 305 as recited in the prior Office action, see pages 9-11, mailed on March 27, 2014 has been overcome due to the amendment to the claims, and it has been withdrawn.

REFERENCES CITED IN THIS OFFICE ACTION

3. The prior art patents and printed publications (the prior art references) cited in the Request pursuant to C.F.R. § 1.510(b) (3), see the Request page 10, and relied upon are relisted below:

- U.S. Patent No. 5,463,388 issued to Boie et al. on October 31, 1995 ("Boie" or the '388 patent), which was submitted with the request as Exhibit C.
- U.S. Patent No. 5,565,658 issued to Gerpheide et al. on October 15, 1996 ("Gerpheide" or the '658 patent), which was submitted with the request as Exhibit D.
- Casio advertisement entitled "Now... The Invisible Casio Calculator Watch," published in Popular Science by On the Run in 1984 ("Casio"), which was submitted with the request as Exhibit E.
- Lee, thesis entitled "A Fast Multiple-Touch-Sensitive Input Device," and published October 1984 ("Lee"), which was submitted with the IDS filed with the request.

ALLOWABLE SUBJECT MATTER

4. New claims 40-117 are patentable.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

5. The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

Each of the newly added independent claims 45, 56, 72, 84, 95, 106, and 111 identifies the uniquely distinct features that are not taught or suggested by the cited prior art references, either alone or in any reasonable combinations. Specifically,

Regarding independent claim 45, claim 45 is similar to cancelled patent claim 18 but includes the new limitation of "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies directly to a plurality of small sized input touch terminals of a keypad;*".

The combination of Boie, Gerpheide, Lee and/or Casio does not disclose or fairly suggest this limitation. The examiner agrees with the discussion articulated by the patent owner for claim 45; see the 12/24/2013 Amendment filed with the Request at pages 24-25.

Regarding independent claim 56, claim 56 is similar to cancelled patent claim 18 but includes the new limitation of "*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 a keypad, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;*".

The combination of Boie, Gerpheide, Lee and/or Casio does not disclose or fairly suggest this limitation. The examiner agrees with the discussions articulated by the patent owner for claim 56, see the 12/24/2013 Amendment filed with the Request at page 26 and the 5/7/14 Response at pages 16-17.

Regarding independent claim 72, claim 72 is similar to cancelled patent claim 27 but includes the new limitation of "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies directly to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;*" .

The combination of Boie, Gerpheide, Lee and/or Casio does not disclose or fairly suggest this limitation. The examiner agrees with the discussion articulated by the patent owner for claim 72, see the 5/7/14 Response at pages 27-28.

Regarding independent claim 84, claim 84 is similar to cancelled patent claim 27 but includes the new limitation of "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein a peak voltage of the signal output frequencies is greater than a supply voltage;*".

The prior references, Boie, Gerpheide, Lee, and Casio, either alone or in any combination, do not disclose or fairly suggest this limitation. The examiner agrees with the discussions articulated by the patent owner for claim 84, see the 12/24/2013 Amendment filed with the Request at page 26 and the 5/7/14 Response at pages 28-29.

Regarding independent claim 95, claim 95 is similar to cancelled patent claim 27 but includes the new limitation of "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller*

selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;".

The prior references, Boie, Gerpheide, Lee, and Casio, either alone or in any combination, do not disclose or fairly suggest this limitation. The examiner agrees with the discussion articulated by the patent owner for claim 95, see the 5/7/14 Response at pages 17-19.

Regarding independent claim 106, claim 106 is similar to cancelled patent claim 18 but includes the limitation of "*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 a keypad.*"

The prior references, Boie, Gerpheide, Lee, and Casio, either alone or in any combination, do not disclose or fairly suggest this limitation. The examiner agrees with the discussion articulated by the patent owner for claim 106, see the 5/7/14 Response at pages 19-20.

Regarding independent claim 111, claim 111 is similar to cancelled patent claim 27 but includes the limitation of "*a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, and wherein the selectively providing comprises the microcontroller selectively*

providing a signal output frequency to each row of closely spaced array of input touch terminals of a keypad."

The prior references, Boie, Gerpheide, Lee, and Casio, either alone or in any combination, do not disclose or fairly suggest this limitation. The examiner agrees with the discussion articulated by the patent owner for claim 111, see the 5/7/14 Response at page 20.

Regarding dependent claims 46-55, claims 46-55 depend from claim 45 and add further limitations. They are allowable at least by the reason set forth for claim 45.

Regarding dependent claims 57-65, claims 57-65 depend from claim 56 and add further limitations. They are allowable at least by the reason set forth for claim 56.

Regarding dependent claims 73-83, claims 73-83 depend from claim 72 and add further limitations. They are allowable at least by the reason set forth for claim 72.

Regarding dependent claims 85-94, claims 85-94 depend from claim 84 and add further limitations. They are allowable at least by the reason set forth for claim 84.

Regarding dependent claims 96-104, claims 96-104 depend from claim 95 and add further limitations. They are allowable at least by the reason set forth for claim 95.

Regarding dependent claims 40-44 and 107-110, claims 40-44 and 107-110 depend from claim 106 and add further limitations. They are allowable at least by the reason set forth for claim 106.

Regarding dependent claims 66-71 and 112-117, claims 66-71 and 112-117 depend from claim 111 and add further limitations. They are allowable at least by the reason set forth for claim 11.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should

be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

6. Claims 40-117 are renumbered consecutively in compliance with 37 CFR 1.126 and 37 CFR 1.530(g), see MPEP 608.01(j) and MPEP § 2250, as shown in the table below.

▨ Claims renumbered in the same order as presented by applicant				▨ CPA		▨ T.D.		▨ R.1.47							
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		18		35	60	52	109	69	86	86	103	103		
2	2	19	19	36	36	53	53	110	70	87	87	104	104		
3	3	20	20	37	37	54	54	111	71	88	88	95	105		
4	4	21	21	38	38	55	55	71	72	89	89	40	106		
5	5	22	22	39	39	51	56	73	73	90	90	46	107		
6	6	23	23	45	40	52	57	74	74	91	91	47	108		
7	7	24	24	41	41	53	58	75	75	92	92	48	109		
8	8	25	25	42	42	56	59	76	76	93	93	43	110		
9	9	26	26	43	43	57	60	77	77	94	94	105	111		
10	10		27	44	44	58	61	78	78	94	95	112	112		
11	11	28	28	50	45	59	62	79	79	96	96	113	113		
12	12	29	29	51	46	70	63	72	80	97	97	114	114		
13	13	30	30	52	47	64	64	80	81	98	98	115	115		
14	14	31	31	56	48	65	65	81	82	98	98	116	116		
15	15	32	32	57	49	105	66	82	83	100	100	117	117		
16	16	33	33	58	50	107	67	83	84	101	101				
17	17	34	34	59	51	108	68	85	85	102	102				

CONCLUSION

7. Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

8. Litigation Reminder

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '183 patent throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

9. Correspondence and Inquiry as to Office Actions

All correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 2231

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in

accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the data of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry by the patent owner concerning this communication or earlier communications from the Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Henry N Tran/
Patent Reexamination Specialist,
CRU - Art Unit 3992

Conferees:

/Albert Gagliardi/
Patent Reexamination Specialist,
CRU - Art Unit 3992

/SUDHANSHU PATHAK/
Supervisory Patent Examiner, Art Unit 3992

Reexamination	**Application/Control No.** 90013106	**Applicant(s)/Patent Under Reexamination** 5796183
	Certificate Date 04/29/2013	**Certificate Number** 5796183 C2

Requester Correspondence Address: ☒ **Patent Owner** ☐ **Third Party**
SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793

LITIGATION REVIEW ☒	/HT/ (examiner initials)	01/26/2014 (date)
Case Name		Director Initials
1:06cv 1777 - CLOSED		
2:03cv75169 - CLOSED		
1:10cv691 - CLOSED		
2:06cv500 -CLOSED		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
1. NONE	

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

UNITED STATES PATENT AND TRADEMARK OFFICE

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

BIB DATA SHEET

CONFIRMATION NO. 9188

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/013,106	12/24/2013 RULE	307	3992	NAR-5796183RX2

APPLICANTS

INVENTORS

5796183, Residence Not Provided;
NARTRON CORPORATION, REED CITY, MI;

**** CONTINUING DATA ***************************

This application is a REX of 08/601,268 01/31/1996 PAT 5796183

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/HENRY N TRAN/ Examiner's Signature	☐ Initials			~~32~~ 114	~~8~~ 14

ADDRESS

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793
UNITED STATES

TITLE

Capacitive Responsive Electronic Switching Circuit

FILING FEE RECEIVED		
6000	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
307	112,113,116,125,139,140,157	6/2/2014	HT
361	181	6/2/2014	HT

SEARCH NOTES		
Search Notes	Date	Examiner
Review of patented file's prosecution history	03/102014/	HT
Review of patented file's prosecution history	05/30 & 06/02/14	HT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
307	112,113,116,125,139,140,157	6/2/14	HT
361	181	6/2/14	HT

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

CPC		
Symbol	Type	Version

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 78	
/HENRY N TRAN/ Primary Examiner.Art Unit 3992 (Primary Examiner)	06/03/2014 (Date)	O.G. Print Claim(s) 40	O.G. Print Figure 4

U.S. Patent and Trademark Office

Part of Paper No. 20140606

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
307	116	H	0	3	K	17 / 96 (2006.01.01)						
CROSS REFERENCE(S)		H	0	3	K	17 / 94 (2006.01.01)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											
307	125	139	140	112	113							
361	181											

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	78	
/HENRY N TRAN/ Primary Examiner.Art Unit 3992	06/03/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	40	4

U.S. Patent and Trademark Office

Part of Paper No. 20140606

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
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	Examiner	Art Unit
	HENRY N TRAN	3992

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 78	
/HENRY N TRAN/ Primary Examiner.Art Unit 3992 (Primary Examiner)	06/03/2014 (Date)	O.G. Print Claim(s) 40	O.G. Print Figure 4

U.S. Patent and Trademark Office

Part of Paper No. 20140606

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
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	35	-	-							
36	36	N	N							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
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☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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37	37	N	N							
38	38	N	N							
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42	42	✓	=							
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57	49	=	=							
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108	68	✓	=							
109	69	✓	=							
110	70	✓	=							
111	71	✓	=							
71	72	=	=							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
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78	78	=	=							
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72	80	=	=							
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81	82	=	=							
82	83	=	=							
83	84	=	=							
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104	104	✓	=							
95	105	✓	=							
40	106		=							
46	107		=							
47	108		=							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
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	HENRY N TRAN	3992

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=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014	06/03/2014							
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49	110		=							
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113	113		=							
114	114		=							
115	115		=							
116	116		=							
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No.:	5,796,183 B1	§	Docket No.:	5796183RX2
Issued:	August 18, 1998	§	Inventors:	Hourmand et al.
Filed:	January 31, 1996	§	Patent Owner:	UUSI, LLC
Control No.	TBD	§	Examiner:	TBD

For: Capacitive Responsive Electronic Switching Circuit

Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION

Dear Sir:

Patent Owner UUSI, LLC respectfully submits the following amendments and remarks in response to the Examiner's Office Action dated March 27, 2014. The Patent Owner respectfully requests the following amendments and remarks be entered and respectfully requests reconsideration of claims 40-117.

In the Claims:

18. (Canceled)

27. (Canceled)

35. (Canceled)

40. (New – Once Amended) The capacitive responsive electronic switching circuit as defined in claim 106, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad has a same Hertz value.

41. (New – Once Amended) The capacitive responsive electronic switching circuit as defined in claim 106, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad is selected from a plurality of Hertz values.

42. (New) The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

43. (New) The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

44. (New) The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

45. (New) 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 directly to a plurality of small sized input touch terminals of a 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.

46. (New) The capacitive responsive electronic switching circuit as defined in claim 45, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

47. (New) The capacitive responsive electronic switching circuit as defined in claim 45, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

48. (New) The capacitive responsive electronic switching circuit as defined in claim 45, wherein the signal output frequencies have a same Hertz value.

49. (New) The capacitive responsive electronic switching circuit as defined in claim 45, wherein each signal output frequency is selected from a plurality of Hertz values.

50. (New) The capacitive responsive electronic switching circuit as defined in claim 49, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

51. (New) The capacitive responsive electronic switching circuit as defined in claim 49, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

52. (New) The capacitive responsive electronic switching circuit as defined in claim 49, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

53. (New) The capacitive responsive electronic switching circuit as defined in claim 45, wherein a peak voltage of the signal output frequencies is greater than a supply voltage.

54. (New) The capacitive responsive electronic switching circuit as defined in claim 53, wherein the supply voltage is a battery supply voltage.

55. (New) The capacitive responsive electronic switching circuit as defined in claim 53, wherein the supply voltage is a voltage regulator supply voltage.

56. (New – Once Amended) 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, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;

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.

57. (New) The capacitive responsive electronic switching circuit as defined in claim 56, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

58. (New) The capacitive responsive electronic switching circuit as defined in claim 56, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

59. (New) The capacitive responsive electronic switching circuit as defined in claim 56, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad has a same Hertz value.

60. (New) The capacitive responsive electronic switching circuit as defined in claim 56, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad is selected from a plurality of Hertz values.

61. (New) The capacitive responsive electronic switching circuit as defined in claim 60, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

62. (New) The capacitive responsive electronic switching circuit as defined in claim 60, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

63. (New) The capacitive responsive electronic switching circuit as defined in claim 60, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

64. (New) The capacitive responsive electronic switching circuit as defined in claim 56, wherein the supply voltage is a battery supply voltage.

65. (New) The capacitive responsive electronic switching circuit as defined in claim 56, wherein the supply voltage is a voltage regulator supply voltage.

66. (New – Once Amended) The capacitive responsive electronic switching circuit as defined in claim 111, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad has a same Hertz value.

67. (New – Once Amended) The capacitive responsive electronic switching circuit as defined in claim 111, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad is selected from a plurality of Hertz values.

68. (New) The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

69. (New) The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

70. (New) The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

71. (New – Once Amended) The capacitive responsive electronic switching circuit as defined in claim 111, wherein the detector circuit is configured to inhibit the control output

signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

72. (New) A capacitive responsive electronic switching circuit for a controlled keypad device 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 directly to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

73. (New) The capacitive responsive electronic switching circuit as defined in claim 72, wherein the signal output frequencies have a same Hertz value.

74. (New) The capacitive responsive electronic switching circuit as defined in claim 72, wherein each signal output frequency is selected from a plurality of Hertz values.

75. (New) The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

76. (New) The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

77. (New) The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

78. (New) The capacitive responsive electronic switching circuit as defined in claim 72, wherein said detector circuit is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.

79. (New) The capacitive responsive electronic switching circuit as defined in claim 72, further comprising an indicator for indicating the detector circuit has determined that the operator is proximal or touches said second touch terminal.

80. (New) The capacitive responsive electronic switching circuit as defined in claim 72, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

81. (New) The capacitive responsive electronic switching circuit as defined in claim 72, wherein a peak voltage of the signal output frequencies is greater than a supply voltage.

82. (New) The capacitive responsive electronic switching circuit as defined in claim 81, wherein the supply voltage is a battery supply voltage.

83. (New) The capacitive responsive electronic switching circuit as defined in claim 81, wherein the supply voltage is a voltage regulator supply voltage.

84. (New) A capacitive responsive electronic switching circuit for a controlled keypad device 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 closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein

a peak voltage of the signal output frequencies is greater than a supply voltage;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

85. (New) The capacitive responsive electronic switching circuit as defined in claim 84, wherein the signal output frequencies have a same Hertz value.

86. (New) The capacitive responsive electronic switching circuit as defined in claim 84, wherein each signal output frequency is selected from a plurality of Hertz values.

87. (New) The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

88. (New) The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

89. (New) The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

90. (New) The capacitive responsive electronic switching circuit as defined in claim 84, wherein the supply voltage is a battery supply voltage.

91. (New) The capacitive responsive electronic switching circuit as defined in claim 84, wherein the supply voltage is a voltage regulator supply voltage.

92. (New) The capacitive responsive electronic switching circuit as defined in claim 84, wherein said detector circuit is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.

93. (New) The capacitive responsive electronic switching circuit as defined in claim 84, further comprising an indicator for indicating the detector circuit has determined that the operator is proximal or touches said second touch terminal.

94. (New) The capacitive responsive electronic switching circuit as defined in claim 84, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

95. (New – Once Amended) A capacitive responsive electronic switching circuit for a controlled keypad device 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 closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad, the input touch terminals comprising first and second input touch terminals, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad

device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

96. (New) The capacitive responsive electronic switching circuit as defined in claim 95, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad has a same Hertz value.

97. (New) The capacitive responsive electronic switching circuit as defined in claim 95, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad is selected from a plurality of Hertz values.

98. (New) The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.

99. (New) The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.

100. (New) The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.

101. (New) The capacitive responsive electronic switching circuit as defined in claim 95, wherein the supply voltage is a battery supply voltage.

102. (New) The capacitive responsive electronic switching circuit as defined in claim 95, wherein the supply voltage is a voltage regulator supply voltage.

103. (New) The capacitive responsive electronic switching circuit as defined in claim 95, wherein said detector circuit is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.

104. (New) The capacitive responsive electronic switching circuit as defined in claim 95, further comprising an indicator for indicating the detector circuit has determined that the operator is proximal or touches said second touch terminal.

105. (New) The capacitive responsive electronic switching circuit as defined in claim 95, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

106. (New) 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.

107. (New) The capacitive responsive switching circuit as defined in claim 106, wherein said oscillator provides a periodic output signal having a frequency of 800 kHz or greater.

108. (New) The capacitive responsive electronic switching circuit as defined in claim 106, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

109. (New) The capacitive responsive electronic switching circuit as defined in claim 106, wherein the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground is compared to a second threshold level to generate the control output signal.

110. (New) The capacitive responsive electronic switching circuit as defined in claim 106, wherein the detector circuit comprises a plurality of touch circuits, and wherein the microcontroller selectively provides the signal output frequencies to the plurality of small sized input touch terminals of the keypad via the plurality of touch circuits.

111. (New) A capacitive responsive electronic switching circuit for a controlled keypad device 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 closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad;

the first and second input touch terminals defining areas for an operator to provide an input 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 first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.

112. (New) The capacitive responsive electronic switching circuit as defined in claim 111, wherein said first and second touch terminals are adapted to be mounted on different surfaces of the controlled keypad device.

113. (New) The capacitive responsive electronic switching circuit as defined in claim 111, wherein said first and second touch terminals are adapted to be mounted on non-parallel planar surfaces of the controlled keypad device.

114. (New) The capacitive responsive electronic switching circuit as defined in claim 111, wherein said first and second touch terminals are adapted to be mounted on perpendicular planar surfaces of the controlled keypad device.

115. (New) The capacitive responsive electronic switching circuit as defined in claim 111 and further including an indicator for indicating when said detector circuit determines that the operator is proximal or touches said first touch terminal.

116. (New) The capacitive responsive electronic switching circuit as defined in claim 111 and further including an indicator for indicating when said detector circuit determines that the operator is proximal or touches said second touch terminal.

117. (New) The capacitive responsive electronic switching circuit as defined in claim 111, wherein the detector circuit comprises a plurality of touch circuits, and wherein the microcontroller selectively provides the signal output frequencies to the closely spaced array of input touch terminals of the keypad via the plurality of touch circuits.

REMARKS

Claims 1-17, 19-26, 28-34, and 36-39 are unamended with respect to the first Ex Parte Reexamination Certificate No. 5,796,183 C1 issued April 29, 2013. Claims 18, 27, and 35 are canceled herein. Claims 40-105 were previously added, and claims 106-117 are newly added by this amendment. The present amendment neither enlarges the scope of the claims of the patent nor introduces new matter.

Allowance of Claims

The Patent Owner acknowledges allowance of claims 45-55 and 72-94.

