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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/047,773	05/22/2018	9977519	38018/196002; 150081US02	1009

111408 7590 05/02/2018
FBFK/Synaptics
Robert Lord
9 Greenway Plaza
Suite 500
Houston, TX 77046

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 148 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Jeff Lukanc, San Jose, CA;
Synaptics Incorporated, San Jose, CA;
Kirk Hargreaves, San Jose, CA;
David Sobel, San Jose, CA;
Joseph Kurth Reynolds, San Jose, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PART B—FEE(S) TRANSMITTAL

Complete and send this form, together with the applicable fee(s), to: Mail

Mail Stop ISSUE FEE
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22314-1450
 (571)-273-2885

or Fax

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, EFS-Web transmitted, or facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's Name)
(S-signature)
(Date)

Address Associated with Customer Number 111408

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
15/047,773	February 19, 2016	Jeff Lukanc	38018/196002; 150081US02	1009

TITLE OF INVENTION: ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

APPLN: TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
Regular	Undiscounted	\$1000	\$0	\$0	\$1000	04/26/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
WATKO, JULIE ANNE	2627	345-179000

1. Change of correspondence address or indication of "Fee Address" (37CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered attorney or agent. If no name is listed, no name will be printed

1. FBFK PC
- 2.
- 3.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
- PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

1a. NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Synaptics Incorporated

San Jose, California

Please check the appropriate assignee categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

- 4a. The following fee(s) are submitted:

- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies

- 4b. Payment of Fees(s): (Please first reapply and previously paid fee shown above)

- ☐ A check is enclosed
- ☒ Payment by credit card. Form PTO-2038 is attached
- ☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 50-6631 (enclose an extra copy of this form)

5. Change of Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Robert P. Lord/

Date 04/23/2018

Typed or printed name Robert P. Lord

Registration No. 46,479

Petitioner Shenzhen Qianfenyi Intelligent Technology Co., Ltd

Electronic Patent Application Fee Transmittal

Application Number:	15047773			
Filing Date:	19-Feb-2016			
Title of Invention:	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION			
First Named Inventor/Applicant Name:	Jeff Lukanc			
Filer:	Rober Lord/Kate Ohale			
Attorney Docket Number:	38018/196002; 150081US02			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1000

Electronic Acknowledgement Receipt

EFS ID:	32419924
Application Number:	15047773
International Application Number:	
Confirmation Number:	1009
Title of Invention:	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION
First Named Inventor/Applicant Name:	Jeff Lukanc
Customer Number:	111408
Filer:	Rober Lord/Kate Ohale
Filer Authorized By:	Rober Lord
Attorney Docket Number:	38018/196002; 150081US02
Receipt Date:	23-APR-2018
Filing Date:	19-FEB-2016
Time Stamp:	18:51:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1000
RAM confirmation Number	042418INTEFSW18535300
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Petitioner Shenzhen Qianfenyi Intelligent Technology Co., Ltd.

Exhibit 1002 Page 5

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	38018196002IFTRANS.PDF	1499851	no	1
			a39da10dbff31e40f598d978e2f7762b65ac3f21		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30691	no	2
			d2ecc077d7b1098c06466c390428f2df0debfd37		
Warnings:					
Information:					
Total Files Size (in bytes):			1530542		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

FBFK/Synaptics
Robert Lord
9 Greenway Plaza
Suite 500
Houston, TX 77046



**Courtesy Reminder for
Application Serial No: 15/047,773**

Attorney Docket No: 38018/196002;
150081US02

Customer Number: 111408

Date of Electronic Notification: 01/26/2018

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

ipdocketing@fbfk.law
rlord@fbfk.law
jhathaway@fbfk.law

To view your correspondence online or update your email addresses, please visit us anytime at **<https://sportal.uspto.gov/secure/myportal/privatepair>**. If you have any questions, please email the Electronic Business Center (EBC) at **EBC@uspto.gov** or call 1-866-217-9197.



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UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

111408 7590 01/26/2018
Osha Liang LLP/Synaptics
909 Fannin Street, Suite 3500
Houston, TX 77010

EXAMINER

WATKO, JULIE ANNE

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 01/26/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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15/047,773

02/19/2016

Jeff Lukanc

38018/196002;
150081US02

1009

TITLE OF INVENTION: ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0	\$0	\$1000	04/26/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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111408 7590 01/26/2018
Osha Liang LLP/Synaptics
909 Fannin Street, Suite 3500
Houston, TX 77010

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/047,773	02/19/2016	Jeff Lukanc	38018/196002; 150081US02	1009

TITLE OF INVENTION: ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0	\$0	\$1000	04/26/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
WATKO, JULIE ANNE	2627	345-179000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
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NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

Petitioner: Shenzhen Qianfenyi Intelligent Technology Co., Ltd.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/047,773	02/19/2016	Jeff Lukanc	38018/196002; 150081US02	1009
111408	7590	01/26/2018	EXAMINER	
Osha Liang LLP/Synaptics 909 Fannin Street, Suite 3500 Houston, TX 77010			WATKO, JULIE ANNE	
			ART UNIT	PAPER NUMBER
			2627	
DATE MAILED: 01/26/2018				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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 12 minutes 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

Petitioner Shenzhen Qianfenyi Intelligent Technology Co., Ltd.

Notice of Allowability	Application No. 15/047,773	Applicant(s) LUKANC ET AL.	
	Examiner Julie Anne Watko	Art Unit 2627	AIA (First Inventor to File) Status Yes

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 12/14/2017.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-5,7-16 and 18-26. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐ All b) ☐ Some *c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s) 1. ☐ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____ 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____	5. ☐ Examiner's Amendment/Comment 6. ☐ Examiner's Statement of Reasons for Allowance 7. ☒ Other <u>replacement drawings annotated for entry</u> .
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/Julie Anne Watko/ Primary Examiner, Art Unit 2627	01/19/2018
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Issue Classification 	Application/Control No. 15047773	Applicant(s)/Patent Under Reexamination LUKANC ET AL.	
	Examiner JULIE ANNE WATKO	Art Unit 2627	

CPC						
Symbol					Type	Version
G06F		3		0383	F	2013-01-01
G06F		3		03545	I	2013-01-01
G06F		2203		0384	A	2013-01-01
G06F		3		0412	A	2013-01-01
G06F		3		044	A	2013-01-01
G06F		3		038	I	2013-01-01
G06F		3		0416	I	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
		24	
(Assistant Examiner)	(Date)		
/JULIE ANNE WATKO/ Primary Examiner.Art Unit 2627	01/19/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 15047773	Applicant(s)/Patent Under Reexamination LUKANC ET AL.
	Examiner JULIE ANNE WATKO	Art Unit 2627

☐ 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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2	2	15	20												
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NONE	Total Claims Allowed: 24	
(Assistant Examiner)	(Date)	
/JULIE ANNE WATKO/ Primary Examiner.Art Unit 2627	01/19/2018	O.G. Print Claim(s) 1
(Primary Examiner)	(Date)	O.G. Print Figure 1

EAST Search History

EAST Search History (Interference)

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S41	4159	(G06F3/0416).cpc.	USPAT	OR	ON	2017/09/01 14:16
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S43	989	(G06F2203/04104).cpc.	USPAT	OR	ON	2017/09/01 14:16
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S45	408	(G06F2203/04108).cpc.	USPAT	OR	ON	2017/09/01 14:16
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S123	7927	S121 and (beacon signal handshake).clm.	USPAT	OR	ON	2018/01/18 17:41
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S136	917	(G06F3/0425).cpc.	USPAT	OR	ON	2018/01/19 15:21
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S142	0	S141 and @pd>="20180118"	USPAT	OR	ON	2018/01/19 15:21

01/ 19/ 2018 4:06:51 PM
C:\ Users\ jwatko\ Documents\ jawdocs\ EAST reference notes\ 15047773.wsp

EAST Search History

EAST Search History (Prior Art)

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S4	16553	(G06F3/038).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 13:57
S5	39141	(G06F3/0416).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 13:57
S6	2714	(G06F2203/0384).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 13:57
S7	8957	(G06F2203/04104).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:02
S8	4443	(G06F2203/04105).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:09
S9	3994	(G06F2203/04108).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:10
S10	12045	(G06F3/0414).cpc.	US-PGPUB; USPAT;	OR	ON	2017/09/01 14:14

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S12	6549	(G06F3/0425).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:14
S13	61201	(G06F3/044).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:14
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S17	525884	(pens styli)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:18
S18	2441107	(transmitter transponder transceiver broadcast)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:18
S19	12420	S17 same S18	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:18
S20	2926	S19 same (beacon signal handshake)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:19
S21	182	S20 same (pairing coupling (establish\$4 near2 (communication	US-PGPUB; USPAT;	OR	ON	2017/09/01 14:20

		contact)))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S22	409	S20 same (paired coupled (establish\$4 near2 (communication contact)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:20
S23	482	S21 S22	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:20
S24	0	S23 and ((timesharing) (time adj sharing))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:21
S25	14	S20 and ((timesharing) (time adj sharing))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:21
S26	342	S23 and (frequency)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:22
S27	343	S23 and (frequency wavelength)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:23
S28	255	S27 and (identify identification identifying ID)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:23
S29	47	S23 and (timing near3 (control controlling controlled controller))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:35
S30	162	S23 and (tilt orientation attitude)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:47
S31	1	multi?user with tabletop with touch with screen	US-PGPUB; USPAT;	OR	ON	2017/09/01 14:49

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
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S53	83	(US-20120013555-\$ or US-20090017889-\$ or US-20160154528-\$ or US-20030015650-\$ or US-20020050983-\$ or US-20020056577-\$ or US-20020063159-\$ or US-20020185542-\$ or US-20030198365-\$ or US-20040016812-\$ or US-20080169132-\$ or US-20090102816-\$ or US-20110241988-\$ or US-20120062519-\$ or US-20120274583-\$ or US-20150193041-\$ or US-20150242043-\$ or US-20150248189-\$ or US-20150331505-\$ or US-20160246390-\$ or US-20170060274-\$ or US-20170097695-\$ or US-20030077004-\$ or US-20030122803-\$ or US-20030137588-\$ or US-20040113896-\$).did. or (US-20090295757-\$ or US-20140198082-\$ or US-20150062091-\$ or US-	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/09/07 15:19

