#### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

# (19) World Intellectual Property Organization International Bureau



## 

# (43) International Publication Date 13 January 2011 (13.01.2011)

# (10) International Publication Number WO 2011/005359 A3

(51) International Patent Classification: G01R 27/26 (2006.01) G06F 3/044 (2006.01)

(21) International Application Number:

PCT/US2010/034573

(22) International Filing Date:

12 May 2010 (12.05.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/491,102

24 June 2009 (24.06.2009)

US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:

US Filed on 12/491,102 (CON) 24 June 2009 (24.06.2009)

(71) Applicant (for all designated States except US): SYNAPTICS INCORPORATED [US/US]; 3120 Scott Blvd., Santa Clara, California 95054 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SHAHPARNIA, Shahrooz [IR/US]; 3120 Scott Blvd., Santa Clara, California 95054 (US). HARGREAVES, Kirk [US/US]; 3120 Scott Blvd., Santa Clara, California 95054 (US).

(74) Agents: GALLENSON, Mavis S. et al.; 5670 Wilshire Boulevard, Suite 2100, Los Angeles, California 90036 (US).

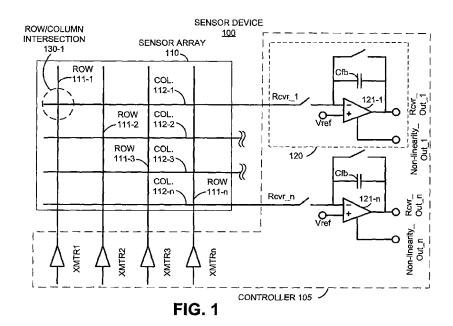
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

— with international search report (Art. 21(3))

[Continued on next page]

#### (54) Title: CAPACITIVE SENSOR INTERFERENCE DETERMINATION



(57) Abstract: In a method of determining interference in a capacitance sensor, a signal is transmitted on a transmitter sensor channel of the capacitive sensor. The signal is received on a receiver sensor channel of the capacitive sensor, the receiver sensor channel being coupled with an amplifier. Behavior of the amplifier is examined for non-linearity to determine if a level of interference has been received by the receiver sensor channel in conjunction with receipt of the signal.





 before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report: 3 March 2011

International application No. PCT/US2010/034573

#### A. CLASSIFICATION OF SUBJECT MATTER

G01R 27/26(2006.01)i, G06F 3/044(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

### FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G01R 27/26; G01R 11/52; G06K 9/00; G01R 31/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: capacitance sensor device, interference

#### **DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003-0016849 A1 (THOMAS L. ANDRADE) 23 January 2003 See abstract, column 2, [0011]-[0018] and figures 2-3	1-17
A	US 2003-0011378 A1 (SEIICHIRO ISHIO et al.) 16 January 2003 See abstract, column 1, [0007]-[0012] and figure 2	1-17
A	US 5659254 A1 (MATSUMOTO; MASAHIRO et al.) 19 August 1997 See abstract and figure 1	1-17

	Further documents are l	listed in the	continuation	of Box C.
--	-------------------------	---------------	--------------	-----------

See patent family annex.

- Special categories of cited documents:
- document defining the general state of the art which is not considered to be of particular relevance
- earlier application or patent but published on or after the international
- document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
- document referring to an oral disclosure, use, exhibition or other
- document published prior to the international filing date but later than the priority date claimed
- later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of mailing of the international search report

Date of the actual completion of the international search

28 DECEMBER 2010 (28.12.2010)

29 DECEMBER 2010 (29.12.2010)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seogu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

JEONG, So Yeon

Telephone No. 82-42-481-5656



INTERNATIONAL SEARCH REPORT  Information on patent family members				
Publication date	Patent family member(s)	Publication date		
23.01.2003	US 7256589 B2	14.08.2007		
16.01.2003	DE 10230910 A1 DE 10230910 B4 DE 10230910 B8 JP 04-336066 B2 JP 2003-028741 A JP 4336066 B2 US 6744258 B2	13.02.2003 01.10.2009 11.02.2010 03.07.2009 29.01.2003 30.09.2009 01.06.2004		
19.08.1997	JP 03-216955 B2 JP 08-015306 A JP 3216955 B2 KR 10-1995-0033487 A	03.08.2001 19.01.1996 09.10.2001 26.12.1995		
	23.01.2003 16.01.2003	date member(s)  23.01.2003 US 7256589 B2  16.01.2003 DE 10230910 A1 DE 10230910 B4 DE 10230910 B8 JP 04-336066 B2 JP 2003-028741 A JP 4336066 B2 US 6744258 B2  19.08.1997 JP 03-216955 B2 JP 08-015306 A JP 3216955 B2		