Claim Rejections under 35 U.S.C. § 305

Claims 18, 27, 40-44, 56-71, and 95-105 were rejected under 35 U.S.C. § 305 as enlarging the scope of claims 18 and 27 of the patent being reexamined. The Patent Owner respectfully submits that the amendments made herein overcome these rejections. In particular, the amendments to each independent claim restore the amended clause to its original form, and add the new claim language as a separate clause, so that the original clause retains its original scope. The Patent Owner further provides below a discussion of the newly-amended claims with respect to the cited prior art references.

Independent Claim 18

Independent claim 18 has been canceled and rewritten as new claim 106 per the Examiner's suggestion in Section 5 of the Office Action. Dependent claims 40-44 now depend from new claim 106. Likewise, dependent claims 107-109 – corresponding to claims 19, 33, and 34 – have been added and depend from claim 106. Each of these claims is allowable at least for the reasons discussed below with respect to claim 106.

Independent Claim 27

Independent claim 27 has been canceled and rewritten as new claim 111 per the Examiner's suggestion in Section 5 of the Office Action. Dependent claims 66-71 now depend from new claim 111. Likewise, dependent claims 112-117 – corresponding to claims 28-32 and 36 – have been added and depend from claim 111. Each of these claims is allowable at least for the reasons discussed below with respect to claim 111.

Independent Claim 56

Claim 56 has been amended to restore the previously amended clause to its original form and to add the new claim language as a separate clause, so that the original clause retains its original scope. More specifically, independent claim 56 recites "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, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage." None of the cited references, alone or in combination, teaches or suggests these limitations.

Rather, Boie discloses that "RF oscillator 408 provides an RF signal, for example, 100 kilohertz, to circuits 401, synchronous detector and filter 404 via inverter 410, and guard plane 411." Boie, col. 3:67-col. 4:2. Boie further discloses that "[t]he effects of electrode-to-electrode capacitances, wiring capacitances and other extraneous capacitances are minimized by driving all electrodes and guard plane 411 in unison with the same RF signal from RF oscillator 408." *Id.* at col. 4:58-60; *see id.* at Fig. 4. Thus, Boie discloses driving the electrodes of electrode array 100 and guard plane 411 with a single RF signal. As acknowledged by the Examiner, "Boie does not teach or suggest the microcontroller is used to selectively provid[e] signal output frequencies to input touch terminals of a keypad." Office Action, p. 15. Therefore, Boie does not teach or suggest a microcontroller providing signal output frequencies to these components, wherein the microcontroller selectively provides a signal output frequency to each row of the plurality of small sized input touch terminals of the keypad.

Neither Gerpheide nor Lee cures the deficiencies of Boie. While Gerpheide teaches a reference frequency generator 16 "observes position signals to evaluate the extent of interference at some reference frequency" and that in "the event that substantial interference is detected, the generator 16 selects a different frequency for further measurements," Gerpheide does not teach that a microcontroller provides these frequencies selectively to each row of the input touch terminals. *See, e.g., id.* at col. 8:22-30; Fig. 7. Rather, in Gerpheide, the "reference frequency signal is supplied to unit 14 via an AND gate 72…. The AND gate output feeds through inverter 74 and noninverting buffer 76 to wires RP and RN respectively which are part of a capacitive measurement element 78." *See id.* at col. 6:19-26; Fig. 4. Thus, the output of AND gate 72 is

sent to every row of electrode array 12 via one of inverter 74 and noninverting buffer 76 at the same time. Therefore, Gerpheide does not disclose a microcontroller selectively providing a signal output frequency to each row of a plurality of small sized input touch terminals of a keypad.

Likewise, Lee does not teach or suggest that a microcontroller selectively provides a signal output frequency to each row of a plurality of small sized input touch terminals of a keypad. The Examiner has also acknowledged Lee does not disclose this limitation. *See, e.g.*, Office Action, p. 16 ("Lee does not teach or suggest sending signal output frequencies to the selected rows."). Rather, Lee teaches the CPU selects or deselects row(s) by sending binary signals to the selected row(s). *See, e.g., id.* at Figs. 3.1(a), 3.1(b), and 3.4. Therefore, Lee does not teach or suggest a microcontroller selectively providing a signal output frequency to each row of a plurality of small sized input touch terminals of a keypad.

Moreover, none of the cited references teaches or suggests wherein a peak voltage of the signal output frequencies is greater than a supply voltage.

Accordingly, Boie in combination with Gerpheide and/or Lee does not disclose all of the elements of claim 56, and therefore claim 56 is patentable over these references.

New claims 57-65 depend from claim 56 and add further limitations. The Patent Owner respectfully submits that these dependent claims are allowable by reason of depending from an allowable claim as well as for adding new limitations.

Independent Claim 95

Claim 95 has been amended to restore the previously amended clause to its original form and to add the new claim language as a separate clause, so that the original clause retains its original scope. More specifically, independent claim 95 recites "a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad, the input touch terminals comprising first and second input touch terminals, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage." None of the cited references, alone or in combination, teaches or suggests these limitations.

Rather, Boie discloses that "RF oscillator 408 provides an RF signal, for example, 100 kilohertz, to circuits 401, synchronous detector and filter 404 via inverter 410, and guard plane 411." Boie, col. 3:67-col. 4:2. Boie further discloses that "[t]he effects of electrode-to-electrode capacitances, wiring capacitances and other extraneous capacitances are minimized by driving all electrodes and guard plane 411 in unison with the same RF signal from RF oscillator 408." *Id.* at col. 4:58-60; *see id.* at Fig. 4. Thus Boie discloses driving the electrodes of electrode array 100 and guard plane 411 with a single RF signal. As acknowledged by the Examiner, "Boie does not teach or suggest the microcontroller is used to selectively provid[e] signal output frequencies to input touch terminals of a keypad." Office Action, p. 15. Therefore, Boie does not teach or suggest the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad, the input touch terminals comprising first and second input touch terminals.

None of Gerpheide, Lee or Casio cures the deficiencies of Boie. While Gerpheide teaches a reference frequency generator 16 "observes position signals to evaluate the extent of interference at some reference frequency" and that in "the event that substantial interference is detected, the generator 16 selects a different frequency for further measurements," Gerpheide does not teach that a microcontroller provides these frequencies selectively to each row of the input touch terminals. *See, e.g., id.* at col. 8:22-30; Fig. 7. Rather, in Gerpheide, the "reference frequency signal is supplied to unit 14 via an AND gate 72.... The AND gate output feeds through inverter 74 and noninverting buffer 76 to wires RP and RN respectively which are part of a capacitive measurement element 78." *See id.* at col. 6:19-26; Fig. 4. Thus, the output of AND gate 72 is sent to every row of electrode array 12 via one of inverter 74 and noninverting buffer 76 at the same time. Therefore, Gerpheide does not disclose a signal output frequency is selectively provided to each row of a plurality of small sized input touch terminals of a keypad.

Likewise, Lee does not teach or suggest that a microcontroller selectively provides a signal output frequency to each row of a plurality of small sized input touch terminals of a keypad. The Examiner has also acknowledged Lee does not disclose this limitation. *See, e.g.*, Office Action, p. 16 ("Lee does not teach or suggest sending signal output frequencies to the selected rows."). Rather, Lee teaches the CPU selects or deselects row(s) by sending binary

signals to the selected row(s). *See, e.g., id.* at Figs. 3.1(a), 3.1(b), and 3.4. In contrast, claim 95 recites selectively providing a signal output frequency to each row of the touch terminals. Therefore, Lee does not teach or suggest a microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad.

Casio discloses input touch terminals comprising first and second input touch terminals, *see, e.g.*, Figure, but fails to provide any teaching with respect to the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad.

Moreover, none of the cited references teaches or suggests wherein a peak voltage of the signal output frequencies is greater than a supply voltage.

Accordingly, Boie in combination with Gerpheide, Lee and/or Casio does not disclose all of the elements of claim 95, and therefore claim 95 is patentable over these references.

New claims 96-105 depend from claim 95 and add further limitations. The Patent Owner respectfully submits that these dependent claims are allowable by reason of depending from an allowable claim as well as for adding new limitations.

Independent Claim 106

As discussed above, independent claim 18 has been canceled and rewritten as new claim 106 per the Examiner's suggestion in Section 5 of the Office Action. Claim 106 also restores the previously amended clause of claim 18 to its original form and adds the new claim language as a separate clause, so that the original clause retains its original scope. More specifically, independent claim 106 recites "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." None of the cited references, alone or in combination, teaches or suggests these limitations.

As discussed above with respect to claim 56, the cited references, either alone or in combination, fail to teach or suggest 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. For at least these same reasons, claim 106 is allowable over the cited art.

New claims 40-44 and 107-110 depend from claim 106 and add further limitations. The Patent Owner respectfully submits that these dependent claims are allowable by reason of depending from an allowable claim as well as for adding new limitations.

Independent Claim 111

As discussed above, independent claim 27 has been canceled and rewritten as new claim 111 per the Examiner's suggestion in Section 5 of the Office Action. Claim 111 also restores the previously amended clause of claim 27 to its original form and adds the new claim language as a separate clause, so that the original clause retains its original scope. More specifically, independent claim 111 recites "a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad." None of the cited references, alone or in combination, teaches or suggests these limitations.

As discussed above with respect to claim 95, the cited references, either alone or in combination, fail to teach or suggest the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad.

Accordingly, Boie in combination with Gerpheide, Lee and/or Casio does not disclose all of the elements of claim 111, and therefore claim 111 is patentable over these references.

New claims 66-71 and 112-117 depend from claim 111 and add further limitations. The Patent Owner respectfully submits that these dependent claims are allowable by reason of depending from an allowable claim as well as for adding new limitations.

Support for New Claims

Support for each of the new claims 40-117 may be found throughout the `183 Patent, and particular support may be found, for example, as set forth in the charts below. These charts follow the same organizational structure as those provided in the Amendment Accompanying Request for Ex Parte Reexamination under 35 U.S.C. §§ 302-307 filed on December 24, 2013

A. Canceled Claim 18

Claim 18 has been canceled herein, thus no chart of claim support is provided.

B. Canceled Claim 27

Claim 27 has been canceled herein, thus no chart of claim support is provided.

C. New Claim 40

`183 Patent Claim Language	**`183 Patent Support**
40. The capacitive responsive electronic switching circuit as defined in claim 106, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad has a same Hertz value.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This

`183 Patent Claim Language	`183 Patent Support
	allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability

`183 Patent Claim Language	`183 Patent Support
	requirements of a given application." Col. 14:65 – Col. 15:1.

D. New Claim 41

`183 Patent Claim Language	`183 Patent Support
41. The capacitive responsive electronic switching circuit as defined in claim 106, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad is selected from a plurality of Hertz values.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at

`183 Patent Claim Language	`183 Patent Support
	10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

E. New Claim 42

`183 Patent Claim Language	`183 Patent Support
42. The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater	See Figure 11. The `183 Patent discloses "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

`183 Patent Claim Language	`183 Patent Support
than 50 kHz.	surface contamination from materials such a [sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of

`183 Patent Claim Language	`183 Patent Support
	frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

F. New Claim 43

`183 Patent Claim Language	`183 Patent Support
43. The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate

`183 Patent Claim Language	`183 Patent Support
	between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to

`183 Patent Claim Language	`183 Patent Support
	output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

G. New Claim 44

`183 Patent Claim Language	`183 Patent Support
44. The capacitive responsive electronic switching circuit as defined in claim 41, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.	See Fig. 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges

`183 Patent Claim Language	`183 Patent Support
	between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

H. New Claim 45

For ease of analysis, new independent claim 45 is shown below with pseudo-amendments illustrating the differences between new claim 45 and claim 18 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
45. A capacitive responsive electronic switching circuit comprising:	See Claim 18.

`183 Patent Claim Language	`183 Patent Support
an oscillator providing a periodic output signal having a predefined frequency;	See Claim 18.
a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies directly to a plurality of small sized input touch terminals of a keypad;	See Figures 4, 11; and Claims 8, 12, 16. The `183 Patent discloses "The touch detection circuit of the present invention features operation at frequencies at or above 50kHz and preferably at or above 800 kHz to minimize the effects of surface contamination from materials such a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3.  The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via

`183 Patent Claim Language	`183 Patent Support
	line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6. Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator 200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad 450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 12:6-33. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25.  The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components

`183 Patent Claim Language	`183 Patent Support
	similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4). Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
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	See Claim 18.
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	See Claim 18.

`183 Patent Claim Language	`183 Patent Support
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.	See Claim 18.

I. New Claim 46

For ease of analysis, new dependent claim 46 is shown below with pseudo-amendments illustrating the differences between new claim 46 and claim 33 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
46. The capacitive responsive electronic switching circuit as defined in claim 45, ~~further comprising~~ wherein ~~said detector circuit compares~~ the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground ~~when proximate to the input touch terminal~~ is compared to a second threshold level to generate the control output signal.	See Claims 1, 18, 28, and 33. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "Touch circuit 400 senses capacitance from a touch pad 450 via line

`183 Patent Claim Language	`183 Patent Support
	451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8." Col. 12:24-28. The `183 Patent discloses "As can be seen, at 1 kHz, the capacitive impedance of the glass is much greater than the nominal 1 MΩ of the water bridge across the pads. As a result, at 1 kHz, there would be little difference in the impedance paths to ground of the two adjacent pads when either is touched. This would result in the voltage on both pads being pulled towards ground by comparable amounts. Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Col. 10:54 – Col. 11:9. The `183 Patent discloses "As stated above, the operator's body includes a capacitance to ground, which may range in a typical person from between 20 to 300 pF. The base terminal of transistor 410 is coupled to it's [sic] emitter by resistor 412 such that unless capacitance is

`183 Patent Claim Language	`183 Patent Support
	present by the user touching the touch pad 450, transistor 410 will not be forward biased and will not conduct. Thus, when touch pad 450 is not touched, the output signal at the collector terminal of transistor 410 and across pulse stretcher circuit 417 will be zero volts. When, however, a person touches the touch pad 450, that person's body capacitance to ground couples the base of transistor 410 to ground 103 through resistor 413, thereby forward biasing transistor 410 into conduction. This charges capacitor 418 providing a positive DC voltage with respect to the line 301 and causes the output of the Schmitt trigger 420 to go low. Diode 414 is coupled across the base to emitter junction of transistor 410 to clamp the base emitter reverse bias voltage to –0.7V and also reduce the forward recovery and turn-on time. Col. 15:29-47.

J. New Claim 47

For ease of analysis, new dependent claim 47 is shown below with pseudo-amendments illustrating the differences between new claim 47 and claim 34 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
47. The capacitive responsive electronic switching circuit as defined in claim 45, ~~further comprising~~ wherein ~~said detector circuit compares~~ the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground ~~when proximate to the input touch terminal~~ is compared to a second threshold level to generate the control output signal.	See Claims 1, 18, 28, and 34. The `183 Patent discloses "Another method for implementing capacitive touch switches relies on the change in capacitive coupling between a touch terminal and ground. Systems utilizing such a method are described in U.S. Pat. No. 4,758,735 and U.S. Pat. No. 5,087,825. With this methodology the detection circuit consists of an oscillator (or AC line voltage derivative) providing a signal to a touch terminal whose voltage is then monitored by a detector. The touch terminal is driven in electrical series with other components that function in part as a charge pump. The touch of an operator then provides a capacitive short to ground via the operator's own body capacitance that lowers the

`183 Patent Claim Language	`183 Patent Support
	amplitude of oscillator voltage seen at the touch terminal." Col. 3:44-56. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8." Col. 12:24-28. The `183 Patent discloses "As can be seen, at 1 kHz, the capacitive impedance of the glass is much greater than the nominal 1 MΩ of the water bridge across the pads. As a result, at 1 kHz, there would be little difference in the impedance paths to ground of the two adjacent pads when either is touched. This would result in the voltage on both pads being pulled towards ground by comparable amounts. Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads

`183 Patent Claim Language	`183 Patent Support
	by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Col. 10:54 – Col. 11:9. The `183 Patent discloses "As stated above, the operator's body includes a capacitance to ground, which may range in a typical person from between 20 to 300 pF. The base terminal of transistor 410 is coupled to it's [sic] emitter by resistor 412 such that unless capacitance is present by the user touching the touch pad 450, transistor 410 will not be forward biased and will not conduct. Thus, when touch pad 450 is not touched, the output signal at the collector terminal of transistor 410 and across pulse stretcher circuit 417 will be zero volts. When, however, a person touches the touch pad 450, that person's body capacitance to ground couples the base of transistor 410 to ground 103 through resistor 413, thereby forward biasing transistor 410 into conduction. This charges capacitor 418 providing a positive DC voltage with respect to the line 301 and causes the output of the Schmitt trigger 420 to go low. Diode 414 is coupled across the base to emitter junction of transistor 410 to clamp the base emitter reverse bias voltage to –0.7V and also reduce the forward recovery and turn-on time. Col. 15:29-47.

K. New Claim 48

`183 Patent Claim Language	`183 Patent Support
48. The capacitive responsive electronic switching circuit as defined in claim 45, wherein the signal output	See Figure 11. The `183 Patent discloses "The touch detection

`183 Patent Claim Language	`183 Patent Support
frequencies have a same Hertz value.	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 a [sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance

`183 Patent Claim Language	`183 Patent Support
	paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

L. New Claim 49

`183 Patent Claim Language	`183 Patent Support
49. The capacitive responsive electronic switching circuit as defined in claim 45, wherein each signal output frequency is selected from a plurality of Hertz values.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are

`183 Patent Claim Language	`183 Patent Support
	comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to

`183 Patent Claim Language	`183 Patent Support
	provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

M. New Claim 50

`183 Patent Claim Language	`183 Patent Support
50. The capacitive responsive electronic switching circuit as defined in claim 49, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched

`183 Patent Claim Language	`183 Patent Support
	pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65

`183 Patent Claim Language	`183 Patent Support
	– Col. 15:1.

N. New Claim 51

`183 Patent Claim Language	`183 Patent Support
51. The capacitive responsive electronic switching circuit as defined in claim 49, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass

`183 Patent Claim Language	`183 Patent Support
	becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

O. New Claim 52

`183 Patent Claim Language	`183 Patent Support
52. The capacitive responsive electronic switching circuit as defined in claim 49, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.	See Fig. 11. The `183 Patent discloses "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 a

`183 Patent Claim Language	`183 Patent Support
	[sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however,

`183 Patent Claim Language	`183 Patent Support
	oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

P. New Claim 53

`183 Patent Claim Language	`183 Patent Support
53. The capacitive responsive electronic switching circuit as defined in claim 45, wherein a peak voltage of the signal output frequencies is greater than a supply voltage.	See Figures 4, 5; Claims 27 and 37. The `183 Patent discloses "Having provided a basis for the use of higher frequencies, the basic construction of the electronic switching circuit constructed in accordance with a first embodiment of the present invention is now described with reference to FIG. 4. The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5. Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6." Col. 11:60 – Col. 12:13.

`183 Patent Claim Language	`183 Patent Support
	The `183 Patent discloses "Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s)." Col. 18:43-49. The `183 Patent discloses "A preferred circuit for implementing a voltage regulator 100 is shown in FIG. 5. Voltage regulator 100 preferably includes an AC/DC convertor 110 for generating 29 V to 36 V unregulated DC on line 119. This unregulated DC power is supplied to a 5 V DC regulator 120 and to a 26 V DC regulator 130. AC/DC convertor 110 includes diodes 112, 114, 116, and 118, which rectify the supplied 24 V AC power provided on power lines 101 and 102." Col. 12:50-57; see also Col. 12:57 – Col. 13:31. The `183 Patent discloses "The oscillator circuitry shown in FIG. 6 is very stable over the temperature range of -40° C. to 105° C. The output of the touch switch circuitry drops at a rate of approximately 40 mV/°C. when temperature falls below 0° C. If application requires operation at low temperatures (-40° C.), the following three methods may be used to increase the output of the switch: increase the oscillator's regulated supply voltage, increase the resistance of resistor 416, and use a higher gain transistor 410. All of these methods would increase sensitivity at high temperatures." Col. 16:33-41.