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S54	7	(US-20120013555-\$ or US-20080169132-\$ or US-20110241988-\$ or US-20170060274-\$ or US-20070291007-\$).did. or (CN-103440053-\$).did.	US-PGPUB; FPRS	OR	OFF	2017/09/07 15:19
S55	5	(US-20030198365-\$ or US-20170139483-\$).did. or (US-5960367-\$ or US-6727894-\$ or US-6842116-\$).did.	US-PGPUB; USPAT	OR	OFF	2017/09/07 15:19
S56	1	(US-20120013555-\$).did.	US-PGPUB	OR	OFF	2017/09/07 17:49
S76	83	(US-20120013555-\$ or US-20090017889-\$ or US-20160154528-\$ or US-20030015650-\$ or US-20020050983-\$ or US-20020056577-\$ or US-20020063159-\$ or US-20020185542-\$ or US-20030198365-\$ or US-20040016812-\$ or US-20080169132-\$ or US-20090102816-\$ or US-20110241988-\$ or US-20120062519-\$ or US-20120274583-\$ or US-20150193041-\$ or US-20150242043-\$ or US-20150248189-\$ or US-20150331505-\$ or US-20160246390-\$ or US-20170060274-\$ or US-20170097695-\$ or US-20030077004-\$ or US-20030122803-\$ or US-20030137588-\$ or US-20040113896-\$).did. or (US-20090295757-\$ or US-20140198082-\$ or US-20150062091-\$ or US-	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/09/08 15:38

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S79	10	(US-20120013555-\$ or US-20120274583-\$ or US-20170060274-\$ or US-20170097695-\$ or US-20070046649-\$ or US-20070291007-\$ or US-20160077616-\$).did. or (US-5581783-\$ or US-7110576-\$ or US-9411440-\$).did.	US-PGPUB; USPAT	OR	OFF	2017/09/08 20:02
S80	1	(US-9411440-\$).did.	USPAT	OR	OFF	2017/09/08 20:03
S81	7	(US-20030198365-\$ or US-20160077616-\$ or US-20170139483-\$).did. or (US-5960367-\$ or US-6714133-\$ or US-6727894-\$ or US-6842116-\$).did.	US-PGPUB; USPAT	OR	OFF	2017/09/08 20:03
S82	288	(US-20160246390-\$ or US-20100278087-\$ or US-20050096070-\$ or US-20160306447-\$ or US-20160306448-\$ or US-20170235384-\$ or US-20150109263-\$ or US-20160299583-\$ or US-20170060274-\$ or US-20170249029-\$ or US-20080159185-\$ or US-20080232286-\$ or US-20090016314-\$ or US-20110280165-\$ or US-20140348041-\$ or US-20020089956-\$ or US-20040233879-\$ or US-20060209803-\$ or US-20070008916-\$ or US-20070165593-\$ or US-20080240139-\$ or US-20100150045-\$ or US-20100203895-\$ or US-20130100940-\$ or US-20140105188-\$ or US-20160112166-\$).did. or (US-20100103045-\$ or US-20100265925-\$ or US-20110310770-\$ or US-20120051365-\$ or US-20120213062-\$ or US-20140314053-\$ or US-20160192381-\$ or US-20170111893-\$	US-PGPUB; USPAT	OR	OFF	2017/09/08 22:24

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S86	22389	(G06F3/03545).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S87	17159	(G06F3/038).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
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S91	5110	(G06F2203/04105).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S92	4361	(G06F2203/04108).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
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S95	6812	(G06F3/0425).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S96	65436	(G06F3/044).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S97	149745	S85 S86 S87 S88 S89 S90 S91 S92 S93 S94 S95 S96	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
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S99	43	S97 and @pd>="20180118"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S100	542948	(pens styli)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S101	2517187	(transmitter transponder transceiver broadcast)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S102	12839	S100 same S101	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
S103	3036	S102 same (beacon signal handshake)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT;	OR	ON	2018/01/18 17:30

			IBM_TDB			
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S105	421	S103 same (paired coupled (establish\$4 near2 (communication contact)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
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S107	72	S96 and S106	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/18 17:30
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01/ 19/ 2018 3:27:48 PM
C:\ Users\ jwatko\ Documents\ jaw docs\ EAST reference notes\ 15047773.wsp

Search Notes 	Application/Control No. 15047773	Applicant(s)/Patent Under Reexamination LUKANC ET AL.
	Examiner JULIE ANNE WATKO	Art Unit 2627

CPC- SEARCHED		
Symbol	Date	Examiner
G06F 3/0383, 3/03545, 3/038, 3/0416, 2203/0384, 2203/04104, 2203/04105, 2203/04108, 3/0414, 3/0412, 3/0425, 3/044	09/08/2017	/JAW/
updated above	01/18/2018	/JAW/

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
G06F 3/0383, 3/03545, 3/038, 3/0416, 2203/0384, 2203/04104, 2203/04105, 2203/04108, 3/0414, 3/0412, 3/0425, 3/044	09/08/2017	/JAW/
EAST search printout. PLUS search.	09/08/2017	/JAW/
updated above	01/18/2018	/JAW/
EAST search	01/18/2018	/JAW/

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

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INTERFERENCE SEARCH

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
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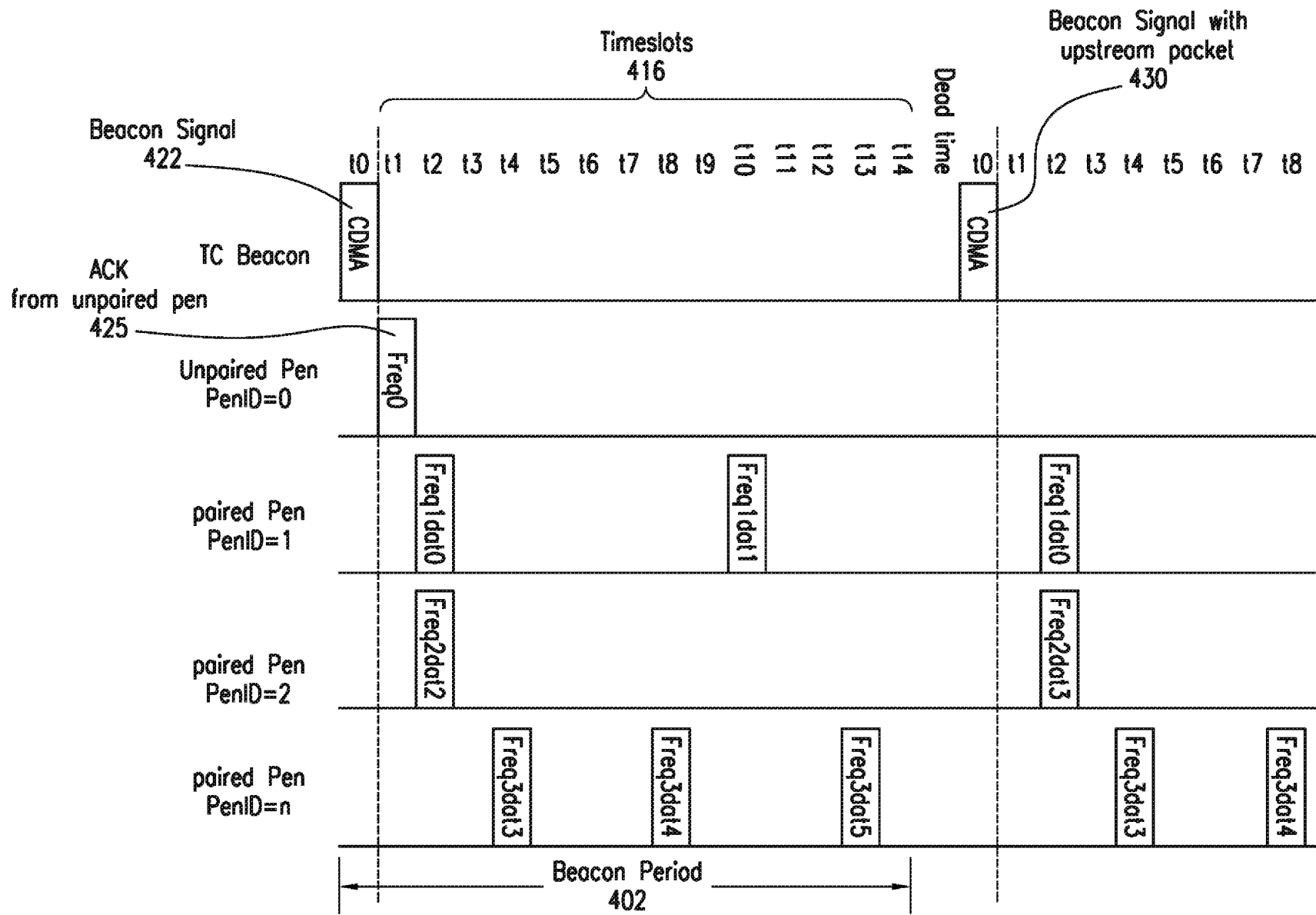
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<i>Index of Claims</i> 	Application/Control No. 15047773	Applicant(s)/Patent Under Reexamination LUKANC ET AL.
	Examiner JULIE ANNE WATKO	Art Unit 2627

✓	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	09/08/2017	01/18/2018												
1	1	✓	=												
2	2	○	=												
3	3	✓	=												
4	4	✓	=												
7	5	✓	=												
	6	○	-												
8	7	○	=												
9	8	✓	=												
10	9	○	=												
5	10	○	=												
6	11	○	=												
11	12	○	=												
12	13	✓	=												
13	14	○	=												
14	15	✓	=												
17	16	✓	=												
	17	○	-												
18	18	○	=												
19	19	○	=												
15	20	○	=												
16	21	○	=												
20	22	✓	=												
21	23	○	=												
22	24	○	=												
24	25	○	=												
23	26	○	=												

FIG. 3



REPLACEMENT SHEET

FIG. 4

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/047,773	Filing Date 02/19/2016	☐ To be Mailed
---	---	----------------------------------	---------------------------------------

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	12/14/2017	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 24	Minus	** 26	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						0	

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	☐ Application Size Fee (37 CFR 1.16(s))					
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
TOTAL ADD'L FEE						

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SLIE
KIMBERLY D. WILLIAMS

This collection of information is required by 37 CFR 1.16. 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 12 minutes 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Docket No.: 38018/196002; 150081US02
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Jeff Lukanc et al.

