



US009372580B2

(12) **United States Patent**
Simmons et al.

(10) **Patent No.:** **US 9,372,580 B2**
(45) **Date of Patent:** **Jun. 21, 2016**

(54) **ENHANCED TOUCH DETECTION METHODS**

(75) Inventors: **Martin John Simmons**, Southampton (GB); **Darren Golbourn**, Southampton (GB); **Daniel Pickett**, Southampton (GB); **Andrew Hersee**, Southampton (GB)

(73) Assignee: **Atmel Corporation**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 425 days.

8,031,094 B2	10/2011	Hotelling	
8,031,174 B2	10/2011	Hamblin	
8,040,326 B2	10/2011	Hotelling	
8,049,732 B2	11/2011	Hotelling	
8,179,381 B2	5/2012	Frey	
8,462,135 B1 *	6/2013	Xiao et al.	345/174
8,482,544 B2 *	7/2013	Land et al.	345/174
8,692,795 B1 *	4/2014	Kremin et al.	345/174
8,773,146 B1 *	7/2014	Hills et al.	324/658
8,810,544 B2 *	8/2014	Liu et al.	345/174
2009/0315854 A1	12/2009	Matsuo	
2010/0001966 A1 *	1/2010	Lii et al.	345/173
2012/0049869 A1 *	3/2012	Kremin et al.	324/679
2012/0206407 A1 *	8/2012	Taylor et al.	345/174

(Continued)

(21) Appl. No.: **13/332,945**

FOREIGN PATENT DOCUMENTS

(22) Filed: **Dec. 21, 2011**

WO WO 2012/129247 9/2012

(65) **Prior Publication Data**

OTHER PUBLICATIONS

US 2013/0162583 A1 Jun. 27, 2013

U.S. Appl. No. 61/454,936, filed Mar. 21, 2011, Myers.

(Continued)

(51) **Int. Cl.**

G06F 3/045 (2006.01)
G06F 3/044 (2006.01)
G06F 3/041 (2006.01)

Primary Examiner — Aneeta Yodichkas
Assistant Examiner — Joseph Fox
(74) *Attorney, Agent, or Firm* — Baker Botts L.L.P.

(52) **U.S. Cl.**

CPC **G06F 3/044** (2013.01); **G06F 3/0416** (2013.01); **G06F 3/0418** (2013.01); **G06F 2203/04104** (2013.01); **G06F 2203/04112** (2013.01)

(57) **ABSTRACT**

(58) **Field of Classification Search**

CPC G06F 3/044; G06F 3/0416; G06F 3/0418; G06F 2203/04104; G06F 2203/04112
USPC 345/174
See application file for complete search history.

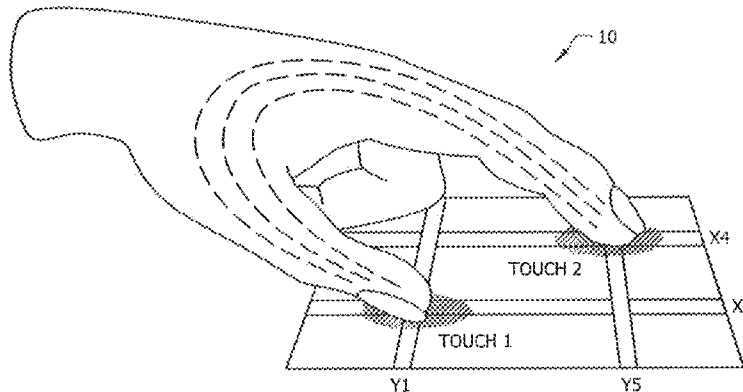
In one embodiment, a method includes sending a first set of signals to a first set of lines of a touch sensor. The method also includes receiving a second set of signals on a second set of lines of the touch sensor in response to sending the first set of signals. The second set of lines are capacitively coupled to the first set of lines. The method includes sending a third set of signals and receiving a fourth set of signals. The fourth set of signals is capacitively generated based on the third set of signals. The method also includes determining a fifth set of signals by compensating the second set of signals based on the fourth set of signals and determining whether a touch occurred based on the fifth set of signals.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,663,607 B2 * 2/2010 Hotelling et al. 345/173
7,875,814 B2 1/2011 Chen
7,920,129 B2 4/2011 Hotelling