Q. New Claim 54

`183 Patent Claim Language	`183 Patent Support
54. The capacitive responsive	The `183 Patent discloses "It will be apparent to

`183 Patent Claim Language	`183 Patent Support
electronic switching circuit as defined in claim 53, wherein the supply voltage is a battery supply voltage.	those skilled in the art, that various components of voltage regulator 100 may be added or excluded depending upon the source of power available to power the oscillator 200. For example, if the available power is a 110 V AC 60 Hz commercial power line, a transformer may be added to convert the 100 V AC power to 24 V AC. Alternatively, if a DC batter is used, the AC/DC convertor among other components may be eliminated." Col 13:23-31.

R. New Claim 55

`183 Patent Claim Language	`183 Patent Support
55. The capacitive responsive electronic switching circuit as defined in claim 53, wherein the supply voltage is a voltage regulator supply voltage.	Figures 4, 5, 11, and 12. The `183 Patent discloses "The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5." Col. 11:64 – Col. 12:5; see also Col. 12:50 – Col. 13:31.

S. New Claim 56

For ease of analysis, new independent claim 56 is shown below with pseudo-amendments illustrating the differences between new claim 56 and claim 18 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
56. A capacitive responsive electronic switching circuit comprising:	See Claim 18.
an oscillator providing a periodic output signal having a predefined	See Claim 18.

`183 Patent Claim Language	`183 Patent Support
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, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;	See Figures 4, 5, 11; and Claims 8, 12, 16, 18, 27 and 37. The `183 Patent discloses "The touch detection circuit of the present invention features operation at frequencies at or above 50kHz and preferably at or above 800 kHz to minimize the effects of surface contamination from materials such a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3.  The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Having provided a basis for the use of higher frequencies, the basic construction of the electronic switching circuit constructed in accordance with a first embodiment of the present invention is now described with reference to FIG. 4. The electronic switching circuit includes a voltage

`183 Patent Claim Language	`183 Patent Support
	regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5. Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6. Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator 200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad

`183 Patent Claim Language	`183 Patent Support
	450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 11:60 – 12:33. The `183 Patent discloses "A preferred circuit for implementing a voltage regulator 100 is shown in FIG. 5. Voltage regulator 100 preferably includes an AC/DC convertor 110 for generating 29 V to 36 V unregulated DC on line 119. This unregulated DC power is supplied to a 5 V DC regulator 120 and to a 26 V DC regulator 130. AC/DC convertor 110 includes diodes 112, 114, 116, and 118, which rectify the supplied 24 V AC power provided on power lines 101 and 102." Col. 12:50-57; see also Col. 12:57 – Col. 13:31. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25.  The `183 Patent discloses "The oscillator circuitry shown in FIG. 6 is very stable over the temperature range of -40° C. to 105° C. The output of the touch switch circuitry drops at a rate of approximately 40 mV/°C. when temperature falls below 0° C. If application requires operation at low temperatures (-40° C.), the following three methods may be used to increase the output of the switch: increase the oscillator's regulated supply voltage, increase the resistance of resistor 416, and use a higher gain transistor 410. All of these methods would increase sensitivity at high temperatures." Col. 16:33-41. The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components

`183 Patent Claim Language	`183 Patent Support
	similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4). Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
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	See Claim 18.
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	See Claim 18.

`183 Patent Claim Language	`183 Patent Support
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.	See Claim 18.

T. New Claim 57

For ease of analysis, new dependent claim 57 is shown below with pseudo-amendments illustrating the differences between new claim 57 and claim 33 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
57. The capacitive responsive electronic switching circuit as defined in claim 56, ~~further comprising~~ wherein ~~said detector circuit compares~~ the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal on the detector circuit, and wherein the sensed body capacitance change to ground ~~when proximate to the input touch terminal~~ is compared to a second threshold level to generate the control output signal.	See Claims 1, 18, 28, and 33. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57.

`183 Patent Claim Language	`183 Patent Support
	The `183 Patent discloses "Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8." Col. 12:24-28. The `183 Patent discloses "As can be seen, at 1 kHz, the capacitive impedance of the glass is much greater than the nominal 1 MΩ of the water bridge across the pads. As a result, at 1 kHz, there would be little difference in the impedance paths to ground of the two adjacent pads when either is touched. This would result in the voltage on both pads being pulled towards ground by comparable amounts. Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Col. 10:54 – Col. 11:9. The `183 Patent discloses "As stated above, the operator's body includes a capacitance to ground, which may range in a typical person from between 20 to 300 pF. The base terminal

`183 Patent Claim Language	`183 Patent Support
	of transistor 410 is coupled to it's [sic] emitter by resistor 412 such that unless capacitance is present by the user touching the touch pad 450, transistor 410 will not be forward biased and will not conduct. Thus, when touch pad 450 is not touched, the output signal at the collector terminal of transistor 410 and across pulse stretcher circuit 417 will be zero volts. When, however, a person touches the touch pad 450, that person's body capacitance to ground couples the base of transistor 410 to ground 103 through resistor 413, thereby forward biasing transistor 410 into conduction. This charges capacitor 418 providing a positive DC voltage with respect to the line 301 and causes the output of the Schmitt trigger 420 to go low. Diode 414 is coupled across the base to emitter junction of transistor 410 to clamp the base emitter reverse bias voltage to –0.7V and also reduce the forward recovery and turn-on time. Col. 15:29-47.

U. New Claim 58

For ease of analysis, new dependent claim 58 is shown below with pseudo-amendments illustrating the differences between new claim 58 and claim 34 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
58. The capacitive responsive electronic switching circuit as defined in claim 56, ~~further comprising~~ wherein ~~said detector circuit compares~~ the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on the detector circuit, and wherein the sensed body capacitance change to ground ~~when proximate to the input touch terminal~~ is compared to a second threshold level to generate the control output signal.	See Claims 1, 18, 28, and 34. The `183 Patent discloses "Another method for implementing capacitive touch switches relies on the change in capacitive coupling between a touch terminal and ground. Systems utilizing such a method are described in U.S. Pat. No. 4,758,735 and U.S. Pat. No. 5,087,825. With this methodology the detection circuit consists of an oscillator (or AC line voltage derivative) providing a signal to a touch terminal whose voltage is then monitored by a detector. The touch terminal is driven in electrical series with other components that function in part as a charge pump. The touch of an operator then

`183 Patent Claim Language	`183 Patent Support
	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." Col. 3:44-56. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8." Col. 12:24-28. The `183 Patent discloses "As can be seen, at 1 kHz, the capacitive impedance of the glass is much greater than the nominal 1 MΩ of the water bridge across the pads. As a result, at 1 kHz, there would be little difference in the impedance paths to ground of the two adjacent pads when either is touched. This would result in the voltage on both pads being pulled towards ground by comparable amounts. Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low

`183 Patent Claim Language	`183 Patent Support
	detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Col. 10:54 – Col. 11:9. The `183 Patent discloses "As stated above, the operator's body includes a capacitance to ground, which may range in a typical person from between 20 to 300 pF. The base terminal of transistor 410 is coupled to it's [sic] emitter by resistor 412 such that unless capacitance is present by the user touching the touch pad 450, transistor 410 will not be forward biased and will not conduct. Thus, when touch pad 450 is not touched, the output signal at the collector terminal of transistor 410 and across pulse stretcher circuit 417 will be zero volts. When, however, a person touches the touch pad 450, that person's body capacitance to ground couples the base of transistor 410 to ground 103 through resistor 413, thereby forward biasing transistor 410 into conduction. This charges capacitor 418 providing a positive DC voltage with respect to the line 301 and causes the output of the Schmitt trigger 420 to go low. Diode 414 is coupled across the base to emitter junction of transistor 410 to clamp the base emitter reverse bias voltage to –0.7V and also reduce the forward recovery and turn-on time. Col. 15:29-47.

V. New Claim 59

`183 Patent Claim Language	`183 Patent Support
59. The capacitive responsive	See Figure 11.

`183 Patent Claim Language	`183 Patent Support
electronic switching circuit as defined in claim 56, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad has a same Hertz value.	The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies

`183 Patent Claim Language	`183 Patent Support
	as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

W. New Claim 60

`183 Patent Claim Language	`183 Patent Support
60. The capacitive responsive electronic switching circuit as defined in claim 56, wherein each signal output frequency selectively provided to each row of the plurality of small sized input touch terminals of the keypad is selected from a plurality of Hertz values.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that

`183 Patent Claim Language	`183 Patent Support
	of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the

`183 Patent Claim Language	`183 Patent Support
	resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

X. New Claim 61

`183 Patent Claim Language	`183 Patent Support
61. The capacitive responsive electronic switching circuit as defined in claim 60, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10

`183 Patent Claim Language	`183 Patent Support
	to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily

`183 Patent Claim Language	`183 Patent Support
	vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

Y. New Claim 62

`183 Patent Claim Language	`183 Patent Support
62. The capacitive responsive electronic switching circuit as defined in claim 60, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at

`183 Patent Claim Language	`183 Patent Support
	or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

Z. New Claim 63

`183 Patent Claim Language	`183 Patent Support
63. The capacitive responsive electronic switching circuit as defined in claim 60, wherein the plurality of Hertz values comprises Hertz values greater	See Fig. 11. The `183 Patent discloses "The touch detection circuit of the present invention features operation at frequencies at or above 50 kHz and preferably

`183 Patent Claim Language	`183 Patent Support
than 800 kHz.	at or above 800 kHz to minimize the effects of surface contamination from materials such a [sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to

`183 Patent Claim Language	`183 Patent Support
	provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

AA. New Claim 64

`183 Patent Claim Language	`183 Patent Support
64. The capacitive responsive electronic switching circuit as defined in claim 56, wherein the supply voltage is a battery supply voltage.	The `183 Patent discloses "It will be apparent to those skilled in the art, that various components of voltage regulator 100 may be added or excluded depending upon the source of power available to power the oscillator 200. For example, if the available power is a 110 V AC 60 Hz commercial power line, a transformer may be added to convert the 100 V AC power to 24 V AC. Alternatively, if a DC batter is used, the AC/DC convertor among other components may be eliminated." Col 13:23-31.

BB. New Claim 65

`183 Patent Claim Language	`183 Patent Support
65. The capacitive responsive electronic switching circuit as defined in claim 56, wherein the supply voltage is a voltage regulator supply voltage.	Figures 4, 5, 11, and 12. The `183 Patent discloses "The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200

`183 Patent Claim Language	`183 Patent Support
	with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5." Col. 11:64 – Col. 12:5; see also Col. 12:50 – Col. 13:31.

CC. New Claim 66

`183 Patent Claim Language	`183 Patent Support
66. The capacitive responsive electronic switching circuit as defined in claim 111, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad has a same Hertz value.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift

`183 Patent Claim Language	`183 Patent Support
	and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

DD. New Claim 67

`183 Patent Claim Language	`183 Patent Support
67. The capacitive responsive electronic switching circuit as defined in claim 111, wherein each signal output frequency selectively provided to each	See Figure 11. The `183 Patent discloses "The touch detection circuit of the present invention features operation

`183 Patent Claim Language	`183 Patent Support
row of the closely spaced array of input touch terminals of the keypad is selected from a plurality of Hertz values.	at frequencies at or above 50 kHz and preferably at or above 800 kHz to minimize the effects of surface contamination from materials such a [sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough

`183 Patent Claim Language	`183 Patent Support
	to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

EE. New Claim 68

`183 Patent Claim Language	`183 Patent Support
68. The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator

`183 Patent Claim Language	`183 Patent Support
	frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output

`183 Patent Claim Language	`183 Patent Support
	frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

FF. New Claim 69

`183 Patent Claim Language	`183 Patent Support
69. The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad

`183 Patent Claim Language	`183 Patent Support
	resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

GG. New Claim 70

`183 Patent Claim Language	`183 Patent Support
70. The capacitive responsive electronic switching circuit as defined in claim 67, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.	See Fig. 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or

`183 Patent Claim Language	`183 Patent Support
	covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

HH. New Claim 71

`183 Patent Claim Language	`183 Patent Support
71. The capacitive responsive electronic switching circuit as defined in claim 111, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Figures 19, 20A-C; and Claims 28 and 35. The `183 Patent discloses "In another embodiment a method to prevent inadvertent so actuations is to require a multi-step process. Referring to FIG. 19, a device is shown having a first palm button 2201, a second palm button 2202, and an indicator light 2205. Palm button 2201 has to be activated first and then button 2202 has to be activated within a 2 second time window before a desired actuation can occur." Col. 22:49-55. The `183 Patent discloses "In a variation of the multi-step process, two touch plates within a housing (one vertical and one horizontal) are used to provide a two-step turn-on. Referring to FIGS. 20A-C, the first step to actuate the output relay 2310, is initiated when the operator inserts his hands and touches the vertical touch sensor

`183 Patent Claim Language	`183 Patent Support
	2301 with the dorsal side of the hands. A yellow LED 2304 on top of the device show the successful completion of the first step. The second step is to flip the hand over and touch the horizontal touch sensor 2302 with the palmar side of the hand. A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310. The flipping action of the hand in the second step causes the forearm muscles to flex, thereby reducing stiffness and fatigue. Also, the hands, and arms can rest on the run bar until the machine cycle is complete. The second step of the two-step turn-on must occur within some predetermined time (for example 2 seconds) after the release of vertical touch sensor or the first step must be repeated." Col. 23:19-36.

II. New Claim 72

For ease of analysis, new independent claim 72 is shown below with pseudo-amendments illustrating the differences between new claim 72 and claim 27 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
72. A capacitive responsive electronic switching circuit for a controlled keypad device comprising:	See Claim 27.
an oscillator providing a periodic output signal having a predefined frequency;	See Claim 27.
a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies <u>directly</u> to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;	See Figures 4, 11; and Claims 8, 12, 16. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally

`183 Patent Claim Language	`183 Patent Support
	very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3.  The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6. Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator

`183 Patent Claim Language	`183 Patent Support
	200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad 450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 12:6-33. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25.  The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4). Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller

`183 Patent Claim Language	`183 Patent Support
	500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
the first and second input touch terminals defining areas for an operator to provide an input by proximity and touch; and	See Claim 27.
a detector circuit coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Claim 27.

JJ. New Claim 73

`183 Patent Claim Language	`183 Patent Support
73. The capacitive responsive	See Figure 11.

`183 Patent Claim Language	`183 Patent Support
electronic switching circuit as defined in claim 72, wherein the signal output frequencies have a same Hertz value.	The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies

`183 Patent Claim Language	`183 Patent Support
	as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

KK. New Claim 74

`183 Patent Claim Language	`183 Patent Support
74. The capacitive responsive electronic switching circuit as defined in claim 72, wherein each signal output frequency is selected from a plurality of Hertz values.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that

`183 Patent Claim Language	`183 Patent Support
	of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the

`183 Patent Claim Language	`183 Patent Support
	resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

LL. New Claim 75

`183 Patent Claim Language	`183 Patent Support
75. The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10

`183 Patent Claim Language	`183 Patent Support
	to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily

`183 Patent Claim Language	`183 Patent Support
	vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

MM. New Claim 76

`183 Patent Claim Language	`183 Patent Support
76. The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at

`183 Patent Claim Language	`183 Patent Support
	or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

NN. New Claim 77

`183 Patent Claim Language	`183 Patent Support
77. The capacitive responsive electronic switching circuit as defined in claim 74, wherein the plurality of Hertz values comprises Hertz values greater	See Fig. 11. The `183 Patent discloses "The touch detection circuit of the present invention features operation at frequencies at or above 50 kHz and preferably

`183 Patent Claim Language	`183 Patent Support
than 800 kHz.	at or above 800 kHz to minimize the effects of surface contamination from materials such a [sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to

`183 Patent Claim Language	`183 Patent Support
	provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

OO. New Claim 78

For ease of analysis, new dependent claim 78 is shown below with pseudo-amendments illustrating the differences between new claim 78 and claim 28 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
78. The capacitive responsive electronic switching circuit as defined in claim 72, wherein said detector circuit ~~generates~~ is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.	See Claims 27 and 28.

PP. New Claim 79

For ease of analysis, new dependent claim 79 is shown below with pseudo-amendments illustrating the differences between new claim 79 and claim 36 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
79. The capacitive responsive	See Claims 32 and 36.

`183 Patent Claim Language	`183 Patent Support
electronic switching circuit as defined in claim 72, ~~and~~ further ~~including~~ comprising an indicator for indicating ~~when said~~ the detector circuit ~~determines~~ has determined that the operator is proximal or touches said second touch terminal.	The `183 Patent discloses "The microprocessor also allows the use of visual indicators such as LEDs or annunciators such as a bell or tone generator to confirm the actuation of a given touch switch or switches. This is particularly useful in cases where a sequence of actuations is required before an action occurs. The feedback to the operator provided by a visual or audio indicator activated by the microprocessor in response to intermediate touches in a required sequence can minimize time lost and/or frustration on the part of the operator due to failed actuations from partial touches or wrong actuations from touching the wrong pad in a given required sequence or combination of touches." Col. 6:31-42. The `183 Patent discloses "A further option is to provide one or more LEDs 2205 or audible annunciators for visual or audible feedback to the operator. Specifically, in FIG. 19 the LED 2205 will come on when button 2201 has been successfully activated to cue the operator that it is time to move to button 2202. Where required a second LED with a different color than the first (yellow for the first LED and red for the second) can be provided to provide visual confirmation that the second button 2202 has been activated or that the required combination of the two buttons has been activated. Two different audible tone or sound generators could also be used in lieu of the LEDs to provide feedback to the operator." Col. 23:1-12. The `183 Patent discloses "A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310." Col. 23:28-30.

QQ. New Claim 80

`183 Patent Claim Language	`183 Patent Support
80. The capacitive responsive	See Figures 19, 20A-C; and Claims 28 and 35.

`183 Patent Claim Language	`183 Patent Support
electronic switching circuit as defined in claim 72, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	The `183 Patent discloses "In another embodiment a method to prevent inadvertent so actuations is to require a multi-step process. Referring to FIG. 19, a device is shown having a first palm button 2201, a second palm button 2202, and an indicator light 2205. Palm button 2201 has to be activated first and then button 2202 has to be activated within a 2 second time window before a desired actuation can occur." Col. 22:49-55. The `183 Patent discloses "In a variation of the multi-step process, two touch plates within a housing (one vertical and one horizontal) are used to provide a two-step turn-on. Referring to FIGS. 20A-C, the first step to actuate the output relay 2310, is initiated when the operator inserts his hands and touches the vertical touch sensor 2301 with the dorsal side of the hands. A yellow LED 2304 on top of the device show the successful completion of the first step. The second step is to flip the hand over and touch the horizontal touch sensor 2302 with the palmar side of the hand. A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310. The flipping action of the hand in the second step causes the forearm muscles to flex, thereby reducing stiffness and fatigue. Also, the hands, and arms can rest on the run bar until the machine cycle is complete. The second step of the two-step turn-on must occur within some predetermined time (for example 2 seconds) after the release of vertical touch sensor or the first step must be repeated." Col. 23:19-36.

RR. New Claim 81

`183 Patent Claim Language	`183 Patent Support
81. The capacitive responsive electronic switching circuit as defined in claim 72, wherein a peak voltage of the signal output frequencies is greater than a	See Figures 4, 5; Claims 27 and 37. The `183 Patent discloses "Having provided a basis for the use of higher frequencies, the basic

`183 Patent Claim Language	`183 Patent Support
supply voltage.	construction of the electronic switching circuit constructed in accordance with a first embodiment of the present invention is now described with reference to FIG. 4. The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5. Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6." Col. 11:60 – Col. 12:13. The `183 Patent discloses "Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s)." Col. 18:43-49. The `183 Patent discloses "A preferred circuit for implementing a voltage regulator 100 is shown in FIG. 5. Voltage regulator 100 preferably includes an AC/DC convertor 110 for generating 29 V to 36 V unregulated DC on line 119. This unregulated DC power is supplied to a 5 V DC regulator 120 and to a 26 V DC regulator 130. AC/DC convertor 110 includes

`183 Patent Claim Language	`183 Patent Support
	diodes 112, 114, 116, and 118, which rectify the supplied 24 V AC power provided on power lines 101 and 102." Col. 12:50-57; see also Col. 12:57 – Col. 13:31. The `183 Patent discloses "The oscillator circuitry shown in FIG. 6 is very stable over the temperature range of -40° C. to 105° C. The output of the touch switch circuitry drops at a rate of approximately 40 mV/°C. when temperature falls below 0° C. If application requires operation at low temperatures (-40° C.), the following three methods may be used to increase the output of the switch: increase the oscillator's regulated supply voltage, increase the resistance of resistor 416, and use a higher gain transistor 410. All of these methods would increase sensitivity at high temperatures." Col. 16:33-41.