Application No.: 15/047,773

Confirmation No.: 1009

Filed: February 19, 2016

Art Unit: 2627

For: ACTIVE PEN WITH BIDIRECTIONAL
COMMUNICATION

Examiner: J. A. Watko

REPLY UNDER 37 CFR § 1.111

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action dated September 14, 2017 (hereinafter “Action”),
please reconsider this application in view of the following.

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A processing system for an input device, the processing system comprising:
 - a sensor module coupled to sensor circuitry and configured to:
 - initiate a current beacon period comprising a plurality of timeslots by broadcasting, to a plurality of active pens comprising a first active pen, a current beacon signal comprising to a plurality of active pens an upstream packet for the first active pen and specifying a pen identification (ID) associated with the first active pen;
 - receive, during a first timeslot, a first downstream packet from a first active pen transceiver of the first active pen; and
 - receive, during a second timeslot, a second downstream packet from a second active pen transceiver; and
 - a determination module configured to:
 - generate the upstream packet for the first active pen specifying the pen ID; and
 - determine an attribute of ~~[[a]]~~ the first active pen comprising the first active pen transceiver from at least the first downstream packet.
2. (Original) The processing system of claim 1, wherein the first active pen further comprises the second active pen transceiver, and wherein the attribute of the first active pen is further determined from the second downstream packet.
3. (Original) The processing system of claim 1, wherein the attribute is at least one selected from a group consisting of pen tilt, color, and erasure mode.

4. (Original) The processing system of claim 1, wherein the determination module is further configured to:
determine an attribute of a second active pen comprising the second active pen transceiver from the second downstream packet.
5. (Original) The processing system of claim 1, wherein the attribute of the first active pen is at least one selected from a group consisting of a force measurement at a tip of the first active pen and a button status of a button on the first active pen.
6. (Cancelled)
7. (Currently Amended) The processing system of claim [[6]] 1, wherein the determination module is further configured to:
obtain a user ID for a user of the first active pen in response to the user logging into an application,
wherein the upstream packet comprises the user ID; and
wherein the first active pen transmits the user ID in subsequent pairings.
8. (Original) The processing system of claim 1, wherein the first downstream packet is transmitted using a first frequency and the second downstream packet is transmitted using a second frequency.
9. (Currently Amended) The processing system of claim 8, wherein:
the sensor module is further configured to:
initiate a prior beacon period by broadcasting a prior beacon; and
receive, during a timeslot of the prior beacon period, an acknowledgement from the first active pen in response to the prior beacon,
wherein the first active pen is unpaired during a portion of the prior beacon period, [[;]]
wherein the upstream packet is generated in response to the acknowledgement, and
wherein the upstream packet further specifies the first timeslot and the first frequency.
~~the determination module is further configured to:~~

~~generate an upstream packet specifying a pen identification (ID) for the first active pen, the first timeslot, and the first frequency;~~
~~wherein the current beacon comprises the upstream packet for the first active pen [.]~~

10. (Original) The processing system of claim 4, wherein the determination module is further configured to:

detect a missing downstream packet from the second active pen during a subsequent beacon period; and
add a pen ID for the second pen to a quiet ID data structure after detecting the missing downstream packet.

11. (Original) The processing system of claim 4, wherein the determination module is further configured to:

detect a collision between the first active pen and the second active pen; and
generate a collision packet for the first active pen and the second active pen,
wherein the sensor module is further configured to send the collision packet, and
wherein each of the first active pen and the second active pen wait a random time interval before reattempting to pair in response to the collision packet.

12. (Original) The processing system of claim 1, wherein the sensor module is further configured to:
transmit firmware data to the first active pen over a plurality of timeslots during a subsequent beacon period, the first active pen configured to update pen firmware based on the firmware data.

13. (Currently Amended) A method for operating a processing system of an input device, comprising:

generating an upstream packet for a first active pen specifying a pen identification (ID) associated with the first active pen;
initiating a current beacon period comprising a plurality of timeslots by broadcasting, to a plurality of active pens comprising the first active pen, a current beacon signal ~~to a plurality of active pens~~ comprising the upstream packet;

- receiving, during a first timeslot, a first downstream packet from a first active pen transceiver over a first frequency;
- receiving, during a second timeslot, a second downstream packet from a second active pen transceiver over a second frequency; and
- determining an attribute of [[a]] the first active pen comprising the first active pen transceiver from at least the first downstream packet.
14. (Original) The method of claim 13, wherein the first active pen further comprises the second active pen transceiver, and wherein the attribute of the first active pen is further determined from the second downstream packet.
15. (Original) The method of claim 13, further comprising:
- determining an attribute of a second active pen comprising the second active pen transceiver from the second downstream packet.
16. (Original) The method of claim 13, wherein the attribute of the first active pen is at least one selected from a group consisting of a force measurement at a tip of the first active pen and a button status of a button on the first active pen.
17. (Cancelled)
18. (Original) The method of claim 13, further comprising:
- obtaining a user ID for a user of the first active pen in response to the user logging into an application,
- wherein the upstream packet comprises the user ID; and
- wherein the first active pen transmits the user ID in subsequent pairings.
19. (Currently Amended) The method of claim 13, further comprising:
- initiating, before initiating the current beacon period, a prior beacon period by broadcasting a prior beacon signal;
- receiving, during a timeslot of the prior beacon period, an acknowledgement from the first active pen in response to the prior beacon,

wherein the first active pen is unpaired during at least a portion of the prior beacon period,
wherein the upstream packet is generated in response to the acknowledgment, [[:]] and
wherein the upstream packet further specifies ~~generating, in response to the~~
~~acknowledgment, an upstream packet specifying a pen ID for the first active pen, the~~
first timeslot [[:]] and the first frequency, [[:]]
~~wherein the current beacon signal comprises the upstream packet for the first active pen [[:]]~~

20. (Original) The method of claim 15, further comprising:

detecting a missing downstream packet from the second active pen during a subsequent
beacon period; and
adding a pen ID for the second pen to a quiet ID data structure after detecting the missing
downstream packet.

21. (Original) The method claim 15, further comprising:

detecting a collision between the first active pen and the second active pen; and
sending a collision packet for the first active pen and the second active pen,
wherein each of the first active pen and the second active pen wait a random time interval
before reattempting to pair in response to the collision packet.

22. (Original) An active pen, comprising:

an identification (ID) register storing a pen identification (ID);
a button; and
a transceiver configured to:

receive, from a first input device, a current beacon signal comprising an upstream
packet specifying the pen ID, a timeslot, and a frequency,
wherein the current beacon signal initiates a current beacon period comprising a
plurality of timeslots; and
transmit, to the first input device and during the timeslot specified in the upstream
packet, a downstream packet comprising a status of the button using the
frequency specified in the upstream packet.

23. (Original) The active pen of claim 22, wherein the transceiver is further configured to:
receive, before receiving the current beacon signal, a prior beacon from the first input device,
wherein the prior beacon signal initiates a prior beacon period, and
wherein the active pen is unpaired for at least a portion of the prior beacon period; and
send, in response to the prior beacon, an acknowledgment to trigger pairing with the first input device.
24. (Original) The active pen of claim 23, wherein the transceiver is further configured to:
receive, from the first input device, a collision packet;
wait a random time interval in response to the collision packet; and
re-attempt pairing with the first input device after the random time interval.
25. (Original) The active pen of claim 22, wherein the transceiver is further configured to:
receive, from the first input device, a user ID of a user;
send the user ID to a second input device during a pairing of the second input device.
26. (Original) The active pen, of claim 23, further comprising:
a determination module configured to:
detect a missing beacon from the first input device; and
set the ID register to zero in response to the missing beacon to unpair the active pen.

AMENDMENTS TO THE DRAWINGS

Please replace FIG. 3 and FIG. 4 with the enclosed replacement sheets. No new matter is added.

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application and for indicating that claims 2, 6, 7, 9-12, 14, 17-21, and 23-26 contain allowable subject matter.

Disposition of Claims

Claims 1-26 were pending in the present application. By way of this reply, claims 6 and 17 are cancelled and thus the rejection is moot as to those claims. Accordingly, claims 1-5, 7-16, and 18-26 are now pending in the present application. Claims 1, 13, and 22 are independent. The remaining claims depend, either directly or indirectly, from claims 1, 13, and 22.

Claim Amendments

Claims 1 and 13 are amended to include the subject matter of now-cancelled dependent claims 6 and 17, respectively. Further, claims 7, 9, and 19 are amended for clarification. No new matter is added by way of these amendments.

Drawings

The Examiner objects to the drawings, specifically FIG. 3 and FIG. 4, for containing various informalities. *See* Action, p. 2. Replacement sheets for FIG. 3 and FIG. 4 are enclosed with this reply. Applicant respectfully asserts that the replacement sheets correct the informalities. Accordingly, withdrawal of this objection is respectfully requested.

Rejections under 35 U.S.C. § 102

Claims 1, 3-5, 8, 13, 15, 16, and 22 stand rejected under 35 U.S.C. § 102(a)(1) as being anticipated by U.S. Patent Publication No. 2012/0013555 (hereinafter “Maeda”). For the reasons set forth below, this rejection is respectfully traversed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *See Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

In order to anticipate under 35 U.S.C. § 102, the prior art reference must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements arranged as in the claim. The “arranged as in the claim” requirement applies to all claims and refers to the need for an anticipatory reference to show all the limitations of the claims arranged or combined in the same way as recited in the claims. *See Net Moneyin, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1369-71 (Fed. Cir. 2008).

Claims 1, 3-5, 8, 13, 15, 16

Independent claims 1 and 13 are amended to include the allowable subject matter of now-cancelled dependent claims 6 and 17, respectively. Amended independent claim 1 recites, in part: “initiate a current beacon period comprising a plurality of timeslots by broadcasting, to a plurality of active pens comprising a first active pen, a current beacon signal comprising an upstream packet for the first active pen and specifying a pen identification (ID) associated with the first active pen.” Amended independent claim 13 recites similar limitations. Applicant respectfully

asserts, and the Examiner agrees, that Maeda fails to disclose these limitations. Accordingly, Maeda fails to disclose each and every limitation of amended independent claims 1 and 13.

In view of the above, the Examiner's contentions and the cited art do not support an anticipation rejection of amended independent claims 1 and 13. Claims 3-5, 8, 15, and 16 depend directly from claims 1 and 13. Accordingly, the Examiner's contentions and the cited art also do not support an anticipation rejection of claims 3-5, 8, 15, and 16, and withdrawal of this rejection is respectfully requested.