12 Claims, 3 Drawing Sheets



(56)

References Cited

OTHER PUBLICATIONS

U.S. PATENT DOCUMENTS

2012/0242588 A1 9/2012 Myers
2012/0242592 A1 9/2012 Rothkopf
2012/0243151 A1 9/2012 Lynch
2012/0243719 A1 9/2012 Franklin

U.S. Appl. No. 61/454,950, filed Mar. 21, 2011, Lynch.
U.S. Appl. No. 61/454,894, filed Mar. 21, 2011, Rothkopf.

* cited by examiner

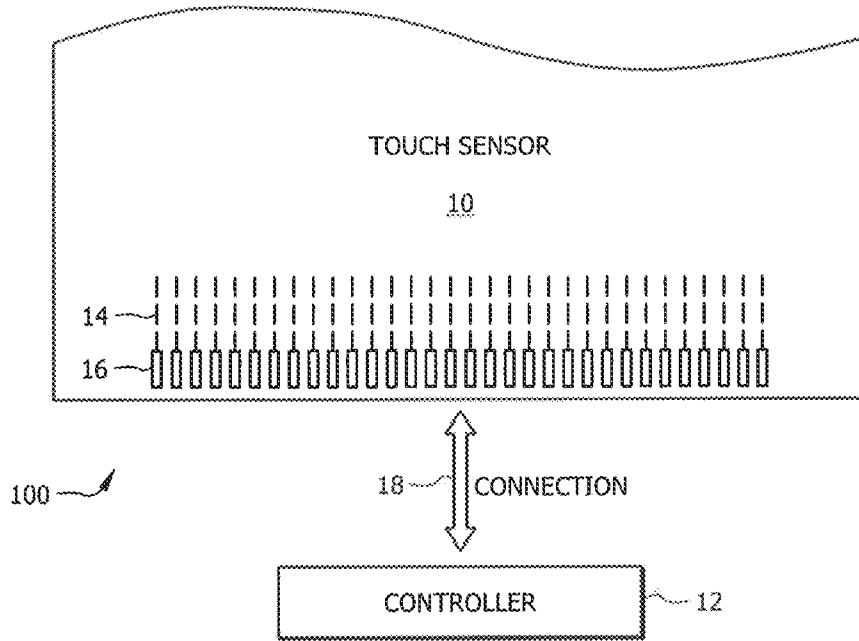


FIG. 1A

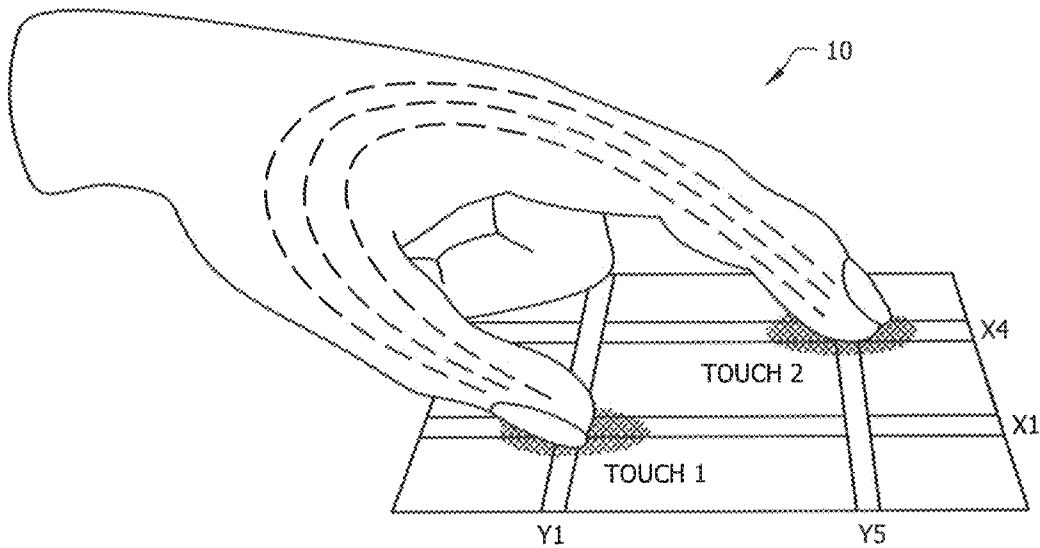


FIG. 1B