SS. New Claim 82

`183 Patent Claim Language	`183 Patent Support
82. The capacitive responsive electronic switching circuit as defined in claim 81, wherein the supply voltage is a battery supply voltage.	The `183 Patent discloses "It will be apparent to those skilled in the art, that various components of voltage regulator 100 may be added or excluded depending upon the source of power available to power the oscillator 200. For example, if the available power is a 110 V AC 60 Hz commercial power line, a transformer may be added to convert the 100 V AC power to 24 V AC. Alternatively, if a DC batter is used, the AC/DC convertor among other components may be eliminated." Col 13:23-31.

TT. New Claim 83

`183 Patent Claim Language	`183 Patent Support
83. The capacitive responsive electronic switching circuit as defined in claim 81, wherein the supply voltage is a	Figures 4, 5, 11, and 12. The `183 Patent discloses "The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for

`183 Patent Claim Language	`183 Patent Support
voltage regulator supply voltage.	receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5." Col. 11:64 – Col. 12:5; see also Col. 12:50 – Col. 13:31.

UU. New Claim 84

For ease of analysis, new independent claim 84 is shown below with pseudo-amendments illustrating the differences between new claim 84 and claim 27 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
84. A capacitive responsive electronic switching circuit for a controlled keypad device comprising:	See Claim 27.
an oscillator providing a periodic output signal having a predefined frequency;	See Claim 27.
a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals, wherein a peak voltage of the signal output frequencies is greater than a supply voltage;	See Figures 4, 5, 11; and Claims 8, 12, 16, 27 and 37. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred

`183 Patent Claim Language	`183 Patent Support
	embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3. The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Having provided a basis for the use of higher frequencies, the basic construction of the electronic switching circuit constructed in accordance with a first embodiment of the present invention is now described with reference to FIG. 4. The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5. Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference

`183 Patent Claim Language	`183 Patent Support
	to FIG. 6. Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator 200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad 450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 11:60 – 12:33. The `183 Patent discloses "A preferred circuit for implementing a voltage regulator 100 is shown in FIG. 5. Voltage regulator 100 preferably includes an AC/DC convertor 110 for generating 29 V to 36 V unregulated DC on line 119. This unregulated DC power is supplied to a 5 V DC regulator 120 and to a 26 V DC regulator 130. AC/DC convertor 110 includes diodes 112, 114, 116, and 118, which rectify the supplied 24 V AC power provided on power lines 101 and 102." Col. 12:50-57; see also Col. 12:57 – Col. 13:31. The `183 Patent discloses "As will be apparent

`183 Patent Claim Language	`183 Patent Support
	to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25. The `183 Patent discloses "The oscillator circuitry shown in FIG. 6 is very stable over the temperature range of -40° C. to 105° C. The output of the touch switch circuitry drops at a rate of approximately 40 mV/°C. when temperature falls below 0° C. If application requires operation at low temperatures (-40° C.), the following three methods may be used to increase the output of the switch: increase the oscillator's regulated supply voltage, increase the resistance of resistor 416, and use a higher gain transistor 410. All of these methods would increase sensitivity at high temperatures." Col. 16:33-41. The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4). Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection

`183 Patent Claim Language	`183 Patent Support
	circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
the first and second input touch terminals defining areas for an operator to provide an input by proximity and touch; and	See Claim 27.
a detector circuit coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Claim 27.

VV. New Claim 85

`183 Patent Claim Language	`183 Patent Support
85. The capacitive responsive electronic switching circuit as defined in claim 84, wherein the signal output frequencies have a same Hertz value.	See Figure 11. The `183 Patent discloses "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 a

`183 Patent Claim Language	`183 Patent Support
	[sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be

`183 Patent Claim Language	`183 Patent Support
	possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

WW. New Claim 86

`183 Patent Claim Language	`183 Patent Support
86. The capacitive responsive electronic switching circuit as defined in claim 84, wherein each signal output frequency is selected from a plurality of Hertz values.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads

`183 Patent Claim Language	`183 Patent Support
	by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50

`183 Patent Claim Language	`183 Patent Support
	kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

XX. New Claim 87

`183 Patent Claim Language	`183 Patent Support
87. The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of

`183 Patent Claim Language	`183 Patent Support
	operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

YY. New Claim 88

`183 Patent Claim Language	`183 Patent Support
88. The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at

`183 Patent Claim Language	`183 Patent Support
	or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

ZZ. New Claim 89

`183 Patent Claim Language	`183 Patent Support
89. The capacitive responsive electronic switching circuit as defined in claim 86, wherein the plurality of Hertz values comprises Hertz values greater than 800 kHz.	See Fig. 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower

`183 Patent Claim Language	`183 Patent Support
	giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28.

`183 Patent Claim Language	`183 Patent Support
	The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

AAA. New Claim 90

`183 Patent Claim Language	`183 Patent Support
90. The capacitive responsive electronic switching circuit as defined in claim 84, wherein the supply voltage is a battery supply voltage.	The `183 Patent discloses "It will be apparent to those skilled in the art, that various components of voltage regulator 100 may be added or excluded depending upon the source of power available to power the oscillator 200. For example, if the available power is a 110 V AC 60 Hz commercial power line, a transformer may be added to convert the 100 V AC power to 24 V AC. Alternatively, if a DC batter is used, the AC/DC convertor among other components may be eliminated." Col 13:23-31.

BBB. New Claim 91

`183 Patent Claim Language	`183 Patent Support
91. The capacitive responsive electronic switching circuit as defined in claim 84, wherein the supply voltage is a voltage regulator supply voltage.	Figures 4, 5, 11, and 12. The `183 Patent discloses "The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5." Col. 11:64 – Col. 12:5; see also Col. 12:50 – Col. 13:31.

CCC. New Claim 92

For ease of analysis, new dependent claim 92 is shown below with pseudo-amendments illustrating the differences between new claim 92 and claim 28 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
92. The capacitive responsive electronic switching circuit as defined in claim 84, wherein said detector circuit ~~generates~~ is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.	See Claims 27 and 28.

DDD. New Claim 93

For ease of analysis, new dependent claim 93 is shown below with pseudo-amendments illustrating the differences between new claim 93 and claim 36 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
93. The capacitive responsive electronic switching circuit as defined in claim 84, ~~and~~ further ~~including~~ comprising an indicator for indicating ~~when said~~ the detector circuit ~~determines~~ has determined that the operator is proximal or touches said second touch terminal.	See Claims 32 and 36. The `183 Patent discloses "The microprocessor also allows the use of visual indicators such as LEDs or annunciators such as a bell or tone generator to confirm the actuation of a given touch switch or switches. This is particularly useful in cases where a sequence of actuations is required before an action occurs. The feedback to the operator provided by a visual or audio indicator activated by the microprocessor in response to intermediate touches in a required sequence can minimize time lost and/or frustration on the part of the operator due to failed actuations from partial touches or wrong actuations from touching the wrong pad in a given required sequence or combination of

`183 Patent Claim Language	`183 Patent Support
	touches." Col. 6:31-42. The `183 Patent discloses "A further option is to provide one or more LEDs 2205 or audible annunciators for visual or audible feedback to the operator. Specifically, in FIG. 19 the LED 2205 will come on when button 2201 has been successfully activated to cue the operator that it is time to move to button 2202. Where required a second LED with a different color than the first (yellow for the first LED and red for the second) can be provided to provide visual confirmation that the second button 2202 has been activated or that the required combination of the two buttons has been activated. Two different audible tone or sound generators could also be used in lieu of the LEDs to provide feedback to the operator." Col. 23:1-12. The `183 Patent discloses "A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310." Col. 23:28-30.

EEE. New Claim 94

`183 Patent Claim Language	`183 Patent Support
94. The capacitive responsive electronic switching circuit as defined in claim 84, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Figures 19, 20A-C; and Claims 28 and 35. The `183 Patent discloses "In another embodiment a method to prevent inadvertent so actuations is to require a multi-step process. Referring to FIG. 19, a device is shown having a first palm button 2201, a second palm button 2202, and an indicator light 2205. Palm button 2201 has to be activated first and then button 2202 has to be activated within a 2 second time window before a desired actuation can occur." Col. 22:49-55. The `183 Patent discloses "In a variation of the multi-step process, two touch plates within a housing (one vertical and one horizontal) are used to provide a two-step turn-on. Referring to

`183 Patent Claim Language	`183 Patent Support
	FIGS. 20A-C, the first step to actuate the output relay 2310, is initiated when the operator inserts his hands and touches the vertical touch sensor 2301 with the dorsal side of the hands. A yellow LED 2304 on top of the device show the successful completion of the first step. The second step is to flip the hand over and touch the horizontal touch sensor 2302 with the palmar side of the hand. A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310. The flipping action of the hand in the second step causes the forearm muscles to flex, thereby reducing stiffness and fatigue. Also, the hands, and arms can rest on the run bar until the machine cycle is complete. The second step of the two-step turn-on must occur within some predetermined time (for example 2 seconds) after the release of vertical touch sensor or the first step must be repeated." Col. 23:19-36.

FFF. New Claim 95

For ease of analysis, new independent claim 95 is shown below with pseudo-amendments illustrating the differences between new claim 95 and claim 27 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
95. A capacitive responsive electronic switching circuit for a controlled keypad device comprising:	See Claim 27.
an oscillator providing a periodic output signal having a predefined frequency;	See Claim 27.
a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to	See Figures 4, 5, 11; and Claims 8, 12, 16, 27 and 37. The `183 Patent discloses "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 a

`183 Patent Claim Language	`183 Patent Support
each row of the closed spaced array of input touch terminals of the keypad, the input touch terminals comprising first and second input touch terminals, and wherein a peak voltage of the signal output frequencies is greater than a supply voltage;	[sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3.  The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Having provided a basis for the use of higher frequencies, the basic construction of the electronic switching circuit constructed in accordance with a first embodiment of the present invention is now described with reference to FIG. 4. The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with

`183 Patent Claim Language	`183 Patent Support
	reference to FIG. 5. Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6. Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator 200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad 450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 11:60 – 12:33. The `183 Patent discloses "A preferred circuit for implementing a voltage regulator 100 is shown in FIG. 5. Voltage regulator 100 preferably includes an AC/DC convertor 110 for

`183 Patent Claim Language	`183 Patent Support
	generating 29 V to 36 V unregulated DC on line 119. This unregulated DC power is supplied to a 5 V DC regulator 120 and to a 26 V DC regulator 130. AC/DC convertor 110 includes diodes 112, 114, 116, and 118, which rectify the supplied 24 V AC power provided on power lines 101 and 102." Col. 12:50-57; see also Col. 12:57 – Col. 13:31. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25.  The `183 Patent discloses "The oscillator circuitry shown in FIG. 6 is very stable over the temperature range of -40° C. to 105° C. The output of the touch switch circuitry drops at a rate of approximately 40 mV/°C. when temperature falls below 0° C. If application requires operation at low temperatures (-40° C.), the following three methods may be used to increase the output of the switch: increase the oscillator's regulated supply voltage, increase the resistance of resistor 416, and use a higher gain transistor 410. All of these methods would increase sensitivity at high temperatures." Col. 16:33-41. The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4).

`183 Patent Claim Language	`183 Patent Support
	Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
the first and second input touch terminals defining areas for an operator to provide an input by proximity and touch; and	See Claim 27.
a detector circuit coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Claim 27.

GGG. New Claim 96

`183 Patent Claim Language	`183 Patent Support
96. The capacitive responsive electronic switching circuit as defined in claim 95, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad has a same Hertz value.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at

`183 Patent Claim Language	`183 Patent Support
	or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

HHH. New Claim 97

`183 Patent Claim Language	`183 Patent Support
97. The capacitive responsive electronic switching circuit as defined in claim 95, wherein each signal output frequency selectively provided to each row of the closely spaced array of input touch terminals of the keypad is selected from a plurality of Hertz values.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to

`183 Patent Claim Language	`183 Patent Support
	approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27.

`183 Patent Claim Language	`183 Patent Support
	The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

III. New Claim 98

`183 Patent Claim Language	`183 Patent Support
98. The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 50 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to

`183 Patent Claim Language	`183 Patent Support
	ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of

`183 Patent Claim Language	`183 Patent Support
	oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

JJJ. New Claim 99

`183 Patent Claim Language	`183 Patent Support
99. The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz values comprises Hertz values greater than 100 kHz.	See Figure 11. The `183 Patent discloses "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 a [sic] skin oils and water. Col. 5:49-53.  The `183 Patent discloses "Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components

`183 Patent Claim Language	`183 Patent Support
	and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 10:60 – Col. 11:27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

KKK. New Claim 100

`183 Patent Claim Language	`183 Patent Support
100. The capacitive responsive electronic switching circuit as defined in claim 97, wherein the plurality of Hertz	See Fig. 11. The `183 Patent discloses "The touch detection

`183 Patent Claim Language	`183 Patent Support
values comprises Hertz values greater than 800 kHz.	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 a [sic] skin oils and water. Col. 5:49-53. The `183 Patent discloses "At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Ideally, the frequency of operation would be kept at the 800 kHz of the preferred embodiment or even higher. However, as noted earlier, higher frequency operation forces the use of more expensive components and designs. For applications where thermal drift and electronic noise levels are low, operation at or near 100 kHz may be possible. However, at 10 kHz and below, the impedance of the glass becomes much greater than that of likely water bridges between pads resulting in adjacent pads being effected as much by a touch as the touched pad itself. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad. Col. 11:1-27. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the

`183 Patent Claim Language	`183 Patent Support
	resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies. As discussed above, however, oscillator 200 is preferably constructed so as to output a square wave having a frequency of 50 kHz or greater, and more preferably, of 800 kHz or greater. Col. 14:22-28. The `183 Patent disclosed "The combination of oscillator voltage, frequency and transistor gain bandwidth product that is used will necessarily vary with the cost, safety and reliability requirements of a given application." Col. 14:65 – Col. 15:1.

LLL. New Claim 101

`183 Patent Claim Language	`183 Patent Support
101. The capacitive responsive electronic switching circuit as defined in claim 95, wherein the supply voltage is a battery supply voltage.	The `183 Patent discloses "It will be apparent to those skilled in the art, that various components of voltage regulator 100 may be added or excluded depending upon the source of power available to power the oscillator 200. For example, if the available power is a 110 V AC 60 Hz commercial power line, a transformer may be added to convert the 100 V AC power to 24 V AC. Alternatively, if a DC batter is used, the AC/DC convertor among other components may be eliminated." Col 13:23-31.

MMM. New Claim 102

`183 Patent Claim Language	`183 Patent Support
102. The capacitive responsive electronic switching circuit as defined in claim 95, wherein the supply voltage is a voltage regulator supply voltage.	Figures 4, 5, 11, and 12. The `183 Patent discloses "The electronic switching circuit includes a voltage regulator 100 including input lines 101 and 102 for receiving a 24 V AC line voltage and a line 103 for grounding the circuit. Voltage regulator 100 converts the received AC voltage to a DC voltage and supplies a regulated 5 V DC power

`183 Patent Claim Language	`183 Patent Support
	to an oscillator 200 via lines 104 and 105. Voltage regulator also supplies oscillator 200 with 26 V DC power via line 106. The details of voltage regulator 100 are discussed below with reference to FIG. 5." Col. 11:64 – Col. 12:5; see also Col. 12:50 – Col. 13:31.

NNN. New Claim 103

For ease of analysis, new dependent claim 103 is shown below with pseudo-amendments illustrating the differences between new claim 103 and claim 28 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
103. The capacitive responsive electronic switching circuit as defined in claim 95, wherein said detector circuit ~~generates~~ is configured to generate said control output signal only when the operator is proximal or touches said second touch terminal within a predetermined time period after the operator is proximal or touches said first touch terminal.	See Claims 27 and 28.

OOO. New Claim 104

For ease of analysis, new dependent claim 104 is shown below with pseudo-amendments illustrating the differences between new claim 104 and claim 36 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
104. The capacitive responsive electronic switching circuit as defined in claim 95, ~~and~~ further ~~including~~ comprising an indicator for indicating ~~when said~~ the detector circuit ~~determines~~ has determined that the operator is proximal or touches said second touch terminal.	See Claims 32 and 36. The `183 Patent discloses "The microprocessor also allows the use of visual indicators such as LEDs or annunciators such as a bell or tone generator to confirm the actuation of a given touch switch or switches. This is particularly useful in cases where a sequence of actuations is required before an action occurs. The feedback to the operator provided by a visual or audio

`183 Patent Claim Language	`183 Patent Support
	indicator activated by the microprocessor in response to intermediate touches in a required sequence can minimize time lost and/or frustration on the part of the operator due to failed actuations from partial touches or wrong actuations from touching the wrong pad in a given required sequence or combination of touches." Col. 6:31-42. The `183 Patent discloses "A further option is to provide one or more LEDs 2205 or audible annunciators for visual or audible feedback to the operator. Specifically, in FIG. 19 the LED 2205 will come on when button 2201 has been successfully activated to cue the operator that it is time to move to button 2202. Where required a second LED with a different color than the first (yellow for the first LED and red for the second) can be provided to provide visual confirmation that the second button 2202 has been activated or that the required combination of the two buttons has been activated. Two different audible tone or sound generators could also be used in lieu of the LEDs to provide feedback to the operator." Col. 23:1-12. The `183 Patent discloses "A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310." Col. 23:28-30.

PPP. New Claim 105

`183 Patent Claim Language	`183 Patent Support
105. The capacitive responsive electronic switching circuit as defined in claim 95, wherein the detector circuit is configured to inhibit the control output signal unless the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Figures 19, 20A-C; and Claims 28 and 35. The `183 Patent discloses "In another embodiment a method to prevent inadvertent so actuations is to require a multi-step process. Referring to FIG. 19, a device is shown having a first palm button 2201, a second palm button 2202, and an indicator light 2205. Palm button 2201 has to be activated first and then button 2202 has to be activated within a 2 second time

`183 Patent Claim Language	`183 Patent Support
	window before a desired actuation can occur." Col. 22:49-55. The `183 Patent discloses "In a variation of the multi-step process, two touch plates within a housing (one vertical and one horizontal) are used to provide a two-step turn-on. Referring to FIGS. 20A-C, the first step to actuate the output relay 2310, is initiated when the operator inserts his hands and touches the vertical touch sensor 2301 with the dorsal side of the hands. A yellow LED 2304 on top of the device show the successful completion of the first step. The second step is to flip the hand over and touch the horizontal touch sensor 2302 with the palmar side of the hand. A red LED 2305 on top of the device shows the completion of the two step turn-on and activation of output relay 2310. The flipping action of the hand in the second step causes the forearm muscles to flex, thereby reducing stiffness and fatigue. Also, the hands, and arms can rest on the run bar until the machine cycle is complete. The second step of the two-step turn-on must occur within some predetermined time (for example 2 seconds) after the release of vertical touch sensor or the first step must be repeated." Col. 23:19-36.

QQQ. Claim 106

For ease of analysis, new independent claim 106 is shown below with pseudo-amendments illustrating the differences between new claim 106 and claim 18 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
106. A capacitive responsive electronic switching circuit comprising:	See Claim 18.
an oscillator providing a periodic output signal having a predefined frequency;	See Claim 18.
a microcontroller using the	See Figures 4, 11; and Claims 8, 12, 16, 18.