Claim 22

A claim term is functional when it recites a feature "by what it does rather than by what it is." *In re Swinehart*, 439 F.2d 210, 212 (CCPA 1971). A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. *See* MPEP § 2173.05(g).

Features of an apparatus may be recited either structurally or functionally. If the Examiner concludes that a functional limitation is an inherent characteristic of the prior art, then to establish a *prima facie* case of anticipation or obviousness, the Examiner should explain that the prior art structure inherently possesses the functionally defined limitations of the claimed apparatus. *See In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997). *See also* MPEP § 2114.

The Examiner contends that: "configured to: receive, from a first input device, a current beacon signal comprising an upstream packet... using the frequency specified in the upstream packet," as recited by independent claim 22, is intended use and thus cannot be used to

patentably distinguish the claimed invention from the prior art. *See* Action, pp. 5-6. Applicant disagrees.

As a threshold matter, contrary to the Examiner's contentions, Applicant respectfully asserts that the cited limitation is not intended use. Instead, the cited limitation is actually a functional limitation because it defines the particular capabilities/features of the transceiver in claim 22. By imposing limits on the function of the transceiver, the cited limitation effectively provides a patentable distinction between the claimed invention and the prior art.

Secondly, the Examiner has not explained how the prior art structure inherently possesses the functionally defined limitations of the apparatus of claim 22. Even assuming *arguendo* that Maeda discloses a transceiver, Applicant respectfully asserts that Maeda's transceiver does not receive an upstream packet specifying a pen ID, a timeslot, and a frequency, as recited by claim 22. Moreover, Applicant respectfully asserts that Maeda's transceiver also does not transmit a downstream packet using the frequency specified in the upstream packet and during the timeslot specified in the upstream packet. Accordingly, Maeda fails to disclose each and every limitation of independent claim 22.

In view of the above, the Examiner's contentions and the cited art do not support an anticipation rejection of independent claim 22. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number or email listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 38018/196002).

Dated: December 14, 2017

Respectfully submitted,

By /Robert P. Lord/
Robert P. Lord
Registration No.: 46,479
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Houston, Texas 77010
(713) 228-8600
(713) 228-8778 (Fax)
lord@oshaliang.com (Email)
Attorney for Applicant

Enclosure (Replacement sheets for FIG. 3 and FIG. 4)

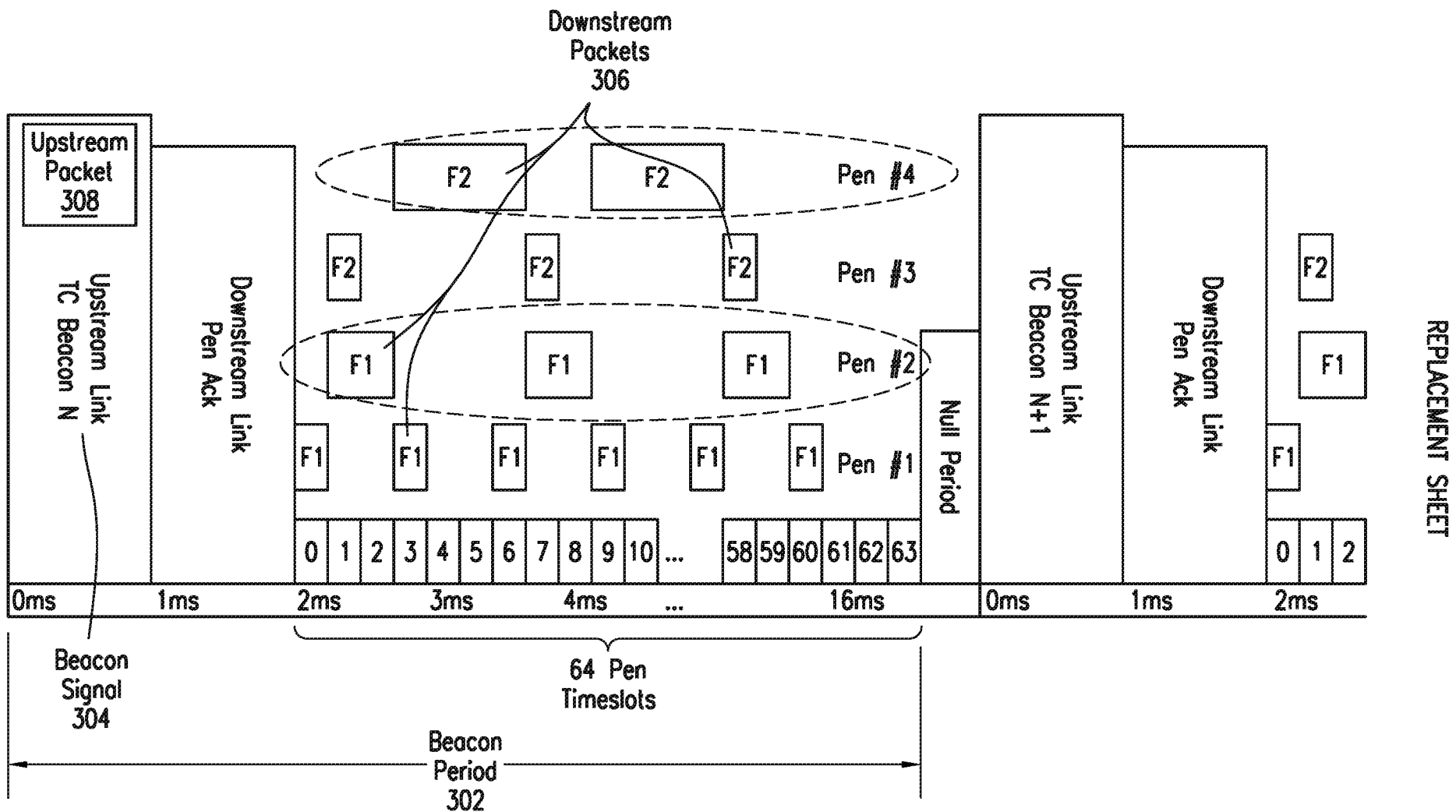


FIG. 3

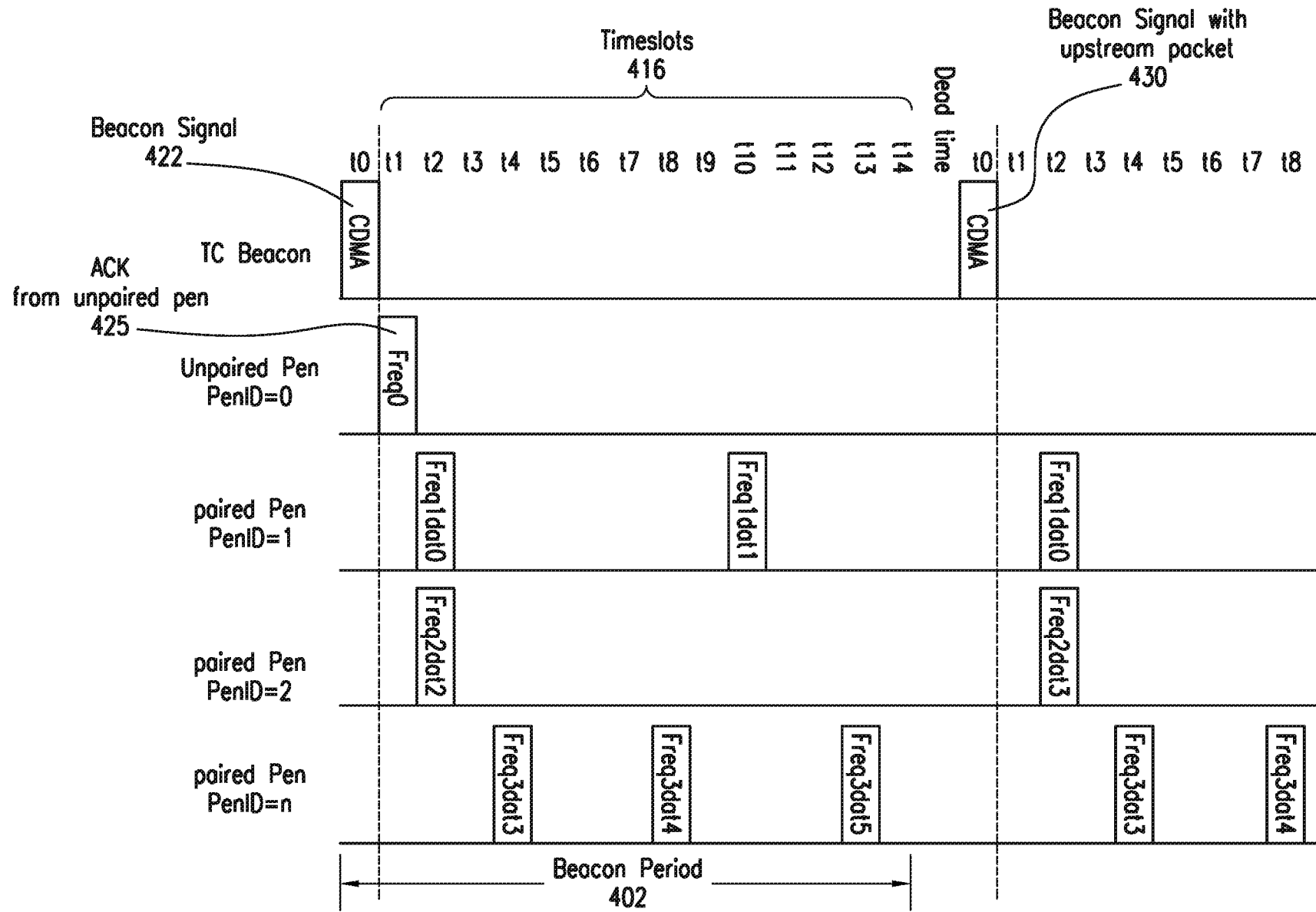


FIG. 4

Electronic Acknowledgement Receipt

EFS ID:	31233006
Application Number:	15047773
International Application Number:	
Confirmation Number:	1009
Title of Invention:	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION
First Named Inventor/Applicant Name:	Jeff Lukanc
Customer Number:	111408
Filer:	Rober Lord/Kate Ohale
Filer Authorized By:	Rober Lord
Attorney Docket Number:	38018/196002; 150081US02
Receipt Date:	14-DEC-2017
Filing Date:	19-FEB-2016
Time Stamp:	16:44:17
Application Type:	Utility under 35 USC 111(a)

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		38018196002AMDTRANS.pdf	312658	yes	16
			b15a73127d15e57f76fce553121552d524c33f05		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Transmittal Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	2
	Claims	3	8
	Drawings-only black and white line drawings	9	9
	Applicant Arguments/Remarks Made in an Amendment	10	14
	Drawings-only black and white line drawings	15	16
Warnings:			
Information:			
Total Files Size (in bytes):		312658	
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.			