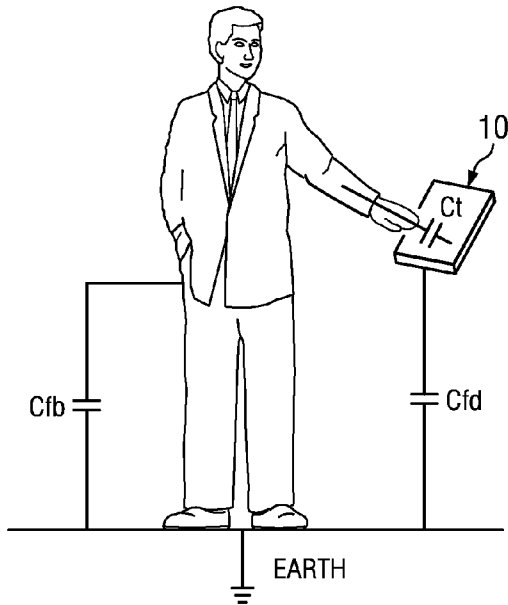


FIG. 1C

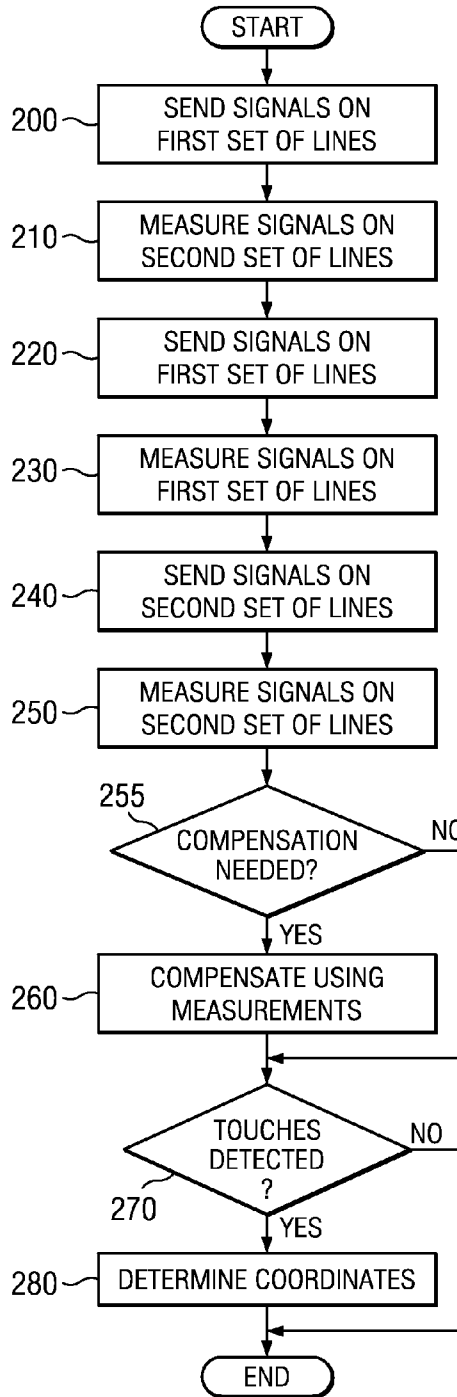


FIG. 2

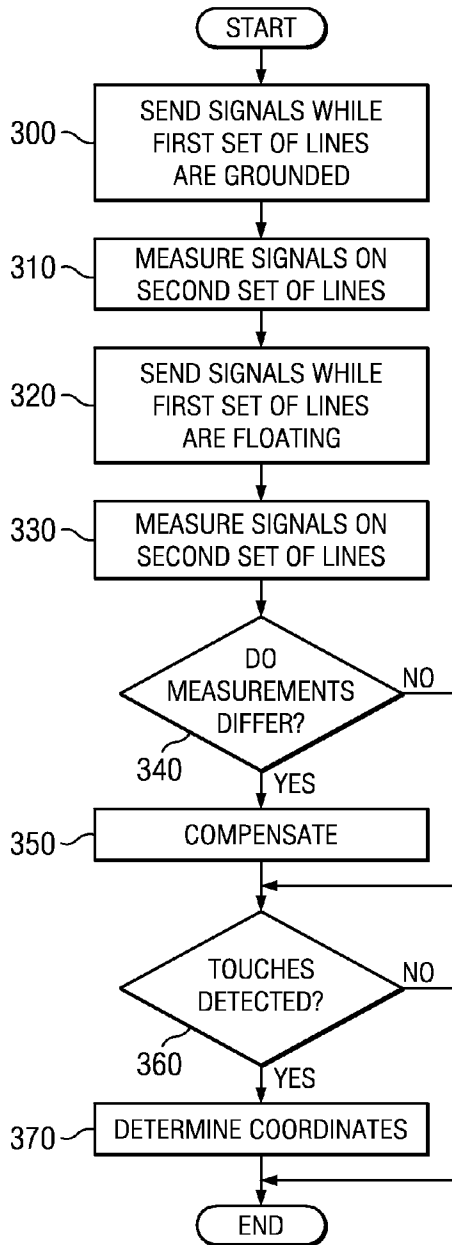


FIG. 3

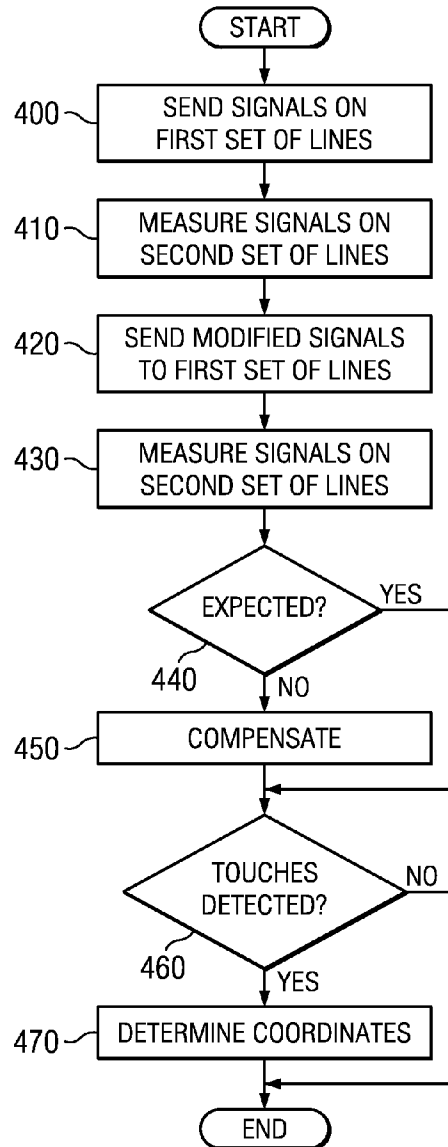


FIG. 4

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.