`183 Patent Claim Language	`183 Patent Support
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 `183 Patent discloses "The touch detection circuit of the present invention features operation at frequencies at or above 50kHz and preferably at or above 800 kHz to minimize the effects of surface contamination from materials such a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3.  The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6.

`183 Patent Claim Language	`183 Patent Support
	Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator 200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad 450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 12:6-33. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25.  The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of

`183 Patent Claim Language	`183 Patent Support
	the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4). Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
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	See Claim 18.
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,	See Claim 18.
wherein said predefined frequency of said oscillator and said signal output	See Claim 18.

`183 Patent Claim Language	`183 Patent Support
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.	

RRR. New Claim 107

`183 Patent Claim Language	`183 Patent Support
107. The capacitive responsive switching circuit as defined in claim 106, wherein said oscillator provides a periodic output signal having a frequency of 800 kHz or greater.	See Claim 19.

SSS. New Claim 108

For ease of analysis, new dependent claim 108 is shown below with pseudo-amendments illustrating the differences between new claim 108 and claim 33 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
108. The capacitive responsive electronic switching circuit as defined in claim 106, ~~further comprising~~ wherein ~~said detector circuit compares~~ the sensed body capacitance change <u>to ground proximate the input touch terminal is</u> caused by the <u>operator's</u> body capacitance decreasing an input touch terminal signal on the detector <u>circuit, and wherein the sensed body</u>	See Claims 1, 18, 28, and 33. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow

`183 Patent Claim Language	`183 Patent Support
capacitance change to ground ~~when proximate to the input touch terminal~~ is compared to a second threshold level to generate the control output signal.	close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8." Col. 12:24-28. The `183 Patent discloses "As can be seen, at 1 kHz, the capacitive impedance of the glass is much greater than the nominal 1 MΩ of the water bridge across the pads. As a result, at 1 kHz, there would be little difference in the impedance paths to ground of the two adjacent pads when either is touched. This would result in the voltage on both pads being pulled towards ground by comparable amounts. Conversely, at 100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of

`183 Patent Claim Language	`183 Patent Support
	inadvertent actuation of adjacent touch pads to that of the touched pad. Col. 10:54 – Col. 11:9. The `183 Patent discloses "As stated above, the operator's body includes a capacitance to ground, which may range in a typical person from between 20 to 300 pF. The base terminal of transistor 410 is coupled to it's [sic] emitter by resistor 412 such that unless capacitance is present by the user touching the touch pad 450, transistor 410 will not be forward biased and will not conduct. Thus, when touch pad 450 is not touched, the output signal at the collector terminal of transistor 410 and across pulse stretcher circuit 417 will be zero volts. When, however, a person touches the touch pad 450, that person's body capacitance to ground couples the base of transistor 410 to ground 103 through resistor 413, thereby forward biasing transistor 410 into conduction. This charges capacitor 418 providing a positive DC voltage with respect to the line 301 and causes the output of the Schmitt trigger 420 to go low. Diode 414 is coupled across the base to emitter junction of transistor 410 to clamp the base emitter reverse bias voltage to –0.7V and also reduce the forward recovery and turn-on time. Col. 15:29-47.

TTT. New Claim 109

For ease of analysis, new dependent claim 109 is shown below with pseudo-amendments illustrating the differences between new claim 109 and claim 34 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
109. The capacitive responsive electronic switching circuit as defined in claim 106, ~~further comprising~~ wherein ~~said detector circuit compares~~ the sensed body capacitance change to ground proximate the input touch terminal is caused by the operator's body capacitance decreasing an input touch terminal signal amplitude on	See Claims 1, 18, 28, and 34. The `183 Patent discloses "Another method for implementing capacitive touch switches relies on the change in capacitive coupling between a touch terminal and ground. Systems utilizing such a method are described in U.S. Pat. No. 4,758,735 and U.S. Pat. No. 5,087,825. With

`183 Patent Claim Language	`183 Patent Support
the detector circuit, and wherein the sensed body capacitance change to ground ~~when proximate to the input touch terminal~~ is compared to a second threshold level to generate the control output signal.	this methodology the detection circuit consists of an oscillator (or AC line voltage derivative) providing a signal to a touch terminal whose voltage is then monitored by a detector. The touch terminal is driven in electrical series with other components that function in part as a charge pump. The 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." Col. 3:44-56. The `183 Patent discloses "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 a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8." Col. 12:24-28. The `183 Patent discloses "As can be seen, at 1 kHz, the capacitive impedance of the glass is much greater than the nominal 1 MΩ of the water bridge across the pads. As a result, at 1 kHz, there would be little difference in the impedance paths to ground of the two adjacent pads when either is touched. This would result in the voltage on both pads being pulled towards ground by comparable amounts. Conversely, at

`183 Patent Claim Language	`183 Patent Support
	100 kHz, the glass impedance drops to approximately 1 MΩ resulting in the impedance of the path to ground for pad 59 being twice that of the touched pad 57. For cases where background noise and temperature drifts are comparatively small, a 100 kHz oscillator frequency would allow a sufficiently low detection threshold to be set to differentiate between the signal changes induced at both pads by a human touch opposite a single pad. At 800 kHz, the impedance of the glass drops to 200 kΩ or lower giving a ratio of a greater than 5 to 1 impedance difference between the paths to ground of the touched pad 57 and adjacent pads 59. In fact, the impedance ratio may exceed 10 to 1, as illustrated in the calculation below. This allows the detection threshold for the touched pad to be set well below that of an adjacent pad resulting in a much lower incidence of inadvertent actuation of adjacent touch pads to that of the touched pad. Col. 10:54 – Col. 11:9. The `183 Patent discloses "As stated above, the operator's body includes a capacitance to ground, which may range in a typical person from between 20 to 300 pF. The base terminal of transistor 410 is coupled to it's [sic] emitter by resistor 412 such that unless capacitance is present by the user touching the touch pad 450, transistor 410 will not be forward biased and will not conduct. Thus, when touch pad 450 is not touched, the output signal at the collector terminal of transistor 410 and across pulse stretcher circuit 417 will be zero volts. When, however, a person touches the touch pad 450, that person's body capacitance to ground couples the base of transistor 410 to ground 103 through resistor 413, thereby forward biasing transistor 410 into conduction. This charges capacitor 418 providing a positive DC voltage with respect to the line 301 and causes the output of the Schmitt trigger 420 to go low. Diode 414 is coupled across the base to emitter junction of transistor 410 to clamp the base emitter reverse bias

`183 Patent Claim Language	`183 Patent Support
	voltage to –0.7V and also reduce the forward recovery and turn-on time. Col. 15:29-47.

UUU. New Claim 110

`183 Patent Claim Language	`183 Patent Support
110. The capacitive responsive electronic switching circuit as defined in claim 106, wherein the detector circuit comprises a plurality of touch circuits, and wherein the microcontroller selectively provides the signal output frequencies to the plurality of small sized input touch terminals of the keypad via the plurality of touch circuits.	See Figures 4 and 11; Claims 6, 18. Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. Col. 18:43-52.

VVV. New Claim 111

For ease of analysis, new independent claim 111 is shown below with pseudo-amendments illustrating the differences between new claim 111 and claim 27 of the `183 Patent following the first reexamination proceeding.

`183 Patent Claim Language	`183 Patent Support
111. A capacitive responsive electronic switching circuit for a controlled keypad device comprising:	See Claim 27.
an oscillator providing a periodic output signal having a predefined frequency;	See Claim 27.
a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals	See Figures 4, 11; and Claims 8, 12, 16, 27. The `183 Patent discloses "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

`183 Patent Claim Language	`183 Patent Support
comprising first and second input touch terminals, wherein the selectively providing comprises the microcontroller selectively providing a signal output frequency to each row of the closely spaced array of input touch terminals of the keypad;	surface contamination from materials such a [sic] skin oils and water. It also offers improvements in detection sensitivity that allow close control of the degree of proximity (ideally very close proximity) that is required for actuation and to enable employment of a multiplicity of small sized touch terminals in a physically close array such as a keyboard." Col. 5:49-57. The `183 Patent discloses "In a first preferred embodiment the circuit offers enhanced detection sensitivity to allow reliable operation with small (finger size) touch pads." Col. 6:1-3.  The `183 Patent discloses "Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. Use of frequencies as low as 50 kHz may also be possible depending upon the type of glass or covering or the thickness thereof used for the touch pad." Col. 11:19-27. The `183 Patent discloses "Upon being powered by voltage regulator 100, oscillator 200 generates a square wave with a frequency of 50 kHz, and preferably greater than 800 kHz, and having an amplitude of 26 V peak. The square wave generated by oscillator 200 is supplied via line 201 to a floating common generator 300, a touch pad shield plate 460, a touch circuit 400, and a microcontroller 500. Oscillator 200 is described below with reference to FIG. 6. Floating common generator 300 receives the 26 V peak square wave from oscillator 200 and outputs a regulated floating common that is 5 volts below the square wave output from oscillator 200 and has the same phase and

`183 Patent Claim Language	`183 Patent Support
	frequency as the received square wave. This floating common output is supplied to touch circuit 400 and microcontroller 500 via line 301 such that the output square wave from oscillator 200 and floating common output from floating common generator 300 provide power to touch circuit 400 and microcontroller 500. Details of floating common generator 300 are discussed below with reference to FIG. 7. Touch circuit 400 senses capacitance from a touch pad 450 via line 451 and outputs a signal to microcontroller 500 via line 401 upon detecting a capacitance to ground at touch pad 450 that exceeds a threshold value. The details of touch circuit 400 are described below with reference to FIG. 8. Upon receiving an indication from touch circuit 400 that a sufficient capacitance to ground (typically at least 20 pF) is present at touch pad 450, microcontroller 500 outputs a signal to a load-controlling microcontroller 600 via line 501, which is preferably a two way optical coupling bus." Col. 12:6-33. The `183 Patent discloses "As will be apparent to those skilled in the art, the values of the resistors and capacitors utilized in oscillator 200 may be varied from those disclosed above to provide for different oscillator output frequencies." Col. 14:22-25.  The `183 Patent discloses "A multiple touch pad circuit constructed in accordance with the second embodiment is shown in FIG. 11. In the second embodiment of FIG. 11, components similar to those in the first embodiment in FIG. 4 are designated with the same references numerals and will not be discussed in detail. The multiple touch pad circuit is a variation of the first embodiment in that it includes an array of touch circuits designated as 900_1 through 900_{nm}, which, as shown, include both the touch circuit 400 shown in FIGS. 4 and 8 and the input touch terminal pad 451 (FIG. 4).

`183 Patent Claim Language	`183 Patent Support
	Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. To simplify assembly, a flexible circuit board such as vended by Sheldahl, Inc. or Circuit Etching Technics, Inc. can be used for this purpose. Ideally, the printed circuit will be fixed directly against the surface (typically glass) bearing the conductive touch pads to eliminate air gaps and the need for conductive foam pads and spring contacts which were used to fill air gaps." Col. 18:34-59.
the first and second input touch terminals defining areas for an operator to provide an input by proximity and touch; and	See Claim 27.
a detector circuit coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.	See Claim 27.

WWW. New Claim 112

`183 Patent Claim Language	`183 Patent Support
112. The capacitive responsive electronic switching circuit as defined in claim 111, wherein said first and second touch terminals are adapted to be mounted on different surfaces of the controlled keypad device.	See Claim 29.

XXX. New Claim 113

`183 Patent Claim Language	`183 Patent Support
113. The capacitive responsive electronic switching circuit as defined in claim 111, wherein said first and second touch terminals are adapted to be mounted on non-parallel planar surfaces of the controlled keypad device.	See Claim 30.

YYY. New Claim 114

`183 Patent Claim Language	`183 Patent Support
114. The capacitive responsive electronic switching circuit as defined in claim 111, wherein said first and second touch terminals are adapted to be mounted on perpendicular planar surfaces of the controlled keypad device.	See Claim 31.

ZZZ. New Claim 115

`183 Patent Claim Language	`183 Patent Support
115. The capacitive responsive electronic switching circuit as defined in	See Claim 32.

`183 Patent Claim Language	`183 Patent Support
claim 111 and further including an indicator for indicating when said detector circuit determines that the operator is proximal or touches said first touch terminal.	

AAAA. New Claim 116

`183 Patent Claim Language	`183 Patent Support
116. The capacitive responsive electronic switching circuit as defined in claim 111 and further including an indicator for indicating when said detector circuit determines that the operator is proximal or touches said second touch terminal.	See Claims 32 and 36. The `183 Patent discloses "The microprocessor also allows the use of visual indicators such as LEDs or annunciators such as a bell or tone generator to confirm the actuation of a given touch switch or switches. This is particularly useful in cases where a sequence of actuations is required before an action occurs. The feedback to the operator provided by a visual or audio indicator activated by the microprocessor in response to intermediate touches in a required sequence can minimize time lost and/or frustration on the part of the operator due to failed actuations from partial touches or wrong actuations from touching the wrong pad in a given required sequence or combination of touches." Col. 6:31-42. The `183 Patent discloses "A further option is to provide one or more LEDs 2205 or audible annunciators for visual or audible feedback to the operator. Specifically, in FIG. 19 the LED 2205 will come on when button 2201 has been successfully activated to cue the operator that it is time to move to button 2202. Where required a second LED with a different color than the first (yellow for the first LED and red for the second) can be provided to provide visual confirmation that the second button 2202 has been activated or that the required combination of the two buttons has been activated. Two different audible tone

`183 Patent Claim Language	`183 Patent Support
	or sound generators could also be used in lieu of the LEDs to provide feedback to the operator." Col. 23:1-12. The `183 Patent discloses "A red LED 2305 on top of the device shows the completion of the two step tum-on and activation of output relay 2310." Col. 23:28-30.

BBBB. New Claim 117

`183 Patent Claim Language	`183 Patent Support
117. The capacitive responsive electronic switching circuit as defined in claim 111, wherein the detector circuit comprises a plurality of touch circuits, and wherein the microcontroller selectively provides the signal output frequencies to the closely spaced array of input touch terminals of the keypad via the plurality of touch circuits.	See Figures 4 and 11; Claims 6, 27. Microcontroller 500 selects each row of the touch circuits 900_1 to 900_{nm} by providing the signal from oscillator 200 to selected rows of touch circuits. In this manner, microcontroller 500 can sequentially activate the touch circuit rows and associate the received inputs from the columns of the array with the activated touch circuit(s). To keep the path length 451 between the touch pad 450 and the base to the detection transistor 410 to a minimum, the detection circuits 900 are physically located directly beneath the touch pads. Col. 18:43-52.

I. CONCLUSION

In view of the above, the Patent Owner submits that the claims are in condition for allowance. The present amendment neither enlarges the scope of the claims of the patent nor introduces new matter. If the Examiner should have any questions, please contact the Patent Owner's Attorney, Brian A. Carlson, at 972-732-1001. The Commissioner is hereby authorized to charge any fees due in connection with this filing, or credit any overpayment, to Deposit Account No. 50-1065.

Respectfully submitted,

May 7, 2014
Date

/Brian A. Carlson/
Brian A. Carlson
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972-732-1001
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Electronic Patent Application Fee Transmittal	
Application Number:	90013106
Filing Date:	24-Dec-2013
Title of Invention:	Capacitive Responsive Electronic Switching Circuit
First Named Inventor/Applicant Name:	5796183
Filer:	Brian A. Carlson/Michelle Hatcher
Attorney Docket Number:	NAR-5796183RX2
Filed as Large Entity	

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Reexamination claims in excess of 20	1822	10	80	800
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**800**

Electronic Acknowledgement Receipt	
EFS ID:	18972281
Application Number:	90013106
International Application Number:	
Confirmation Number:	9188
Title of Invention:	Capacitive Responsive Electronic Switching Circuit
First Named Inventor/Applicant Name:	5796183
Customer Number:	25962
Filer:	Brian A. Carlson/Michelle Hatcher
Filer Authorized By:	Brian A. Carlson
Attorney Docket Number:	NAR-5796183RX2
Receipt Date:	07-MAY-2014
Filing Date:	24-DEC-2013
Time Stamp:	18:11:47
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$800
RAM confirmation Number	4565
Deposit Account	501065
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		NAR_5796183RX_ResponseToOfficeAction.pdf	595176 cd065edb6eda4b303e75f27de8f369062fd5cc52	yes	141
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Response after non-final action-owner timely		1	1	
	Claims		2	14	
	Applicant Arguments/Remarks Made in an Amendment		15	141	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30097 afa5124608e57e6f6709f2fa7861b4c38d2e117d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	625273		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,106	12/24/2013	5796183	NAR-5796183RX2	9188

25962 7590 03/27/2014

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EXAMINER	
TRAN, HENRY N	
ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
03/27/2014	PAPER

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

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

Office Action in Ex Parte Reexamination	Control No. 90/013,106	Patent Under Reexamination 5796183	
	Examiner HENRY N. TRAN	Art Unit 3992	AIA (First Inventor to File) Status No

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

a. ☒ Responsive to the communication(s) filed on *12/24/2013* .
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☐ This action is made FINAL.

c. ☒ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *2* month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☒ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *18,27 and 40-105* are subject to reexamination.
1b. ☒ Claims *1-17,19-26,28-34 and 36-39* are not subject to reexamination.
2. ☒ Claims *35* have been canceled in the present reexamination proceeding.
3. ☒ Claims *45-55 and 72-94* are patentable and/or confirmed.
4. ☒ Claims *18,27,40-44, 56-71 and 95-105* are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
   1 ☐ been received.
   2 ☐ not been received.
   3 ☐ been filed in Application No. _____ .
   4 ☐ been filed in reexamination Control No. _____.
   5 ☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED EX PARTE REEXAMINATION NON-FINAL ACTION

I. INTRODUCTION

1. This Non-Final Office action concerns the *Ex Parte* Reexamination of the U.S. Patent No. 5,796,183 C1 issued April 29, 2013 to Hourmand et al. (the '183 patent or "Hourmand"). Patent Owner's waiver of its statement under 37 CFR 1.530 filed on March 4, 2014 after the Order Granting Request for *Ex Parte* Reexamination of claims 18 and 27 of the '183 patent mailed on February 26, 2014. Patent owner's Amendment under rule 37 CFR 1.510 filed with the Request on December 24, 2013 has been entered. Claims 18, 27, and 40-105 are considered in this reexamination proceeding. The examination results are: Claims 18, 27, 40-44, 56-71, and 95-105 are rejected; and claims 45-55 and 72-94 are found patentable because of the reasons set forth below.

II. RULES, REGULATIONS AND REEXAMINATION PROCEDURE

2. The following rules and procedures are applicable to this action:

35 U.S.C. 305 Conduct of reexamination proceedings.

After the times for filing the statement and reply provided for by **section 304** of this title have expired, reexamination will be conducted according to the procedures established for initial examination under the provisions of **sections 132** and **133** of this title. In any reexamination proceeding under this chapter, the patent owner will be permitted to propose any amendment to his patent and a new claim or claims thereto, in order to distinguish the invention as claimed from the prior art cited under the provisions of **section 301** of this title, or in response to a decision adverse to the patentability of a claim of a patent. No proposed amended or new claim enlarging the scope of a claim of the patent will be permitted in a reexamination proceeding under this chapter. All reexamination proceedings under this section, including any appeal to the

Board of Patent Appeals and Interferences, will be conducted with special dispatch within the Office.

37 C.F.R. 1.552 Scope of reexamination in ex parte reexamination proceedings.

- (a) Claims in an *ex parte* reexamination proceeding will be examined on the basis of patents or printed publications and, with respect to subject matter added or deleted in the reexamination proceeding, on the basis of the requirements of 35 U.S.C. **112**.
- (b) Claims in an *ex parte* reexamination proceeding will not be permitted to enlarge the scope of the claims of the patent.
- (c) Issues other than those indicated in paragraphs (a) and (b) of this section will not be resolved in a reexamination proceeding. If such issues are raised by the patent owner or third party requester during a reexamination proceeding, the existence of such issues will be noted by the examiner in the next Office action, in which case the patent owner may consider the advisability of filing a reissue application to have such issues considered and resolved.