AMENDMENT TRANSMITTAL LETTER			Docket No. 38018/196002; 150081US02																																											
Application No. 15/047,773-Conf. #1009	Filing Date February 19, 2016	Examiner J. A. Watko	Art Unit 2627																																											
Applicant(s): Jeff Lukanc et al.																																														
Invention: ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION TO THE COMMISSIONER FOR PATENTS Transmitted herewith is an amendment in the above-identified application. The fee has been calculated and is transmitted as shown below. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <th colspan="6" style="text-align: center; padding: 5px;">CLAIMS AS AMENDED</th> </tr> <tr> <th style="width: 15%;"></th> <th style="width: 10%;">Claims Remaining After Amendment</th> <th style="width: 10%;">Highest Number Previously Paid</th> <th style="width: 10%;">Number Extra Claims Present</th> <th style="width: 10%;">Rate</th> <th style="width: 45%;"></th> </tr> <tr> <td>Total Claims</td> <td style="text-align: center;">24</td> <td style="text-align: center;">- 26 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td>Independent Claims</td> <td style="text-align: center;">3</td> <td style="text-align: center;">- 3 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td colspan="5">Multiple Dependent Claims (check if applicable) ☐</td> <td></td> </tr> <tr> <td colspan="5">Other fee (please specify):</td> <td></td> </tr> <tr> <td colspan="5">TOTAL ADDITIONAL FEE FOR THIS AMENDMENT:</td> <td style="text-align: right;">0.00</td> </tr> </table> ☒ Large Entity ☐ Small Entity ☒ No additional fee is required for this amendment. ☐ Please charge Deposit Account No. _____ in the amount of \$ _____. ☐ A check in the amount of \$ _____ to cover the filing fee is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☒ The Director is hereby authorized to charge and credit Deposit Account No. <u>50-0591</u> as described below. A duplicate copy of this sheet is enclosed. ☒ Credit any overpayment. ☒ Charge any additional filing or application processing fees required under 37 C.F.R. § 1.16 and 1.17. <u>/Robert P. Lord/</u> Robert P. Lord (Atty/Agent Reg. No.: 46,479) OSHA LIANG LLP 909 Fannin Street, Suite 3500 Houston, Texas 77010 (713) 228-8600 Dated: <u>December 14, 2017</u>					CLAIMS AS AMENDED							Claims Remaining After Amendment	Highest Number Previously Paid	Number Extra Claims Present	Rate		Total Claims	24	- 26 =	0	x		Independent Claims	3	- 3 =	0	x		Multiple Dependent Claims (check if applicable) ☐						Other fee (please specify):						TOTAL ADDITIONAL FEE FOR THIS AMENDMENT:					0.00
CLAIMS AS AMENDED																																														
	Claims Remaining After Amendment	Highest Number Previously Paid	Number Extra Claims Present	Rate																																										
Total Claims	24	- 26 =	0	x																																										
Independent Claims	3	- 3 =	0	x																																										
Multiple Dependent Claims (check if applicable) ☐																																														
Other fee (please specify):																																														
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT:					0.00																																									



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/047,773	02/19/2016	Jeff Lukanc	38018/196002; 150081US02	1009
111408	7590	09/14/2017	EXAMINER	
Osha Liang LLP/Synaptics 909 Fannin Street, Suite 3500 Houston, TX 77010			WATKO, JULIE ANNE	
			ART UNIT	PAPER NUMBER
			2627	
			NOTIFICATION DATE	DELIVERY MODE
			09/14/2017	ELECTRONIC

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 the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

hathaway@oshaliang.com
docketing@oshaliang.com
lord@oshaliang.com

Office Action Summary	Application No. 15/047,773	Applicant(s) LUKANC ET AL.	
	Examiner JULIE ANNE WATKO	Art Unit 2627	AIA (First Inventor to File) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance 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.

Disposition of Claims*

- 5) ☐ Claim(s) 1-26 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1,3-5,8,13,15,16 and 22 is/are rejected.
- 8) ☒ Claim(s) 2,6,7,9-12,14,17-21 and 23-26 is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 02/19/2016 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) ☒ Notice of References Cited (PTO-892) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____ | 4) ☐ Other: _____ |

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Drawings

2. The drawings are objected to because:
 - a. Fewer than all lines, numbers, and letters are clean, black, sufficiently dense and dark, and uniformly thick and well-defined. See especially Figs. 3-4.
 - b. Shading reduces legibility. See especially Figs. 3-4.
 - c. Some numbers, letters and reference characters fail to measure at least 1/8 inch in height. See especially Figs. 3-4.
3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

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be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

5. Claim(s) 1, 3-5, 8, 13, 15-16 and 22 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Maeda et al (US 20120013555 A1).

As recited in claim 1, Maeda et al show a processing system for an input device, the processing system comprising: a sensor module 7 coupled to sensor circuitry 4 and configured to: initiate a current beacon period (see timing in Fig. 8) comprising a plurality of timeslots (see plural detection periods in Fig. 8) by broadcasting a current beacon signal (“Pen synchronization pulse”, see Figs. 7-8) to a plurality of active pens (P1 and P2, for example); receive, during a first timeslot (time is on the horizontal axis in Fig. 9), a first downstream packet (see “Comparator output” detecting signal from “first electronic pen” in Fig. 9) from a first active pen transceiver (37 of P1); and receive, during a second timeslot (time is on the horizontal axis in Fig. 9; compare time when 2nd pen is detected to time when 1st pen was previously detected), a second downstream packet (see “Comparator output” detecting signal from “second electronic pen” in Fig. 9) from a second active pen transceiver (37 of P2); and a determination module 79 configured to: determine an attribute (“pen identification” [0067], for example) of a first active pen P1 comprising the first active pen transceiver (37 of P1) from at least the first downstream

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packet (“The decoder 79 decodes the pulse train output from the comparator 78, and outputs a digital value of the pen identification signal.” [0067]).

As recited in independent claim 13, Maeda et al show a method for operating a processing system of an input device, comprising: initiating a current beacon period (see timing in Fig. 8) comprising a plurality of timeslots (see plural detection periods in Fig. 8) by broadcasting a current beacon signal (“Pen synchronization pulse”, see Figs. 7-8) to a plurality of active pens (P1 and P2); receiving, during a first timeslot (time is on the horizontal axis in Fig. 9), a first downstream packet (see “Comparator output” detecting signal from “first electronic pen” in Fig. 9) from a first active pen transceiver (37 of P1) over a first frequency (see higher density of pulses for P1’s signal in Fig. 9); receiving, during a second timeslot (time is on the horizontal axis in Fig. 9; compare time when 2nd pen is detected to time when 1st pen was previously detected), a second downstream packet (see “Comparator output” detecting signal from “second electronic pen” in Fig. 9) from a second active pen transceiver (37 of P2) over a second frequency (see lower density of pulses for P2’s signal in Fig. 9); and determining an attribute (“pen identification” [0067], for example) of a first active pen P1 comprising the first active pen transceiver (37 of P1) from at least the first downstream packet (“The decoder 79 decodes the pulse train output from the comparator 78, and outputs a digital value of the pen identification signal.” [0067]).

As recited in claim 3, Maeda et al show that the attribute is at least one (“color” [0059]) selected from a group consisting of pen tilt, color, and erasure mode.

As recited in claims 4 and 15, Maeda et al show that the determination module 79 is further configured to: determine an attribute (“pen identification” [0067], for example) of a

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second active pen P2 comprising the second active pen transceiver (37 of P2) from the second downstream packet (“The decoder 79 decodes the pulse train output from the comparator 78, and outputs a digital value of the pen identification signal.” [0067]).

As recited in claims 5 and 16, Maeda et al show that the attribute of the first active pen is at least one (button status, insofar as “operation switch 41 for the user to set a property (e.g., drawing color in a hand writing mode) thereof. Property information set by the operation switch 41 is sent to the controller 8, and consequently a display operation is performed with the property set by the user” [0059]) selected from a group consisting of a force measurement at a tip of the first active pen and a button status of a button on the first active pen P1.

As recited in claim 8, Maeda et al show that the first downstream packet is transmitted using a first frequency (see higher density of pulses for P1’s signal in Fig. 9) and the second downstream packet is transmitted using a second frequency (see lower density of pulses for P2’s signal in Fig. 9).

As recited in claim 22, Maeda et al show an active pen (see Fig. 3), comprising: an identification (ID) register (ROM) storing a pen identification (ID) (“own pen identification information stored in a ROM” [0049]); a button 41; and a transceiver 37.

Regarding the limitations “configured to: receive, from a first input device, a current beacon signal comprising an upstream packet specifying the pen ID, a timeslot, and a frequency, wherein the current beacon signal initiates a current beacon period comprising a plurality of timeslots; and transmit, to the first input device and during the timeslot specified in the upstream packet, a downstream packet comprising a status of the button using the frequency specified in the upstream packet”: A recitation of the intended use of the claimed invention must result in a

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structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case, the prior art pen is capable of receiving and transmitting signals, including the recited signals.