The reexamination proceeding provides a complete reexamination of the patent claims on the basis of prior art patents and printed publications. Issues relating to **35 U.S.C. 112** are addressed only with respect to new claims or amendatory subject matter in the specification, claims or drawings. Any new or amended claims are examined to ensure that the scope of the original patent claims is not enlarged, i.e., broadened. See **35 U.S.C. 305**.

See MPEP 2258

MPEP 2260.01 Dependent Claims [R-2] provides:

If ** > an unamended base patent claim (i.e., a claim appearing in the reexamination as it appears in the patent) < has been rejected or canceled, any claim which is directly or indirectly dependent thereon should be confirmed or allowed if the dependent claim is otherwise allowable. The dependent claim should *not* be objected to or rejected merely because it depends on a rejected or canceled patent claim. No requirement should be made for rewriting the dependent claim in independent form. As the original patent claim numbers are not changed in a reexamination proceeding, the content of the canceled base claim would remain in the printed patent and would be available to be read as a part of the confirmed or allowed dependent claim.

If a new base claim (a base claim other than a base claim appearing in the patent) has been canceled in a reexamination proceeding, a claim which depends thereon should be rejected as * > indefinite < . If a new base claim > or an amended patent claim < is rejected, a claim dependent thereon should be objected to if it is otherwise patentable and a requirement made for rewriting the dependent claim in independent form

III. PRIOR ART PATENTS AND PRINTED PUBLICATIONS

3. The prior art patents and printed publications cited in the request pursuant to C.F.R. § 1.510(b) (3), see *id.*, Request page 10, and relied upon in this Office action are relisted below:

- U.S. Patent No. 5,463,388 issued to Boie et al. on October 31, 1995 ("Boie" or the '388 patent), which was submitted with the request as Exhibit C.
- U.S. Patent No. 5,565,658 issued to Gerpheide et al. on October 15, 1996 ("Gerpheide" or the '658 patent), which was submitted with the request as Exhibit D.
- Casio advertisement entitled "Now... The Invisible Casio Calculator Watch," published in Popular Science by On the Run in 1984 ("Casio"), which was submitted with the request as Exhibit E.
- Lee, thesis entitled "A Fast Multiple-Touch-Sensitive Input Device," and published October 1984 ("Lee"), which was submitted with the IDS filed with the request.

4. Boie filed on January 29, 1993, Gerpheide filed on December 7, 1994, Casio published in 1984, and Lee published in October 1984; and they are all prior to the Critical Date of January 31, 1996 - which is the filing date of the '183 patent - constitute effective prior art reference as to the claims of the '183 patent under 35 U.S.C. §102(a), 102(e), or 102(b).

It is noted that Boie was previously cited and considered, i.e., "old art", by the Office in an earlier concluded *ex parte* reexamination control number 90/012,439 of the patent being reexamined, which is hereinafter referred to as "the first request"; and Lee was newly cited with the Amendment and its content and pertinent information thereof as explained by the patent owner have been noted.

IV. RESPONSE TO AMENDMENT

Patent owner's Amendment under 37 CFR 1.510 filed on December 24, 2013 has been entered. Patent owner's amendments to the claims and the remarks, see *id.* Amendment pp. 2-142, with respect to the claims status, claims support, and prior art references have been fully considered with the results set forth below.

5. Regarding the status of the claims

(Amendment Section II page 17)

Claims 18 and 27 have been amended, claims 40-105 are new, claim 35 is canceled, and claims 1-17, 19-26, 28-34, and 36-39 are original and they have not been requested for reexamination; thus, claims 18, 27, and 40-105 are considered in this reexamination proceeding.

It is noted that claims 18 and 27 each has dependent claims (i.e., claims 19, 33, and 34, or 28-32, and 36, respectively) that are not subject to reexamination. Because the effect that they would have on the scope of claims that are not subject to reexamination, no amendments to any of these claims that would change the scope of each respective claim may be made, unless all claims that are dependent upon the claim are also made subject to this reexamination proceeding.

In order to make the dependent claims subject to reexamination, the patent holder should submit for each such dependent claim:

(a) a statement pointing out at least one substantial new question of patentability based on the prior patents and printed publications of record as to the dependent claim, and

(b) a detailed explanation of the pertinency and manner of applying the prior art patents and printed publications of record to that dependent claim.

As an alternative, the patent holder may submit new claims that consist of the same limitations as the original parent claims, with any desired amendments to the claims being made to those new claims; and the patent holder may also choose to amend any other claims that are subject to reexamination so that they are properly dependent upon these new claims, as appropriate. In this case, claims 18 and 27 should be canceled and have them rewritten into two new claims; also, new claims 40-44 and 66-71 should be amended, where applicable, to reflect the dependency to the two new claims; and non-reexamined dependent claims19, 28-34, and 36 are not changed (see MPEP 2260.01 recited above).

Appropriate correction is required.

6. Regarding Patent owner's discussion of claims and prior art references

(a) Regarding Lee

Patent owner's arguments, see Amendment pp. 18-20, with respect to the teachings of the Lee's system and method of A Fast Multiple-Touch-Sensitive Input Device, has been fully considered and are persuasive. The examiner agrees that Lee does not disclose sending signal output frequencies to the selected rows.

(b) Regarding Claims 18, 27, 40-44, and 66-71

Patent owner's arguments, see *id.* at Amendment pp. 21-24, with respect to the combinations of prior art references, Boie, Gerpheide, Lee, and/or Casio, for the rejections of independent claims 18 and 27, and their dependent claims 40-44, and 66-71, respectively, have been fully considered but they are not persuasive because the discussion is directed to the issues and/or limitations that enlarge the scope of the claims of the '183 patent. Such issues may be considered and resolved in a reissue application. See 37 C.F.R. 1.552(c). It is noted that claims 18, 27, 40-44, and 66-71 are rejected under 35 U.S.C. 305 (see the rejections under 35 U.S.C. 305 below).

(c) Regarding Claims 45-55

Patent owner's arguments, see *id.* at Amendment pp. 24-26, with respect to claims 45-55, have been fully considered and are persuasive. The examiner agrees that Boie in combination with Gerpheide and/or Lee does not disclose at least all the limitations of base claim 45. Claims 45-55 are patentable.

(d) Regarding Claims 56-65

Patent owner's arguments, see *id.* at Amendment p. 26, with respect to the combinations of prior art references, Boie, Gerpheide, and/or Lee, for the rejections of independent claim 56 and its dependent claims 57-65, have been fully considered but they are not persuasive because the discussion is directed to the issues and/or limitations that enlarge the scope of the claims of the '183 patent. As noted in claims 18 and 27 above, such issues may be considered and resolved in a reissue application. See 37 C.F.R. 1.552(c). It is noted that claims 56-65 are rejected under 35 U.S.C. 305 (see the rejections under 35 U.S.C. 305 below).

(e) Regarding Claims 72-83

Patent owner's arguments, see *id.* at Amendment pp. 27-28, with respect to claims 72-83, have been fully considered and are persuasive. The examiner agrees that Boie in combination with Gerpheide, Lee and/or Casio does not disclose at least all the limitations of base claim 72. Claims 72-83 are patentable.

(f) Regarding Claims 84-94

Patent owner's arguments, see *id.* at Amendment pp. 28-29, with respect to claims 84-94, have been fully considered and are persuasive. The examiner agrees that Boie in combination with Gerpheide, Lee and/or Casio does not disclose at least all the limitations of base claim 84. Claims 84-94 are patentable.

(g) Regarding Claims 95-105

Patent owner's arguments, see *id.* at Amendment pp. 29-30, with respect to the combinations of prior art references, Boie, Gerpheide, Casio and/or Lee, for the rejections of independent claim 95 and its dependent claims 96-105, have been fully considered but they are not persuasive because the discussion is directed to the issues and/or limitations that enlarge the scope of the claims of the '183 patent. As noted in claims 18 and 27 above, such issues may be considered and resolved in a reissue application. See 37 C.F.R. 1.552(c). It is noted that claims 95-105 are rejected under 35 U.S.C. 305 (see the rejections under 35 U.S.C. 305 below).

V. RELEVANT STATUTE - CLAIMS REJECTIONS

7. Relevant Statute

35 U.S.C. 305 Conduct of reexamination proceedings

After the times for filing the statement and reply provided for by **section 304** of this title have expired, reexamination will be conducted according to the procedures established for initial examination under the provisions of **sections 132** and **133** of this title. In any reexamination proceeding under this chapter, the patent owner will be permitted to propose any amendment to his patent and a new claim or claims thereto, in order to distinguish the invention as claimed from the prior art cited under the provisions of **section 301** of this title, or in response to a decision adverse to the patentability of a claim of a patent. No proposed amended or new claim enlarging the scope of a claim of the patent will be permitted in a reexamination proceeding under this chapter. All reexamination proceedings under this section, including any appeal to the Board of Patent Appeals and Interferences, will be conducted with special dispatch within the Office.

8. Claim Rejections

(a) Claim Rejections - 35 U.S.C. 305

Claims 18, 27, 40-44, 56-71, and 95-105 are rejected under 35 U.S.C. 305 as enlarging the scope of the claims 18 and 27 of the patent being reexamined. In 35 U.S.C. 305, it is stated that "[n]o proposed amended or new claim enlarging the scope of a claim of the patent will be permitted in a reexamination proceeding... ." A claim presented in a reexamination "enlarges the scope" of the patent claim(s) where the claim is broader than any claim of the patent. A claim is

broader in scope than the original claims if it contains within its scope any conceivable product or process which would not have infringed the original patent. A claim is broadened if it is broader in any one respect, even though it may be narrower in other respects.

Regarding amended base claim 18, the limitation: "the microcontroller selectively providing signal output frequencies, wherein a signal output frequency is selectively provided to each row of a plurality of small sized input touch terminals of a keypad;" recited in lines 3-5 enlarges the scope of the original patent claim 18 because it is different from the term "the microcontroller selectively providing signal output frequencies to a plurality of small sized input touch terminals of a keypad;" recited in lines 6-8 of the original base patent claim 18. The scope of patent claim 18 has been redefined and enlarged by said limitation in at least one respect. Specifically, the microcontroller is no longer being required to selectively provide signal output frequencies to a plurality of small sized input touch terminals of a keypad as compared with that of the original base patent claim 18; and thus, the claim is broader in scope in this respect. Claim 18 is therefore rejected.

Regarding new claims 40-44, which are dependent upon the amended base claim 18, and they are rejected on the same reason set forth for the amended base claim 18 above due to their dependency.

Regarding amended base claim 27, the limitation: "the microcontroller selectively providing signal output frequencies, wherein a signal output frequency is selectively provided to each row of a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;" recited in lines 4-7 enlarges the scope of the original patent claim 27 because it is different from the term "the microcontroller selectively

providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;" recited in lines 6-9 of the original base patent claim 27. The scope of patent claim 27 has been redefined and enlarged by said limitation in at least one respect. Specifically, the microcontroller is no longer being required to selectively provide signal output frequencies to a closely spaced array of input touch terminals of a keypad as compared with that of the original base patent claim 27; and thus, the claim is broader in scope in this respect. Claim 27 is therefore rejected.

Regarding new claims 66-71, which are dependent upon the amended base claim 27, and they are rejected on the same reason set forth for the amended base claim 27 above due to their dependency.

Regarding new claims 56-65, each recites the limitation: "the microcontroller selectively providing signal output frequencies, wherein a signal output frequency is selectively provided to each row of a plurality of small sized input touch terminals of a keypad;" in lines 3-5 of base claim 56, and which has been found to enlarge the scope of the '183 patent claim 18 (see the discussion for claim 18 above). Claim 56-65 are therefore rejected.

Regarding new claims 95-105, each recites the limitation: "the microcontroller selectively providing signal output frequencies, wherein a signal output frequency is selectively provided to each row of a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals;" in lines 4-7, and which has been found to enlarge the scope of the '183 patent claim 27 (see the discussion for claim 27 above). Claim 95-105 are therefore rejected.

VI. ALLOWABLE SUBJECT MATTER

9. Claims 45-55 and 72-94 are allowed.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

10. The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

The '183 patent generally relates to a capacitive responsive electronic switching circuit including an oscillator **200** providing a periodic output signal, a keypad having a plurality of input touch terminals **450** defining areas for an operator to provide inputs by proximity and touch, a microcontroller **500** using the periodic output signal from the oscillator for selectively providing signal output frequencies to the input touch terminals, and a detector circuit **400** coupled to the oscillator, the input touch terminals, and the microcontroller for providing a control output signal based on the presence of operator's body capacitance to ground coupled to the input touch terminal when in proximity or touched by an operator. See, e.g., the '183 patent, Abstract, Figures 4 and 11. Each of the independent claims 45, 72 and 84 identifies the uniquely distinct features that are not taught or suggested by the cited prior art patents and publications, either alone or in any reasonable combinations. Specifically,

(i) Independent claim 45 requires, *inter alia*, the features: "an oscillator (200) providing a periodic output signal having a predefined frequency;", "the microcontroller (500) selectively providing signal output frequencies directly to a plurality of small sized input touch terminals (57, 59) of a keypad", and "a detector circuit (400) coupled to said oscillator (200) 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 (CBODY) 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.", see Figures 3 and 4;

(ii) Independent claim 72 requires, *inter alia*, the features: "an oscillator (200) providing a periodic output signal having a predefined frequency;", "a microcontroller (500) using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies directly to a closely spaced array of input touch terminals (57, 59) of a keypad,", and "a detector circuit (400) coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said first and second touch terminals (57, 59), said detector circuit being responsive to signals from said oscillator via said microcontroller and a presence of an operator's body capacitance (CBODY) to ground coupled to said first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal." , see Figures 3 and 4; and

(iii) independent claim 84 requires, *inter alia*, the features: "an oscillator (200) providing a periodic output signal having a predefined frequency;", "a microcontroller(500) using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals (57, 59) of a keypad, the input touch terminals comprising first and second input touch terminals (57, 59), wherein a peak voltage of the signal output frequencies is greater than a supply voltage;", and "a detector circuit coupled to said oscillator for receiving said periodic output signal from said oscillator, and coupled to said first and second 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 first and second touch terminals when proximal or touched by the operator to provide a control output signal for actuation of the controlled keypad device, said detector circuit being configured to generate said control output signal when the operator is proximal or touches said second touch terminal after the operator is proximal or touches said first touch terminal.", see Figures 3 and 4

Whereas, the cited prior art:

Boie
Boie discloses a computer input device for use as a computer mouse or keyboard comprises a thin, insulating surface covering an array **100** of electrodes arranged in a grid pattern and connected in columns and rows, each column and row is connected to circuitry **401**, which can be selected by multiplexer **402** under control of microcontroller 406. See *id.* at col. 3:56-61. The selected output is forwarded to summing circuit **403**, the output of which is converted by synchronous detector and filter circuit **404** to a signal related to the capacitance of the row or column selected by the multiplexer. See *id.* at col. 3:62-67. The RF oscillator **408** provides an RF signal of, for example ,100 Kilohertz, to circuits **401**, synchronous detector and filter circuit **404** via inverter **410**, and guard plane **411**, which is a substantially continuous plane parallel to array **100** and associated connections, and serves to isolate array **100** from extraneous signals. See *id.* at col. 3:67 - col. 4:5. To measure separate capacitance values for each electrode in array **100** instead of the collective capacitances of subdivided electrode elements connected in rows and columns, a circuit **401** is provided for each electrode in array **100** and multiplexer **402** is

enlarged to accommodate the outputs from all circuits **401**. *See id.* at col. 4:14-21. The output of synchronous detector and filter **404** is converted to digital form by analog-to-digital converter **405** and forwarded to microcontroller **406** so that microcontroller 406 obtains a digital value representing the capacitance seen by any row or column of electrode elements (or electrode if measured separately) selected by multiplexer **402**. *See id.* at col. 4:22-28. Particularly, Boie discloses driving the electrodes of electrode array 100 and guard planes 411 with a single RF signal for minimizing the effects of electrode-to-electrode capacitances, wiring capacitances and other extraneous capacitances. See *id.* at col. 4:58-61.

Thus, Boie does not teach or suggest the microcontroller is used to selectively providing signal output frequencies to input touch terminals of a keypad.

Accordingly, Boie does not teach or suggest the above-identified underlined claimed features.

Gerpheide

Gerpheide teaches a system and method for a capacitance-based proximity sensor with interference rejection. See Abstract. The system **10** comprises an electrode array **12**, a synchronous electrode capacitance measurement unit **14**, a reference frequency generator **16**, and a position locator **18**. See *id.* at Figure 1, and col. 3:52 to col. 4:26. The electrode array consists of multiple X electrodes **20** and Y electrodes **22**. See *id.* at Figures 2A and 2B. The synchronous electrode capacitance measurement unit **14** is connected to the electrode array **12** and the reference frequency generator **16** for producing capacitive measurement signals. See *id.* at Figure 4, and col. 5:50-67. Particularly, Gerpheide teaches that the reference frequency generator **16** includes an oscillator **100** for driving a microcontroller **102** and a divide-by-(M+N) circuit **104**, for providing signal output frequencies and always selecting a reference frequency away from frequencies which have been found to result in measurement interference; wherein, N is a fixed constant, approximately 50, and M is specified by the microcontroller **102** to be, for example, one of four values in the ranges 61 KHz to 80 KHz as specified by the microcontroller **102**; and wherein, the microcontroller **102** performs the functions of interference evaluation 106 and frequency selection 108. See *id.* at Figure 7, and col. 8:20-43.

Thus, Gerpheide does not teach or suggest the synchronous electrode capacitance measurement unit is responsive to signals from the oscillator via said microcontroller and the presence of an operator's body capacitance (CBODY) to ground.

Accordingly, Gerpheide does not teach or suggest the above-identified underlined claimed features.

Casio

Casio teaches a Casio Calculator Watch, which is a timepiece product employing electro-touch technology. The watch works by reading finger-strokes traced across its face. See *id.*at col. 1. The transparent touch panel construction includes a fiberglass panel having a transparent

conductor film pattern (first layer) and a dielectric layer (second layer) overlying the fiberglass. See *id.*at col. 2. The touch panel determines figure and math symbols outlined with finger-strokes traced across the face. See *id.*at col. 1. The touch panel senses the input, and then digitizes it to extract features of the figure or math symbol. See *id.*at col. 2. The watch then outputs the corresponding figure or math symbol on the screen.

Thus, Casio does not teach or suggest the microcontroller is used to selectively providing signal output frequencies to input touch terminals of a keypad.

Accordingly, Casio does not teach or suggest the above-identified underlined claimed features.

Lee

Lee discloses a fast-scanning multiple-touch-sensitive input device comprising: a sensor matrix board, row and column selection registers, A/D converting circuits and a dedicated CPU. *See id.* at Figure 3.4. The row selection registers select one or more rows by setting the corresponding bits to a high state in order to charge up the sensors while the column selection registers select one or more columns by turn on corresponding analog switches to discharge the sensors through timing resistors. The intersecting region of the selected rows and the selected columns represents the selected sensors as a unit. See *id.* at Figure 3.1(a) shows a model of a selected sensor in the sensor matrix, Figure 3.1 (b) shows the timing diagram for discharging time measurement of a selected sensor, and Figure 3.2 illustrates a small section of a sensor matrix. Particularly, Lee describes the interface between the CPU and the sensor matrix as follows: The CPU selects the row or rows of a sensor group, initiating charging of all the associated sensors. After a charging interval, the CPU discharges the selected column or columns corresponding to a sensor group by connecting a group of discharge resistors whose current is summed via a high slew rate operational amplifier. Wherein, the CPU selects or deselects the row(s) by sending binary signals to the selected row(s). See *id.* at Figs. 3.1(a), 3.1(b), and 3.4, and page 3-10. As illustrated by the data bus of Figure 3.4.

Thus, Lee does not teach or suggest sending signal output frequencies to the selected rows and/or column.

Accordingly, Lee does not teach or suggest the above-identified underlined claimed features.

The above cited prior art references, Boie, Gerpheide, Casio and/or Lee, disclose conventional capacitive responsive switching devices for an operator provide an input by proximity and touch. However, said cited prior art references, either alone or in any reasonable combinations, fail to teach or suggest the above-identified underlined claimed features.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

VII. INFORMATION DISCLOSURE STATEMENT

With respect to the Information Disclosure Statements (PTO/SB/08A and 08B or its equivalent) filed on 12/24/2013, the material has been considered with this action, the information cited thereon has been considered to the extent suggested in the MPEP. Note that MPEP §§ 2256 and 2656 indicate that degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information.

Any duplicate citations noticed by the examiner have been lined through.

VIII. CONCLUSION

A. Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

B. Litigation Reminder

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '183 patent throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

C. Amendment Proposed in Reexamination – 37 CFR 1.530(d)-(j)

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c).

D. Correspondence and Inquiry as to Office Actions

All correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
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United States Patent & Trademark Office
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401 Dulany Street
Alexandria, VA 2231

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the data of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry by the patent owner concerning this communication or earlier communications from the Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Henry N Tran/
Patent Reexamination Specialist,
CRU - Art Unit 3992

Conferees:

/Albert Gagliardi/
Patent Reexamination Specialist,
CRU - Art Unit 3992

/SUDHANSHU PATHAK/
Supervisory Patent Examiner, Art Unit 3992

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Byron Hourmand
Art Unit	3992
Examiner Name	H. Tran
Attorney Docket Number	5796183RX

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4766368		1988-08-23	Cox	
	2	4825385		1989-04-25	Dolph, et al.	
	3	5305017		1994-04-19	Gerpheide	
	4	5337353		1994-08-09	Boie, et al.	
	5	5463388		1995-10-31	Boie, et al.	
	6	5565658		1996-10-15	Gerpheide, et al.	
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Receipt date: 12/24/2013	Application Number	90013106 - GAU: 3992
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	
	First Named Inventor	Byron Hourmand
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	1	BUXTON, B., "31.1: Invited Paper: A Touching Story: A Personal Perspective on the History of Touch Interfaces Past and Future," Society for Information Display (SID) Symposium Digest of Technical Papers, Vol. 41, No. 1, Session 31, May 2010, pp. 444-448.	☐
	2	HINCKLEY, K., et al., "38.2: Direct Display Interaction via Simultaneous Pen + Multi-touch Input," Society for Information Display (SID) Symposium Digest of Technical Papers, Vol. 41, No. 1, Session 38, May 2010, pp. 537-540.	☐
	3	LEE, S., "A Fast Multiple-Touch-Sensitive Input Device," University of Toronto, Department of Electrical Engineering, Master Thesis, October 1984, 118 pages.	☐
	4	HILLIS, W.D., "A High-Resolution Imaging Touch Sensor," The International Journal of Robotics Research, Vol. 1, No. 2, Summer (June - Aug.) 1982, pp. 33-44.	☐
	5	LEE, S.K., et al., "A Multi-Touch Three Dimensional Touch-Sensitive Tablet," Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, April 1985, pp. 21-25.	☐

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Receipt date: 12/24/2013	Application Number	90013106 - GAU: 3992
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	
	First Named Inventor	Byron Hourmand
	Art Unit	
	Examiner Name	
	Attorney Docket Number	5796183RX

	6	HLADY, A.M., "A touch sensitive X-Y position encoder for computer input," Proceedings of the Fall Joint Computer Conference, November 18-20, 1969, pp. 545-551.	☐
	7	SASAKI, L., et al., "A Touch-Sensitive Input Device," International Computer Music Conference Proceedings, November 1981, pp. 293-296.	☐
	8	CALLAHAN, J., et al., "An Empirical Comparison of Pie vs. Linear Menus," Human Factors in Computing Systems: Chicago '88 Conference Proceedings: May 15-19, 1988, Washington DC: Special Issue of the SIGCHI Bulletin, New York, Association for Computing Machinery, pp. 95-100.	☐
	9	CASIO, AT-550 Advertisement, published in Popular Science by On The Run, February 1984, p.-129.	☐
	10	CASIO, "Module No. 320," AT-550 Owner's Manual, at least as early as December 1984, 14 pages.	☐
	11	SMITH, S.D., et al., "Bit-slice microprocessors in h.f. digital communications," The Radio and Electronic Engineer, Vol. 51, No. 6, June 1981, pp. 299-301.	☐
	12	BOIE, R.A., "Capacitive Impedance Readout Tactile Image Sensor," Proceedings of the IEEE International Conference on Robotics and Automation, Vol. 1, March 1984, pp. 370-372.	☐
	13	THOMPSON, C., "Clive Thompson on The Breakthrough Myth," Wired Magazine, http://www.wired.com/magazine/2011/07/st_thompson_breakthrough, August 2011, 3 pages.	☐
	14	"Innovation in Information Technology," National Research Council of the National Academies, Computer Science and Telecommunications Board, Division on Engineering and Physical Sciences, http://www.nap.edu/catalog/10795.html, 2003, 85 pages.	☐
	15	BUXTON, W., et al., "Issues and Techniques in Touch-Sensitive Tablet Input," Proceedings of SIGGRAPH '85, Vol. 19, No. 3, July 22-26, 1985, pp. 215-223.	☐
	16	BUXTON, W., et al., "Large Displays in Automotive Design," IEEE Computer Graphics and Applications, July/August 2000, pp. 68-75.	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	
	First Named Inventor	Byron Hourmand
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	Attorney Docket Number	5796183RX

	17	BUXTON, W., "Lexical and Pragmatic Considerations of Input Structures," ACM SIGGRAPH Computer Graphics, Vol. 17, No. 1, January 1983, pp. 31-37.	☐
	18	BETTS, P., et al., "Light Beam Matrix Input Terminal," IBM Technical Disclosure Bulletin, October 1966, pp. 493-494.	☐
	19	BUXTON, B., "Multi-Touch Systems that I Have Known and Loved," downloaded from http://www.billbuxton.com/multitouchOverview.html, January 12, 2007, 22 pages.	☐
	20	HEROT, C.F., et al., "One-Point Touch Input of Vector Information for Computer Displays," Proceedings of the 5th Annual Conference on Computer Graphics and Interactive Techniques, August 23-25, 1978, pp. 210-216.	☐
	21	WOLFELD, J.A., "Real Time Control of a Robot Tacticle Sensor," University of Pennslyvania, Department of Computer & Information Science, Technical Reports (CIS), Master Thesis, http://repository.upenn.edu/cis reports/678, August 1981, 68 pages.	☐
	22	LEWIS, J.R., "Reaping the Benefits of Modern Usability Evaluation: The Simon Story," Advances in Applied Ergonomics: Proceedings of the 1st International Conference on Applied Ergonomics, ICAE May 21-24, 1996, pp. 752-755.	☐
	23	NAKATANI, L.H., et al., "Soft Machines: A Philosophy of User-Computer Interface Design," Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, December 1983, Chicago, pp. 19-23.	☐
	24	RUBINE, D.H., "The Automatic Recognition of Gestures," Carnegie Mellon University, Master Thesis, CMU-CS-91-202, December, 1991, 285 pages.	☐
	25	KURTENBACH, G.P., "The Design and Evaluation of Marking Menus," University of Toronto, Graduate Department of Computer Science, Master Thesis, May 1993, 201 pages.	☐
	26	HOPKINS, D., "The Design and Implementation of Pie Menus," originally published in Dr. Dobb's Journal, December 1991, lead cover story, user interface issue, reproduced at www.DonHopkins.com, 8 pages.	☐
	27	BUXTON, B., "The Long Nose of Innovation," Bloomberg Businessweek, Innovation & Design, January 2, 2008, 3 pages, downloaded from: http://www.businessweek.com/stories/2008-01-02/the-long-nose-of-innovationbusinessweek-business-news-stock-market-and-financialadvice.	☐

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	First Named Inventor	Byron Hourmand
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	Examiner Name	
	Attorney Docket Number	5796183RX

	28	BUXTON, B., "The Mad Dash Toward Touch Technology," Bloomberg Businessweek, Innovation & Design, October 21, 2009, 3 pages, downloaded from: http://www.businessweek.com/innovate/content/oct2009/id20091021_629186.htm.	☐
	29	"The Sensor Frame Graphic Manipulator," NASA Phase II Final Report, NASA-CR-194243, May 8, 1992, 28 pages.	☐
	30	IZADI, S., et al., "ThinSight: A Thin Form-Factor Interactive Surface Technology," Communications of the ACM, Research Highlights, Vol. 52, No. 12, December 2009, pp. 90-98.	☐
	31	KRUEGER, M.W., et al., "VIDEOPLACE - An Artificial Reality," Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, April 1985, pp. 35-40.	☐
	32	BROWN, E., et al., "Windows on Tablets as a Means of Achieving Virtual Input Devices," Proceedings of the IFIP TC13 Third International Conference on Human-Computer Interaction, August 27-31, 1990, in D. Diaper, et al. (Eds), Human-Computer Interaction - INTERACT '90, Amsterdam: Elsevier Science Publishers B.V. (North Holland), 11 pages.	☐
	33	"A Multi-Touch Three Dimensional Touch-Sensitive Tablet," http://www.youtube.com/watch?v=Arrus9CxUiA, November 18, 2009, 1 page.	☐
	34	"Casio AT-550 Touch Screen Calculator Watch (1984)," http://www.youtube.com/watch?v=UhVAsqhfhqU, May 24, 2012, 1 page.	☐

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EXAMINER SIGNATURE

Examiner Signature	/Henry Tran/ (03/18/2014)	Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Receipt date: 12/24/2013	Application Number	90013106 - GAU: 3992
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	First Named Inventor	Byron Hourmand
	Art Unit	
	Examiner Name	
	Attorney Docket Number	5796183RX

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Brian A. Carlson/	Date (YYYY-MM-DD)	2013-12-24
Name/Print	Brian A. Carlson	Registration Number	37,793

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014								
	1	N								
	2	N								
	3	N								
	4	N								
	5	N								
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	7	N								
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	32	N								
	33	N								
	34	N								
	35	-								
	36	N								

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

CLAIM		DATE								
Final	Original	03/20/2014								
	37	N								
	38	N								
	39	N								
	40	✓								
	41	✓								
	42	✓								
	43	✓								
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	71	✓								
	72	=								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	03/20/2014								
	73	=								
	74	=								
	75	=								
	76	=								
	77	=								
	78	=								
	79	=								
	80	=								
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	100	✓								
	101	✓								
	102	✓								
	103	✓								
	104	✓								
	105	✓								

Reexamination	**Application/Control No.**	**Applicant(s)/Patent Under Reexamination**
	90013106	5796183
	Certificate Date	**Certificate Number**
	04/29/2013	5796183C1

Requester Correspondence Address: ☒ **Patent Owner** ☐ **Third Party**
SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793

LITIGATION REVIEW ☒	/HT/ (examiner initials)	03/10/2014 (date)
Case Name		Director Initials
1:06cv 1777 - CLOSED		
2:03cv75169 - CLOSED		
1:10cv691 - CLOSED		
2:06cv500 -CLOSED		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
1. NONE	

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Review of patented file's prosecution history	03/102014/	HT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No.:	5,796,183 B1	§	Docket No.:	5796183RX2
Issued:	August 18, 1998	§	Inventors:	Hourmand et al.
Filed:	January 31, 1996	§	Patent Owner:	UUSI, LLC
Control No.	90/013,106	§	Examiner:	Henry N. Tran

For: Capacitive Responsive Electronic Switching Circuit

Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

WAIVER OF PATENT OWNER'S STATEMENT

Dear Sir:

Patent Owner UUSI, LLC respectfully notifies the Office that Patent Owner waives the filing of a statement under 37 C.F.R. § 1.530 to expedite the reexamination proceeding. Patent Owner respectfully requests that the reexamination proceeding be allowed to proceed immediately pursuant to 37 C.F.R. § 1.550(a). *See* M.P.E.P. § 2249.

If the Examiner should have any questions, please contact the Patent Owner's Attorney, Brian A. Carlson, at 972-732-1001. The Commissioner is hereby authorized to charge any fees due in connection with this filing, or credit any overpayment, to Deposit Account No. 50-1065.

Respectfully submitted,

March 4, 2014
Date

/Brian A. Carlson/
Brian A. Carlson
Reg. No. 37,793

Slater & Matsil, L.L.P.
17950 Preston Rd., Suite 1000
Dallas, TX 75252
972-732-1001
972-732-9218 (fax)

Electronic Acknowledgement Receipt	
EFS ID:	18368569
Application Number:	90013106
International Application Number:	
Confirmation Number:	9188
Title of Invention:	Capacitive Responsive Electronic Switching Circuit
First Named Inventor/Applicant Name:	5796183
Customer Number:	25962
Filer:	Brian A. Carlson/Michelle Hatcher
Filer Authorized By:	Brian A. Carlson
Attorney Docket Number:	NAR-5796183RX2
Receipt Date:	04-MAR-2014
Filing Date:	24-DEC-2013
Time Stamp:	18:08:23
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	NAR-5796183RX2_WaiverOfPatentOwnerStatement.pdf	17322 b992900dd5ad2cd0648f69ed45e716cc7863ac26	no	1
Warnings:					
Information:					

Total Files Size (in bytes):	17322

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,106	12/24/2013	5796183	NAR-5796183RX2	9188

25962 7590 02/26/2014

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

EXAMINER	
TRAN, HENRY N	
ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
02/26/2014	PAPER

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

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

Order Granting / Denying Request For Ex Parte Reexamination	**Control No.** 90/013,106	**Patent Under Reexamination** 5796183
	Examiner HENRY N. TRAN	**Art Unit** 3992

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

The request for *ex parte* reexamination filed *24 December 2013* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☒ PTO/SB/08, c)☐ Other: _____

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2. ☐ The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 (c) will be made to requester:

a) ☐ by Treasury check or,

b) ☐ by credit to Deposit Account No. _____, or

c) ☐ by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).

/HENRY N TRAN/ Primary Examiner, Art Unit 3992		

cc:Requester (if third party requester)

The present application is being examined under the pre-AIA first to invent provisions.

DECISION GRANTING EX PARTE REEXAMINATION

I. DECISION

1. A substantial new question of patentability (SNQ) affecting claims 18 and 27 of United States Patent Number 5,796,183 C1 to Hourmand et al. (the '183 patent) is raised by the request for *ex parte* reexamination under 35 U.S.C §§ 301-307 filed by the Patent Owner on December 24, 2013.

2. Pursuant to 37 CFR 1.515, it is agreed that a SNQ affecting claims 18 and 27 of the '183 patent has been found based on the request and the prior art patents and/or publications cited therein.

3. The request for *ex parte* reexamination is granted.

II. PRIOR ART PATENTS AND PUBLICATION CITED IN THE REQUEST

4. In the request for reexamination, the requester alleged that the following prior art patents and publication raise a SNQ as to claims 18 and 27 of the '183 patent:

- U.S. Patent No. 5,463,388 issued to Boie et al. on October 31, 1995 ("Boie" or the '388 patent), and filed with the request as Exhibit C.
- U.S. Patent No. 5,565,658 issued to Gerpheide et al. on October 15, 1996 ("Gerpheide" or the '658 patent), and filed with the request as Exhibit D.
- Casio advertisement entitled "Now... The Invisible Casio Calculator Watch," published in Popular Science by On the Run in 1984 ("Casio"), and filed with the request as Exhibit E.

The cited prior art patents and/or publication submitted with the request pursuant to C.F.R. § 1.510(b) (3) are listed in form PTO/SB/08 filed with the request.

Boie filed on January 29, 1993, Gerpheide filed on December 7, 1994, and Casio published in 1984; and which are all prior to the Critical Date of January 31, 1996 - which is the filing date of the '183 patent - constitute effective prior art reference as to the claims of the '183 patent under 35 U.S.C. §102(a), 102(e), or 102(b).

It is noted that Boie was previously cited/considered, i.e., "old art", by the Office in an earlier concluded *ex parte* reexamination control number 90/012,439 of the patent being reexamined, which is hereinafter referred to as "the first request".

III. A SUBSTANTIAL NEW QUESTION OF PATENTABILITY (SNQ)

5. The requester alleges that the combination of Boie with Gerpheide and/or Casio raises a SNQ regarding claims 18 and 27 of the '183 patent (see the request, section III.C page 17).

IV. PROSECUTION HISTORY OF THE '183 PATENT

6. The '183 patent stems from United States Patent Application No. 08/601,268 (hereinafter referred to as "the base application") and the first request for *ex parte* reexamination.

The examiner generally agrees with the description of the prosecution history found in section I. B of the request at pp. 5-9.

With respect to the Examiner's statement of reasons for patentability of claims 18, 27, 28, and 32-39, the prosecution history of the first request indicates:

• On April 10, 2013, the Notice of Intent to Issue Ex Parte Reexamination Certificate was issued with the Examiner's statement of reasons for patentability of the claims provided in pp. 3-4, which is repeated below:

"There is not taught or disclosed in the prior art *a capacitive responsive electronic switching circuit having 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*, as called for in independent claim 18; nor *a capacitive responsive electronic switching circuit having a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals*, as called for in independent claims 27 and 37. The examiner agrees with the discussion articulated by Patent Owner in the Statement that Boie does not teach or suggest these claim elements. Rather, Boie discloses that "RF oscillator 408 provides an RF signal, for example, 100 kilohertz, to circuits 401, synchronous detector and filter 404 via inverter 410, and guard plane 411." Boie, col. 3:67-col. 4:2. Boie further discloses that "[t]he effects of electrode-to-electrode capacitances, wiring capacitances and other extraneous capacitances are minimized by driving all electrodes and guard plane 411 in unison with the same RF signal from RF oscillator 408." Id. at col. 4:58-60 (emphasis added); *see id.* at Fig. 4. Thus Boie discloses driving the electrodes of electrode array 100 and guard plane 411 with a single RF signal. Boie does not teach or suggest providing signal output frequencies to these components. Accordingly, claims 18, 27, amended non-requested claims 28, 32, and newly added claims 33-39 are patentable."

• On April 29, 2013, the Ex Parte Reexamination Certificate was issued as United States Patent Number 5,796,183 C1.

7. In view of the prosecution history, it appears that the reason for allowance of claims 18 and 27 is the fact that no cited prior art reference was considered during the prosecution of the '183 patent that teaches or suggests the following limitation or limitations: *"a capacitive responsive electronic switching circuit having 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"* (independent claim 18); and "*a capacitive responsive electronic switching circuit having a microcontroller using the periodic output signal from the oscillator, the microcontroller selectively providing signal output frequencies to a closely spaced array of input touch terminals of a keypad, the input touch terminals comprising first and second input touch terminals"* (independent claim 27).

V. CRITERIA FOR DECIDING REQUEST

8. MPEP § 2240 provides:

37 C.F.R. 1.515 Determination of the request for ex parte reexamination.

- (a) Within three months following the filing date of a request for an *ex parte* reexamination, an examiner will consider the request and determine whether or not a substantial new question of patentability affecting any claim of the patent is raised by the request and the prior art cited therein, with or without consideration of other patents or printed publications. The examiner's determination will be based on the claims in effect at the time of the determination, will become a part of the official file of the patent, and will be mailed to the patent owner at the address as provided for in § **1.33(c)** and to the person requesting reexamination.

9. MPEP § 2242 provides:

For "a substantial new question of patentability" to be present, it is only necessary that: (A) the prior art patents and/or printed publications raise a substantial question of patentability regarding at least one claim, i.e., the teaching of the (prior art) patents and printed publications is such that a reasonable examiner would consider the teaching to be important in deciding whether or not the claim is patentable; and (B) the same question of patentability as to the claim has not been decided by the Office in a previous examination or pending reexamination of the patent or in a final holding of invalidity by the Federal Courts in a decision on the merits involving the claim. It is not necessary that a "*prima facie*" case of unpatentability exist as to the claim in order for "a substantial new question of patentability" to be present as to the claim. Thus, "a substantial new question of patentability" as to a patent claim could be present even if the examiner would not necessarily reject the claim as either fully anticipated by, or obvious in view of, the prior art patents or printed publications. As to the importance of the difference between "a substantial new question of patentability" and a "*prima facie*" case of unpatentability see generally *In re Etter,* 756 F.2d 852, 857 n.5, 225 USPQ 1, 4 n.5 (Fed. Cir. 1985).