Allowable Subject Matter

6. Claims 2, 6-7, 9-12, 14, 17-21 and 23-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Ohashi (US Pat. No. 5581783 A) shows a stylus with buttons.
- b. Reiner (US 20070046649 A1) shows a stylus with buttons.
- c. Forlines (US 20070291007 A1) shows plural users 280 simultaneously using plural styli 285.
- d. Durojaiye et al (US 20160077616 A1) shows plural users simultaneously using plural styli (see Fig. 5).
- e. Haggerty (US 20120274583 A1) teach that “MTI may receive, distinguish, and uniquely identify each of the (possibly simultaneous) inputs from each of the (possibly simultaneously acting) users and associate the inputs of each of the users to the respective applications they are interacting with on the MTI. In some preferred embodiments, the MTI may recognize, and distinguish between, finger and stylus inputs of the users such

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that both finger and stylus inputs may be sensed as contacting the screen as different types of touches” [0016], and further teach that “RF communications between the styli may occur over single channel and/or multi-channel systems” [0027].

f. Watanabe (US 20170060274 A1) teaches that “The sensor controller repeatedly sends out a discovery packet to detect any of the active capacitive styluses and transmits, to an active capacitive stylus among the one or more active capacity styluses and from which a response packet to the discovery packet is received, a configuration packet including time slot designation information. The time slot designation information defines time slots, which use the discovery packet as a timing reference. The active capacitive stylus returns the response packet when the discovery packet is detected, and transmits operation state data indicative of an operation state of the active capacitive stylus using the time slots designated by the configuration packet” [0015], further teach that “In the stroke mode M3, transmission of the configuration data CD such as the stylus identifier SID, which does not vary depending on an operation state of the stylus, is omitted” [0063], and further teach that “A bit number of the local identifier LID is preferably selected to be a number sufficient for identify those styluses 100 which may be used alternately or substantially simultaneously on one sensor controller 200. For example, if 3 bits are used, it is possible to identify seven different styluses 100” [0070]. Watanabe further teaches that “[0120] If an operation state request packet OD_UP (or a discovery packet D_UP) is not received at step S1031, then the stylus 100 detects at step S1041 how many times (how long) an operation state request packet OD_UP (or a discovery packet D_UP) has not been received consecutively. [0121] If an operation state

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request packet OD_UP (or a discovery packet D_UP) has not been received consecutively N or less number of times, then the stylus 100 determines that there remains the possibility that the user may resume use of the stylus 100, after a temporally removal from the panel, by lowering the stylus 100 onto the sensor panel to resume its communication with the sensor controller 200. Accordingly, within this period of time, while the continuous non-reception counter is successively incremented at step S1043, the second communication channel and the local identifier LID to be used for communication with the sensor controller 200 are maintained.” Watanabe further teaches that “if a packet is not received from the sensor controller 200 for a number of times that exceeds N times at step S945, then the stylus 100 determines that use of the stylus 100 is ceased, and releases the second communication channel and the local identifier LID set in the communication setting table. The stylus 100 returns to the discovery mode M1” [0122].

g. Ribeiro et al (US 20170097695) teaches that [0024] "Once a protocol is selected, the stylus pen can send signals 160 to the digitizer to communicate with the digitizer. The signals 160 can include stylus data, such as a stylus serial number, stylus pressure data related to how much pressure is being received by the stylus pen tip 120 touching the screen 110, a stylus manufacturer identifier, stylus button state data, stylus battery life data, stylus IMU data, etc. Other stylus data can also be included. As further described below, the stylus pen 100 can determine which digitizer (e.g., which make/model) is generating the touch signals through direct comparison of the touch signal characteristics to known characteristics of different digitizers."

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h. Norris, Jr. et al (US Pat. No. 7110576 B2) teaches that “Sender data 204 is utilized to collect biometric data from the user. For example, the user handwrites the user's signature in box 204. The digital pen then collects biometric information including pen movement, orientation, pressure, location and time that can be processed as an authentication packet that is sent to the authentication server for comparison against a profile” (see col. 6, lines 52-58).

i. Avanzi (US Pat. No. 9411440 B2) teaches that “the digital pen and base station may interact with the computing device by transmitting acoustic signals” (see col. 3, lines 61-63).

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIE ANNE WATKO whose telephone number is (571)272-7597. The examiner can normally be reached on M-F noon-6PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is

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encouraged to use the USPTO Automated Interview Request (AIR) at
<http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Mehmood can be reached on (571)272-2976. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/JULIE ANNE WATKO/
Primary Examiner, Art Unit 2627

September 8, 2017
JAW

Notice of References Cited	Application/Control No. 15/047,773		Applicant(s)/Patent Under Reexamination LUKANC ET AL.	
	Examiner JULIE ANNE WATKO		Art Unit 2627	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
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*	B	US-7,110,576 B2	09-2006	Norris, Jr.; James R.	G07B17/00435	178/19.01
*	C	US-2007/0046649 A1	03-2007	Reiner; Bruce	G06F3/03545	345/173
*	D	US-2007/0291007 A1	12-2007	Forlines; Clifton	G06F3/0488	345/173
*	E	US-2012/0013555 A1	01-2012	MAEDA; Takami	G06F3/03545	345/173
*	F	US-2012/0274583 A1	11-2012	Haggerty; Ammon	G06F3/0488	345/173
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NON-PATENT DOCUMENTS

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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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6978149-\$ or US-7161923-\$ or US-7236786-\$
or US-7269419-\$ or US-7412265-\$ or US-
7590100-\$ or US-7610053-\$ or US-7653017-\$
or US-7689225-\$ or US-7751374-\$ or US-
7768991-\$ or US-7769397-\$ or US-7881755-\$
or US-7920530-\$ or US-7920879-\$ or US-
8000298-\$ or US-8023468-\$).did. or (US-
8054798-\$ or US-8085745-\$ or US-8121092-\$
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8320288-\$ or US-8483190-\$ or US-8510442-\$
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or US-9560587-\$ or US-9635147-\$ or US-
6014088-\$ or US-5603053-\$ or US-5396443-\$

		or US-5484966-\$ or US-5677710-\$ or US-5708458-\$ or US-6215464-\$).did. or (US-6222514-\$ or US-4262011-\$ or US-4610924-\$ or US-4877787-\$ or US-4949734-\$ or US-5026850-\$ or US-5258806-\$ or US-5289168-\$ or US-5403824-\$ or US-5418079-\$ or US-5438168-\$ or US-5451723-\$ or US-5530207-\$ or US-5570109-\$ or US-5609671-\$ or US-5680233-\$ or US-5733569-\$ or US-5747447-\$ or US-5756346-\$ or US-5756800-\$ or US-5757361-\$ or US-5759565-\$ or US-5768616-\$ or US-5879930-\$ or US-5945980-\$ or US-5974558-\$ or US-6028649-\$).did. or (US-6118889-\$ or US-6236396-\$ or US-6268342-\$ or US-3623477-\$ or US-3659951-\$ or US-3856420-\$ or US-3834823-\$ or US-4022971-\$ or US-4065576-\$ or US-4065577-\$ or US-4168314-\$ or US-4243682-\$ or US-4251865-\$ or US-4255330-\$ or US-4260618-\$ or US-4260954-\$ or US-4267188-\$ or US-4287234-\$ or US-4301074-\$ or US-4335538-\$ or US-4386030-\$ or US-4388310-\$ or US-4396922-\$ or US-4427888-\$ or US-4458330-\$ or US-4468678-\$ or US-4492819-\$).did. or (US-4547445-\$ or US-4576578-\$ or US-4576961-\$ or US-4616106-\$ or US-4620868-\$ or US-4758951-\$ or US-4771276-\$ or US-4811731-\$ or US-4826270-\$ or US-4831216-\$ or US-4831389-\$ or US-4835347-\$ or US-4837122-\$ or US-4851616-\$ or US-4852221-\$ or US-4858526-\$ or US-4859784-\$ or US-4896002-\$ or US-4926343-\$ or US-4939318-\$ or US-4957778-\$ or US-4975546-\$ or US-4990093-\$ or US-4999652-\$ or US-5001306-\$ or US-5002415-\$ or US-5182324-\$).did. or (US-5194852-\$ or US-5210208-\$ or US-5213873-\$ or US-5243332-\$ or US-5250941-\$ or US-5252951-\$ or US-5264300-\$ or US-5288496-\$ or US-5305017-\$ or US-5306712-\$ or US-5309132-\$ or US-5339392-\$ or US-5350351-\$ or US-5357061-\$ or US-5390260-\$ or US-5401507-\$ or US-5418224-\$ or US-5419706-\$ or US-5419910-\$ or US-5427174-\$ or US-5427796-\$ or US-5429378-\$ or US-5431720-\$ or US-5438275-\$ or US-5443793-\$ or US-5448024-\$ or US-5456970-\$).did. or (US-5461400-\$ or US-5462592-\$ or US-5468898-\$ or US-5477012-\$ or US-5485177-\$ or US-5486109-\$ or US-5490241-\$ or US-5512543-\$ or US-5522920-\$ or US-5528263-\$ or US-5530208-\$ or US-5532260-\$ or US-5550659-\$ or US-5557777-\$ or US-5582963-\$ or US-5587365-\$).did.				
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S3	21379	(G06F3/03545).cpc.	US-PGPUB;	OR	ON	2017/09/01

			USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			13:57
S4	16553	(G06F3/038).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 13:57
S5	39141	(G06F3/0416).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 13:57
S6	2714	(G06F2203/0384).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 13:57
S7	8957	(G06F2203/04104).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:02
S8	4443	(G06F2203/04105).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:09
S9	3994	(G06F2203/04108).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:10
S10	12045	(G06F3/0414).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:14
S11	32220	(G06F3/0412).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:14
S12	6549	(G06F3/0425).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO;	OR	ON	2017/09/01 14:14

			DERWENT; IBM_TDB			
S13	61201	(G06F3/044).cpc.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:14
S15	141854	S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:16
S16	0	S15 and @pd>="20170901"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:16
S17	525884	(pens styli)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:18
S18	2441107	(transmitter transponder transceiver broadcast)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:18
S19	12420	S17 same S18	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:18
S20	2926	S19 same (beacon signal handshake)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:19
S21	182	S20 same (pairing coupling (establish\$4 near2 (communication contact)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:20
S22	409	S20 same (paired coupled (establish\$4 near2 (communication contact)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:20
S23	482	S21 S22	US-PGPUB;	OR	ON	2017/09/01

			USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			14:20
S24	0	S23 and ((timesharing) (time adj sharing))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:21
S25	14	S20 and ((timesharing) (time adj sharing))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:21
S26	342	S23 and (frequency)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:22
S27	343	S23 and (frequency wavelength)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:23
S28	255	S27 and (identify identification identifying ID)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:23
S29	47	S23 and (timing near3 (control controlling controlled controller))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:35
S30	162	S23 and (tilt orientation attitude)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:47
S31	1	multi?user with tabletop with touch with screen	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/09/01 14:49
S32	1765	multiple with users and (tabletop table) with touch with (screen surface)	US-PGPUB; USPAT; FPRS; EPO; JPO;	OR	ON	2017/09/01 14:50