VI. ANALYSIS OF PRIOR ART AND PROPOSED REJECTIONS

10. In view of the prosecution history and the criteria for deciding request noted above, it is considered that a prior art reference or a combination of prior art references that discloses or fairly suggests at least some or all of the main components of the claimed invention noted in the reasons for patentability of claims in the first request reexamination of the '183 patent, or an equivalent thereof, would raise a SNQ.

11. Summary of the '183 patent

The '183 patent relates to a capacitive responsive electronic switching circuit including an oscillator providing a periodic output signal, an input touch terminal defining an area for an operator to provide an input by proximity and touch, and a detector circuit coupled to the oscillator for receiving the periodic output signal from the oscillator, and coupled to the input touch terminal. See Abstract.

An embodiment with a single touch terminal is shown in Figure 4, and an embodiment with multiple touch terminals is shown in Figure 11, both of which are reproduced below:

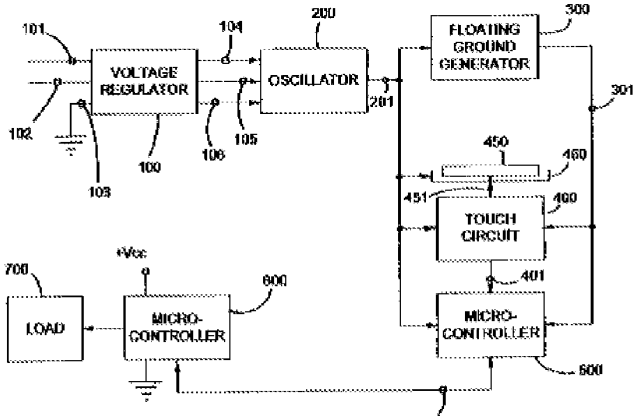


Fig. 4

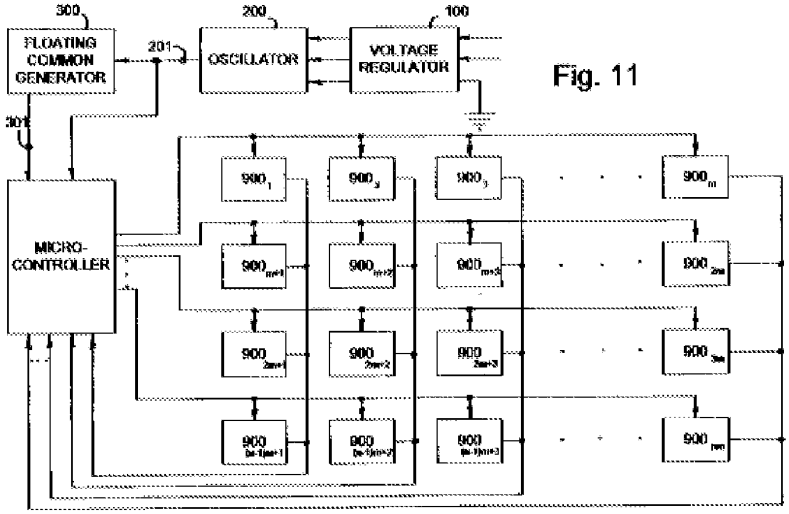


Fig. 11

The multiple touch pad circuit of Figure 11 is a variation of the embodiment shown in Figure 4, but with an array of touch circuits designated as $\mathbf{900_1}$ through $\mathbf{900_{nm}}$. Microcontroller **500** selects each row of the touch circuits $\mathbf{900_1}$ to $\mathbf{900_{nm}}$ by providing the signal from oscillator **200** to selected rows of touch circuits. *See, id.* at col.18:43-46. The values of the resistors and capacitors utilized in oscillator **200** may be varied to provide for different oscillator output frequencies. *See, id.* at col. 14:22-25. Although the preferred frequency is at or above 100 kHz, and more preferably at or above 800 kHz, it is conceivable that frequencies as low as 50 kHz could be used provided the frequency creates a difference in the impedance paths of adjacent pads that is sufficient enough to accurately distinguish between an intended touch and the touch of an adjacent pad. *See, id.* at col. 11:19-25. Microcontroller **500** sequentially activates the touch circuit rows and associates the received inputs from the columns

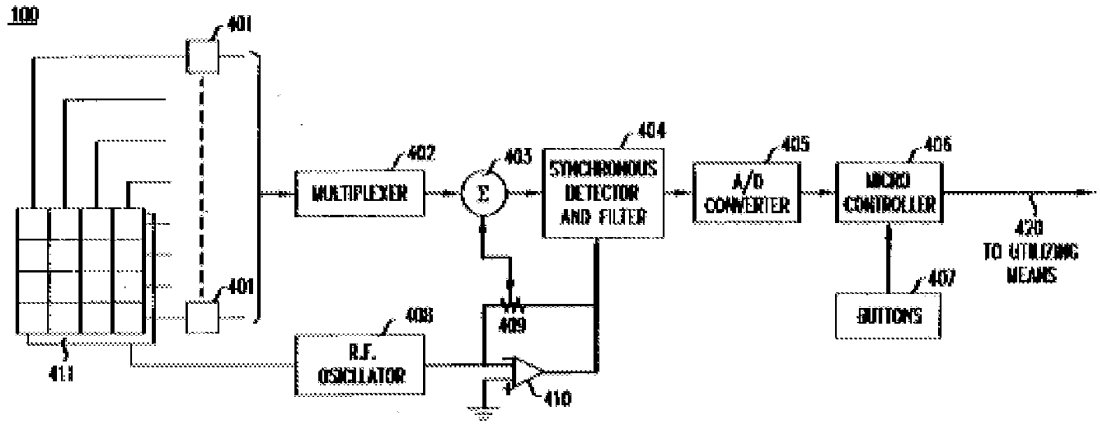
of the array with the activated touch circuit(s). *See, id.* at col. 18:46-49. The detector circuit is responsive to signals from the oscillator and the presence of an operator's body capacitance to ground coupled to the touch terminal when in proximity or touched by an operator to provide a control output signal. *See, id.* at Abstract. Another method for implementing capacitive touch switches relies on the change in capacitive coupling between a touch terminal and ground. *See, id.* at col. 3:44-46. "

12. Summary of the prior art references

Boie

Boie teaches a computer input device for use as a computer mouse or keyboard comprises a thin, insulating surface covering an array of electrodes arranged in a grid pattern and connected in columns and rows, each column and row is connected to circuitry for measuring the capacitance seen by each column and row, and the position of an object with respect to the array is determined from the centroid of such capacitance values, which is calculated in a microcontroller. See Abstract. Particularly, Boie Figure 4 illustrates a block diagram of a two-dimensional capacitive position sensor device.

FIG. 4



The device comprises an electrode array **100** having rows and columns of electrodes, each row and column of electrodes is connected to an integrating amplifier and bootstrap circuit **401**, each of the outputs from circuits **401** can be selected by multiplexer **402** under control of microcontroller **406**. The selected output is then forwarded to summing circuit **403**, where such output is combined with a signal from trimmer resistor **409**. Synchronous detector and filter **404** convert the output from summing circuit to a signal related to the capacitance of the row or column selected by the multiplexer. RF oscillator **408** provides an RF signal, for example, 100 kilohertz, to circuits **401**, synchronous detector and filter **404** via inverter **410**, and guard plane **411**. Guard plane **411** is a substantially continuous plane parallel to array **100** and associated

connections, and serves to isolate array **100** from extraneous signals. See id. at col. 3:67 to col. 4:5. To measure separate capacitance values for each electrode in array **100** instead of the collective capacitances of subdivided electrode elements connected in rows and columns, a circuit **401** is provided for each electrode in array **100** and multiplexer **402** is enlarged to accommodate the outputs from all circuits **401**. See id. at col. 4:14-21. The output of synchronous detector and filter **404** is converted to digital form by analog-to-digital converter **405** and forwarded to microcontroller **406**. Thus, microcontroller 406 can obtain a digital value representing the capacitance seen by any row or column of electrode elements (or electrode if measured separately) selected by multiplexer **402**. See id. at col. 4:22-28.

Gerpheide

Gerpheide teaches a system and method for a capacitance-based proximity sensor with interference rejection. See Abstract. The system **10** comprises an electrode array **12**, a synchronous electrode capacitance measurement unit **14**, a reference frequency generator **16**, and a position locator **18**. See Figure 1, and col. 3:52 to col. 4:26. The electrode array consists of multiple X electrodes **20** and Y electrodes **22**. See Figures 2A and 2B. The synchronous electrode capacitance measurement unit 14 is connected to the electrode array 12 and the reference frequency generator 16 for producing capacitive measurement signals. See Figure 4, and col. 5:50-67.

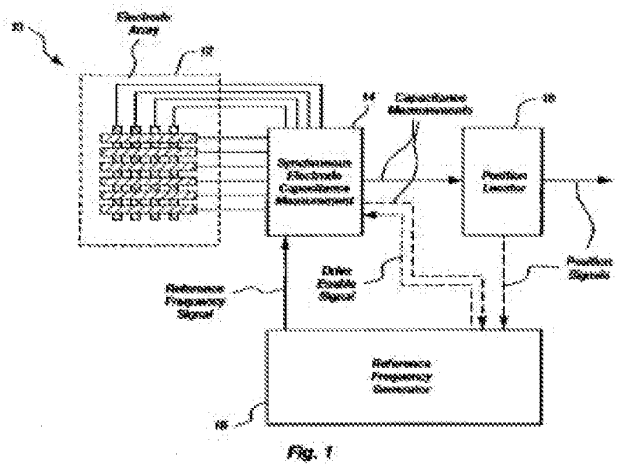


Fig. 1

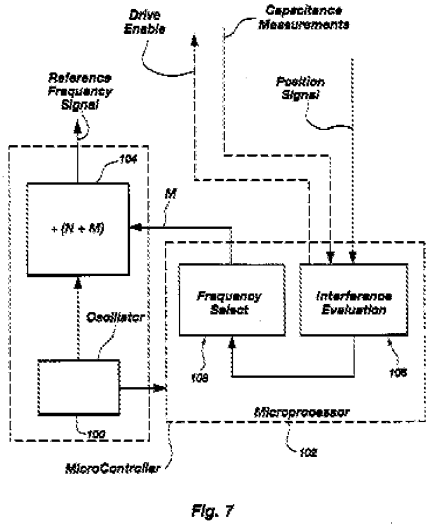


Fig. 7

The reference frequency generator includes an oscillator 100 for driving a microcontroller 102 and a divide-by-(M+N) circuit 104, for providing signal output frequencies in the range 61KHz to 80KHz; wherein, N is a fixed constant, and M is specified by the microcontroller using capacitive measurement signals and position signals. See Figure 7, and col. 8:20-38.

Casio

Casio discloses a Casio Calculator Watch, which is a timepiece product employing electro-touch technology. The watch works by reading finger-strokes traced across its face. See, Casio, col. 1. The transparent touch panel construction includes a fiberglass panel having a transparent conductor film pattern (first layer) and a dielectric layer (second layer) overlying the fiberglass. See id. at col. 2. The touch panel determines figure and math symbols outlined with finger-strokes traced across the face. See id. at col. 1. The touch panel senses the input, and then digitizes it to extract features of the figure or math symbol. See id. at col. 2. The watch then outputs the corresponding figure or math symbol on the screen.

13. Discussion of the Issues

Issue 1: The requester alleges that the combination of Boie with Gerpheide raises a SNQ regarding claim 18 of the '183 patent.

It is agreed that the combination of Boie with Gerpheide raises a SNQ regarding claim 18 of the '183 patent.

As pointed out in the request sections II.B pp. 10-15 and III.A of the claim chart pp. 21-27 for claim 18, Boie teaches a capacitive sensor array 100 comprises a RF oscillator 408 for providing an RF signal having a predefined frequency, e.g., 100KHz, to circuits 401, synchronous detector and filter 404 via inverter 410, and guard plane 411, see Figure 4, and col. 3:67 to col. 4:2. Gerpheide teaches a capacitive sensor system 10 comprises a reference frequency generator 16 that seeks to always select a reference frequency away from frequencies which have been found to result in measurement interference; wherein, the reference frequency generator includes an oscillator 100 for driving a microcontroller 102 and a divide-by-(M+N) circuit 104 for providing signal output frequencies in the range 61KHz to 80KHz. See Figure 7, and col. 8:20-38. Thus, Boie and Gerpheide teach the elements and limitations that led to the patentability of claim 18 of the '183 patent.

The teachings of Boie and Gerpheide present a new, non-cumulative technological teachings that was not previously considered in the prosecution of the '183 patent. Furthermore, there is a substantial likelihood that a reasonable examiner would consider the teachings of Boie and Gerpheide important in deciding whether or not claim 18 is patentable.

Accordingly, it is agreed that the combination of Boie and Gerpheide raises a SNQ of claim 18 which has not been decided in the prior examinations of the '183 patent.

Issue 2: The requester allege that the combination of Boie with Gerpheide and/or Casio raises a SNQ regarding claim 27 of the '183 patent.

It is agreed that the combination of Boie with Gerpheide and/or Casio raises a SNQ regarding claim 27 of the '183 patent.

As pointed out in the request sections II.B pp. 10-17 and III.A of the claim chart pp. 27-33 for claim 27, Boie teaches a capacitive sensor array 100 comprises a RF oscillator 408 for providing an RF signal having a predefined frequency, e.g., 100KHz, to circuits 401, synchronous detector and filter 404 via inverter 410, and guard plane 411, see Figure 4, and col. 3:67 to col. 4:2. Gerpheide teaches a capacitive sensor system 10 comprises a reference frequency generator 16 that seeks to always select a reference frequency away from frequencies which have been found to result in measurement interference; wherein, the reference frequency generator includes an oscillator 100 for driving a microcontroller 102 and a divide-by-(M+N) circuit 104 for providing signal output frequencies in the range 61KHz to 80KHz. See Figure 7, and col. 8:20-38. Casio teaches a calculator watch employing electro-touch technology using a transparent touch panel (a keypad). The transparent touch panel construction includes a fiberglass panel having a

transparent conductor film pattern (first layer) and a dielectric layer (second layer) overlying the fiberglass. See Figure at col. 2.

Thus, Boie and Gerpheide and/or Casio teach the elements and limitations that led to the patentability of claim 27 of the '183 patent.

The teachings of Boie and Gerpheide and/or Casio present a new, non-cumulative technological teachings that was not previously considered in the prosecution of the '183 patent. Furthermore, there is a substantial likelihood that a reasonable examiner would consider the teachings of Boie and Gerpheide and/or Casio important in deciding whether or not claim 27 is patentable.

Accordingly, it is agreed that the combination of Boie and Gerpheide and/or Casio raises a SNQ of claim 27 which has not been decided in the prior examinations of the '183 patent.

VII. INFORMATION DISCLOSURE STATEMENT

14. With respect to the Information Disclosure Statement (PTO/SB/08A and 08B or its equivalent) filed on 12/24/2013, the material has been considered with this action; the information cited thereon has been considered to the extent suggested in the MPEP.

Note that MPEP §§ 2256 and 2656 indicate that degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information. Any duplicate citations noticed by the examiner have been lined through.

It is noted that, according to 37 C.F.R. 1.515 (a), the examiner's decision on the SNQ issues recited in this order is based on only the consideration of patents and publication cited in the request section II.A (page 10). The other patents or printed publications listed in form PTO/SB/08a filed with the request have not been considered and been lined through; and they will be considered after this order as appropriate.

VIII. CONCLUSION

15. The prior art patents and publication, Boie and Gerpheide and Casio, set forth in the request have been considered. They raise SNQs affecting claims 18 and 27 of the '183 patent. Accordingly, the request for *ex parte* reexamination is granted. Claims 18 and 27 of the '183 patent will be reexamined. Claims 1-17, 19-26, and 28-39 of the '183 patent will not be reexamined.

16. The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the '183 patent throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

17. Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

18. Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c).

It is noted that the Patent Owner's Amendment Accompanying Request filed on 12/24/2013 will be addressed subsequently following this Order Granting Request for *ex parte* reexamination as appropriate.

19. **All** correspondence related to this ex parte reexamination proceeding should be directed as follows:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the data of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry by the patent owner concerning this communication or earlier communications from the Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/Henry N Tran/
Patent Reexamination Specialist,
CRU - Art Unit 3992

Conferees:

/Albert Gagliardi/
Patent Reexamination Specialist,
CRU - Art Unit 3992

/Sudhanshu C. Pathak/
Supervisory Patent Reexamination Specialist,
CRU - Art Unit 3992

Order Granting / Denying Request For Ex Parte Reexamination	**Control No.** 90/013,106	**Patent Under Reexamination** 5796183
	Examiner HENRY N. TRAN	**Art Unit** 3992

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

The request for *ex parte* reexamination filed *24 December 2013* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☒ PTO/SB/08, c)☐ Other: _____

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2. ☐ The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 (c) will be made to requester:

a) ☐ by Treasury check or,

b) ☐ by credit to Deposit Account No. _____, or

c) ☐ by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).

/HENRY N TRAN/ Primary Examiner, Art Unit 3992		

cc:Requester (if third party requester)

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Examiner	Art Unit
	HENRY N TRAN	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Review of patented file's prosecution history	02/06/2014	HT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013106	5796183
	Certificate Date	Certificate Number
	04/29/2013	5796183C1

Requester Correspondence Address:	☒ Patent Owner	☐ Third Party

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

LITIGATION REVIEW ☒	/HT/ (examiner initials)	02/06/2014 (date)
Case Name		Director Initials
1:06cv 1777 - CLOSED		
2:03cv75169 - CLOSED		
1:10cv691 - CLOSED		
2:06cv500 -CLOSED		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1. NONE	

	/HENRY N TRAN/ Primary Examiner.Art Unit 3992

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	90/013106
Filing Date	12/24/2013
First Named Inventor	Byron Hourmand
Art Unit	3992
Examiner Name	H. Tran
Attorney Docket Number	5796183RX

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4766368		1988-08-23	Cox	
	2	4825385		1989-04-25	Dolph, et al.	
	3	5305017		1994-04-19	Gerpheide	
	4	5337353		1994-08-09	Boie, et al.	
/HT/	5	5463388		1995-10-31	Boie, et al.	
/HT/	6	5565658		1996-10-15	Gerpheide, et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear

Receipt date: 12/24/2013	Application Number	90013106 - GAU: 3992
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Filing Date	
	First Named Inventor	Byron Hourmand
	Art Unit	
	Examiner Name	
	Attorney Docket Number	5796183RX

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	BUXTON, B., "31.1: Invited Paper: A Touching Story: A Personal Perspective on the History of Touch Interfaces Past and Future," Society for Information Display (SID) Symposium Digest of Technical Papers, Vol. 41, No. 1, Session 31, May 2010, pp. 444-448.	☐
	2	HINCKLEY, K., et al., "38.2: Direct Display Interaction via Simultaneous Pen + Multi-touch Input," Society for Information Display (SID) Symposium Digest of Technical Papers, Vol. 41, No. 1, Session 38, May 2010, pp. 537-540.	☐
	3	LEE, S., "A Fast Multiple-Touch-Sensitive Input Device," University of Toronto, Department of Electrical Engineering, Master Thesis, October 1984, 118 pages.	☐
	4	HILLIS, W.D., "A High-Resolution Imaging Touch Sensor," The International Journal of Robotics Research, Vol. 1, No. 2, Summer (June - Aug.) 1982, pp. 33-44.	☐
	5	LEE, S.K., et al., "A Multi-Touch Three Dimensional Touch-Sensitive Tablet," Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, April 1985, pp. 21-25.	☐