			DERWENT; IBM_TDB			
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S35	75	(US-20120013555-\$ or US-20090017889-\$ or US-20160154528-\$ or US-20030015650-\$ or US-20020050983-\$ or US-20020056577-\$ or US-20020063159-\$ or US-20020185542-\$ or US-20030198365-\$ or US-20040016812-\$ or US-20080169132-\$ or US-20090102816-\$ or US-20110241988-\$ or US-20120062519-\$ or US-20120274583-\$ or US-20150193041-\$ or US-20150242043-\$ or US-20150248189-\$ or US-20150331505-\$ or US-20160246390-\$ or US-20170060274-\$ or US-20170097695-\$ or US-20030077004-\$ or US-20030122803-\$ or US-20030137588-\$ or US-20040113896-\$).did. or (US-20090295757-\$ or US-20140198082-\$ or US-20150062091-\$ or US-20160252954-\$ or US-20060125799-\$ or US-20060181519-\$ or US-20070046649-\$ or US-20070188478-\$ or US-20070291007-\$ or US-20070291008-\$ or US-20090085881-\$ or US-20090094561-\$ or US-20090230083-\$ or US-20150331576-\$ or US-20150331489-\$ or US-20160077616-\$ or US-20160139690-\$ or US-20160299606-\$ or US-20170139483-\$).did. or (US-4084241-\$ or US-5960367-\$ or US-6772949-\$ or US-9678597-\$ or US-4672154-\$ or US-5294792-\$ or US-5475401-\$ or US-4263592-\$ or US-	US-PGPUB; USPAT; FPRS; DERWENT	OR	OFF	2017/09/01 16:20

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S37	5	(US-20030198365-\$ or US-20170139483-\$).did. or (US-5960367-\$ or US-6727894-\$ or US-6842116-\$).did.	US-PGPUB; USPAT	OR	OFF	2017/09/01 16:20
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S56	1	(US-20120013555-\$).did.	US-PGPUB	OR	OFF	2017/09/07 17:49

EAST Search History (Interference)

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L38	6	"Term Removed"	USPAT	OR	OFF	2017/09/08 20:02
S38	920	(G06F3/0383).cpc.	USPAT	OR	ON	2017/09/01 14:16
S39	2893	(G06F3/03545).cpc.	USPAT	OR	ON	2017/09/01 14:16
S40	2516	(G06F3/038).cpc.	USPAT	OR	ON	2017/09/01 14:16
S41	4159	(G06F3/0416).cpc.	USPAT	OR	ON	2017/09/01 14:16
S42	425	(G06F2203/0384).cpc.	USPAT	OR	ON	2017/09/01 14:16
S43	989	(G06F2203/04104).cpc.	USPAT	OR	ON	2017/09/01 14:16
S44	383	(G06F2203/04105).cpc.	USPAT	OR	ON	2017/09/01 14:16
S45	408	(G06F2203/04108).cpc.	USPAT	OR	ON	2017/09/01 14:16
S46	1205	(G06F3/0414).cpc.	USPAT	OR	ON	2017/09/01 14:16
S47	3533	(G06F3/0412).cpc.	USPAT	OR	ON	2017/09/01 14:16
S48	874	(G06F3/0425).cpc.	USPAT	OR	ON	2017/09/01 14:17
S49	6453	(G06F3/044).cpc.	USPAT	OR	ON	2017/09/01 14:17
S58	923	(G06F3/0383).cpc.	USPAT	OR	ON	2017/09/07 14:52
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S61	4188	(G06F3/0416).cpc.	USPAT	OR	ON	2017/09/07 14:52
S62	425	(G06F2203/0384).cpc.	USPAT	OR	ON	2017/09/07 14:52
S63	995	(G06F2203/04104).cpc.	USPAT	OR	ON	2017/09/07 14:52
S64	387	(G06F2203/04105).cpc.	USPAT	OR	ON	2017/09/07 14:52
S65	417	(G06F2203/04108).cpc.	USPAT	OR	ON	2017/09/07 14:52
S66	1210	(G06F3/0414).cpc.	USPAT	OR	ON	2017/09/07 14:52
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						14:52
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S70	16668	S58 S59 S60 S61 S62 S63 S64 S65 S66 S67 S68 S69	USPAT	OR	ON	2017/09/07 14:52
S71	1525	S70 and (pairing coupling (establish\$4 near2 (communication contact))).clm.	USPAT	OR	ON	2017/09/07 14:53
S72	7391	S70 and (beacon signal handshake).clm.	USPAT	OR	ON	2017/09/07 14:53
S73	1032	S71 and S72	USPAT	OR	ON	2017/09/07 14:54
S74	0	S73 and @pd>="20170907"	USPAT	OR	ON	2017/09/07 14:54
S75	6	"Term Removed"	USPAT	OR	OFF	2017/09/07 15:19

9/8/2017 10:25:05 PM
C:\Users\jwatko\Documents\jawdocs\EAST reference notes\15047773.wsp



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BIB DATA SHEET

CONFIRMATION NO. 1009

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.	
15/047,773	02/19/2016	345	2627	38018/196002; 150081US02	
APPLICANTS Synaptics Incorporated, San Jose, CA; INVENTORS Jeff Lukanc, San Jose, CA; Kirk Hargreaves, San Jose, CA; David Sobel, San Jose, CA; Joseph Kurth Reynolds, San Jose, CA; ** CONTINUING DATA ***** This appln claims benefit of 62/120,856 02/25/2015 and claims benefit of 62/207,249 08/19/2015 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 03/03/2016					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /JULIE ANNE WATKO/ Acknowledged Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 7	TOTAL CLAIMS 26	INDEPENDENT CLAIMS 3
ADDRESS Osha Liang LLP/Synaptics 909 Fannin Street, Suite 3500 Houston, TX 77010 UNITED STATES					
TITLE ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION					
FILING FEE RECEIVED 2080	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		

Search Notes 	Application/Control No. 15047773	Applicant(s)/Patent Under Reexamination LUKANC ET AL.
	Examiner JULIE ANNE WATKO	Art Unit 2627

CPC- SEARCHED		
Symbol	Date	Examiner
G06F 3/0383, 3/03545, 3/038, 3/0416, 2203/0384, 2203/04104, 2203/04105, 2203/04108, 3/0414, 3/0412, 3/0425, 3/044	09/08/2017	/JAW/

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
G06F 3/0383, 3/03545, 3/038, 3/0416, 2203/0384, 2203/04104, 2203/04105, 2203/04108, 3/0414, 3/0412, 3/0425, 3/044	09/08/2017	/JAW/
EAST search printout. PLUS search.	09/08/2017	/JAW/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
G06F	3/0383, 3/03545, 3/038, 3/0416, 2203/0384, 2203/04104, 2203/04105, 2203/04108, 3/0414, 3/0412, 3/0425, 3/044, 3/0383, 3/03545, 3/038, 3/0416, 2203/0384, 2203/04104, 2203/04105, 2203/04108, 3/0414, 3/0412, 3/0425, 3/044		
see	attached printout	09/08/2017	/JAW/

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<i>Index of Claims</i> 	Application/Control No. 15047773	Applicant(s)/Patent Under Reexamination LUKANC ET AL.
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✓	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	09/08/2017							
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Most frequently occurring classifications of patents returned
from a search Of 15047773 on Sep 05 , 2017

Original Classifications

27 1/1
19 370/311
13 370/338
8 370/336
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Cross-Reference Classifications

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Combined Classifications

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2 33/1M
2 430/523
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2 106/31.75
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Titles of most frequently occurring classifications of patents returned
from a search of 15047773 on Sep 05 , 2017

- 35 370/338 (13 OR, 22 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE
370/328 ..Having a plurality of contiguous regions served by respective fixed stations
370/338 ...Contiguous regions interconnected by a local area network
- 27 1/1 (27 OR, 0 XR)
Class 1/1 NO DATA PATENTS
- 23 370/311 (19 OR, 4 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE
370/311 ..Signaling for performing battery saving
- 12 370/329 (3 OR, 9 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE
370/328 ..Having a plurality of contiguous regions served by respective fixed stations
370/329 ...Channel assignment
- 12 455/574 (4 OR, 8 XR)
Class 455 TELECOMMUNICATIONS
455/73 .TRANSMITTER AND RECEIVER AT SAME STATION (E.G., TRANSCEIVER)
455/550.1 ..Radiotelephone equipment detail
455/572 ...Power supply
455/574 Power conservation
- 12 370/331 (7 OR, 5 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE
370/328 ..Having a plurality of contiguous regions served by respective fixed stations
370/329 ...Channel assignment
370/331 Hand-off control
- 11 370/328 (1 OR, 10 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE
370/328 ..Having a plurality of contiguous regions served by respective fixed stations
- 10 370/336 (8 OR, 2 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE
370/328 ..Having a plurality of contiguous regions served by respective fixed stations
370/329 ...Channel assignment
370/336 Combining or distributing information via time channels
- 9 370/337 (7 OR, 2 XR)
Class 370 MULTIPLEX COMMUNICATIONS
370/310 .COMMUNICATION OVER FREE SPACE

- 370/328 ..Having a plurality of contiguous regions served by respective fixed stations
- 370/329 ...Channel assignment
- 370/336 Combining or distributing information via time channels
- 370/337 Multiple access (e.g., TDMA)

- 9 455/436 (3 OR, 6 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/436 ...Handoff

- 8 345/179 (1 OR, 7 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/156 .DISPLAY PERIPHERAL INTERFACE INPUT DEVICE
 - 345/179 ..Stylus

- 8 370/318 (2 OR, 6 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/315 ..Repeater
 - 370/316 ...Airborne or space satellite repeater
 - 370/317 Including noise compensation
 - 370/318 Including power control

- 7 455/41.2 (1 OR, 6 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/39 .TRANSMITTER AND RECEIVER AT SEPARATE STATIONS
 - 455/41.2 ..Short range RF communication

- 7 455/450 (2 OR, 5 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/450 ...Channel allocation

- 7 345/156 (4 OR, 3 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/156 .DISPLAY PERIPHERAL INTERFACE INPUT DEVICE

- 7 345/173 (3 OR, 4 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/156 .DISPLAY PERIPHERAL INTERFACE INPUT DEVICE
 - 345/173 ..Touch panel

- 7 987/368 (0 OR, 7 XR)
 - Class 987 ORGANIC COMPOUNDS CONTAINING A Bi, Sb, As, OR P ATOM OR CONTAINING A METAL ATOM OF THE 6TH TO 8TH GROUP OF THE PERIODIC SYSTEM
 - 987/350 .PHOSPHORUS CONTAINING AT LEAST ONE NITROGEN ATOM AS SOLE HETERO ATOM (9/65)
 - 987/363 ..Ring contains a single N atom (9/65A)
 - 987/368 ...Four-membered ring (9/65A4; 9/65A4E; 9/65A4V)

- 6 370/342 (0 OR, 6 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS

370/310 .COMMUNICATION OVER FREE SPACE
370/342 ..Combining or distributing information via code word channels using multiple access techniques
(e.g., CDMA)

6 370/320 (2 OR, 4 XR)

Class 370 MULTIPLEX COMMUNICATIONS

370/310 .COMMUNICATION OVER FREE SPACE

370/315 ..Repeater

370/316 ...Airborne or space satellite repeater

370/319 Multiple access (e.g., FDMA)

370/320 Code division (CDMA)

6 370/346 (2 OR, 4 XR)

Class 370 MULTIPLEX COMMUNICATIONS

370/310 .COMMUNICATION OVER FREE SPACE

370/345 ..Combining or distributing information via time channels

370/346 ...Polling

6 348/E13.022 (0 OR, 6 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals
from different viewpoint locations representing the interocular distance (EPO)

348/E13.003 ...Stereoscopic image signal generation (EPO)

348/E13.022 From a 3D object model, e.g., computer generated stereoscopic image signals (EPO)

6 348/E13.033 (0 OR, 6 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals
from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.033 Color aspects (EPO)

6 348/E13.038 (0 OR, 6 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals
from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.036 For viewing by the user with the aid of special glasses or head mounted displays (HMD), i.e.,
stereoscopic displaying (EPO)

348/E13.038 With polarization multiplexing, i.e., simultaneously displaying left and right images separated
using glasses with different polarizing characteristics (EPO)

6 348/E13.059 (0 OR, 6 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals
from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.059 Synchronization or controlling aspects (EPO)

6 348/E13.071 (0 OR, 6 XR)

- Class 348 TELEVISION
 - 348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
 - 348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
 - 348/E13.06 ...Stereoscopic image signal coding, multiplexing, processing, recording or transmission (EPO)
 - 348/E13.071 Transmission of stereoscopic image signals (EPO)
- 5 370/347 (2 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/345 ..Combining or distributing information via time channels
 - 370/347 ...Multiple access (e.g., TDMA)
- 5 370/252 (1 OR, 4 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/241 .DIAGNOSTIC TESTING (OTHER THAN SYNCHRONIZATION)
 - 370/252 ..Determination of communication parameters
- 5 370/345 (2 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/345 ..Combining or distributing information via time channels
- 5 370/349 (2 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/345 ..Combining or distributing information via time channels
 - 370/349 ...Using messages having an address field as header
- 4 370/321 (1 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/315 ..Repeater
 - 370/316 ...Airborne or space satellite repeater
 - 370/319 Multiple access (e.g., FDMA)
 - 370/321 Time division (TDMA)
- 4 370/335 (1 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/328 ..Having a plurality of contiguous regions served by respective fixed stations
 - 370/329 ...Channel assignment
 - 370/335 Combining or distributing information via code word channels using multiple access techniques (e.g., CDMA)
- 4 370/312 (2 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/312 ..Message addressed to multiple destinations
- 4 455/343.2 (0 OR, 4 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/130 .RECEIVER OR ANALOG MODULATED SIGNAL FREQUENCY CONVERTER
 - 455/334 ..With particular receiver circuit

- 455/343.1 ...Having particular power or bias supply (including self-powered or battery saving means)
- 455/343.2 ...Battery saving based on received signal
- 4 455/439 (0 OR, 4 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/436 ...Handoff
 - 455/439 Handoff initiated by another source (e.g., target, user initiated, mobile switching center (MSC), or mobile telephone switching office (MTSO), etc.)
- 4 455/509 (0 OR, 4 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/39 .TRANSMITTER AND RECEIVER AT SEPARATE STATIONS
 - 455/500 ..Plural transmitters or receivers (i.e., more than two stations)
 - 455/507 ...Central station (e.g., master, etc.)
 - 455/509 Channel allocation
- 4 370/310 (1 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
- 4 370/254 (4 OR, 0 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/254 .NETWORK CONFIGURATION DETERMINATION
- 4 455/432.1 (1 OR, 3 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/432.1 ...Roaming
- 4 455/458 (4 OR, 0 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/458 ...Specific paging technique
- 4 345/84 (4 OR, 0 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/30 .PLURAL PHYSICAL DISPLAY ELEMENT CONTROL SYSTEM (E.G., NON-CRT)
 - 345/55 ..Display elements arranged in matrix (e.g., rows and columns)
 - 345/84 ...Light-controlling display elements
- 4 359/326 (0 OR, 4 XR)
 - Class 359 OPTICAL: SYSTEMS AND ELEMENTS
 - 359/326 .OPTICAL FREQUENCY CONVERTER
- 4 348/E13.055 (0 OR, 4 XR)
 - Class 348 TELEVISION
 - 348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
 - 348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
 - 348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.054 Using a volumetric display, i.e., systems where the image is built up from picture elements distributed over a volume (EPO)

348/E13.055 The picture elements emitting light where a pair of light beams intersect in a transparent material (EPO)

4 348/E13.057 (0 OR, 4 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.054 Using a volumetric display, i.e., systems where the image is built up from picture elements distributed over a volume (EPO)

348/E13.057 With depth sampling, i.e., the volume being constructed from a stack or sequence of 2D image planes (EPO)

4 345/55 (0 OR, 4 XR)

Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS

345/30 .PLURAL PHYSICAL DISPLAY ELEMENT CONTROL SYSTEM (E.G., NON-CRT)

345/55 ..Display elements arranged in matrix (e.g., rows and columns)

4 348/E13.034 (0 OR, 4 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.034 Calibration aspects (EPO)

4 347/100 (0 OR, 4 XR)

Class 347 INCREMENTAL PRINTING OF SYMBOLIC INFORMATION

347/1 .INK JET

347/84 ..Fluid or fluid source handling means

347/95 ...Fluid (e.g., fluid specifics)

347/100 Ink

4 106/31.58 (0 OR, 4 XR)

Class 106 COMPOSITIONS: COATING OR PLASTIC

106/1**1 .COATING OR PLASTIC COMPOSITIONS

106/31.01 ..Marking

106/31.13 ...Inks

106/31.27 Organic dye containing

106/31.57 Specified vehicle, solvent, or dispersing medium containing

106/31.58 Organic oxygen compound containing

4 540/360 (0 OR, 4 XR)

Class 540 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES

540/1**1 .ORGANIC COMPOUNDS (Class 532, Subclass 1)

540/1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS

540/200 ...Hetero ring is four-membered containing nitrogen and having chalcogen double bonded directly to a ring carbon which is adjacent to the ring nitrogen

540/354 Additional chalcogen bonded directly to the hetero ring

- 540/360 Additional carbon bonded directly to the additional chalcogen
- 4 540/310 (2 OR, 2 XR)
- Class 540 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES
- 540/1**1 .ORGANIC COMPOUNDS (Class 532, Subclass 1)
- 540/1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS
- 540/200 ...Hetero ring is four-membered containing nitrogen and having chalcogen double bonded directly to a ring carbon which is adjacent to the ring nitrogen
- 540/203 Polycyclo ring system containing the hetero ring as one of the cyclos
- 540/302 The ring nitrogen is shared by a five-membered ring
- 540/303 The five-membered ring contains an additional hetero atom
- 540/304 1-thia-4-aza-bicyclo(3.2.0)heptane (including unsaturated; e.g., penam, etc.)
- 540/310 Having -C(=X)-, wherein X is chalcogen, bonded directly at the 3-position of the bicyclo ring system
- 4 540/357 (0 OR, 4 XR)
- Class 540 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES
- 540/1**1 .ORGANIC COMPOUNDS (Class 532, Subclass 1)
- 540/1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS
- 540/200 ...Hetero ring is four-membered containing nitrogen and having chalcogen double bonded directly to a ring carbon which is adjacent to the ring nitrogen
- 540/354 Additional chalcogen bonded directly to the hetero ring
- 540/357 Having -C(=X)-, wherein X is chalcogen, bonded directly to the additional chalcogen
- 4 345/182 (3 OR, 1 XR)
- Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
- 345/156 .DISPLAY PERIPHERAL INTERFACE INPUT DEVICE
- 345/182 ..Light pen for fluid matrix display panel
- 4 424/426 (4 OR, 0 XR)
- Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
- 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
- 424/422 ..Implant or insert
- 424/423 ...Surgical implant or material
- 424/426 Erodable, resorbable, or dissolving
- 4 424/424 (0 OR, 4 XR)
- Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
- 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
- 424/422 ..Implant or insert
- 424/423 ...Surgical implant or material
- 424/424 Membrane or diffusion barrier
- 4 424/425 (0 OR, 4 XR)
- Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
- 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
- 424/422 ..Implant or insert
- 424/423 ...Surgical implant or material
- 424/424 Membrane or diffusion barrier
- 424/425 Diffusion barrier is matrix

- 4 604/891.1 (0 OR, 4 XR)
 - Class 604 SURGERY
 - 604/890.1 .CONTROLLED RELEASE THERAPEUTIC DEVICE OR SYSTEM
 - 604/891.1 ..Implanted dynamic device or system
- 4 424/489 (0 OR, 4 XR)
 - Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
 - 424/489 ..Particulate form (e.g., powders, granules, beads, microcapsules, and pellets)
- 4 424/499 (0 OR, 4 XR)
 - Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
 - 424/489 ..Particulate form (e.g., powders, granules, beads, microcapsules, and pellets)
 - 424/499 ...Contains proteins or derivative or polysaccharides or derivative
- 4 424/502 (0 OR, 4 XR)
 - Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
 - 424/489 ..Particulate form (e.g., powders, granules, beads, microcapsules, and pellets)
 - 424/502 ...Contains waxes, higher fatty acids, higher fatty alcohols
- 4 604/890.1 (0 OR, 4 XR)
 - Class 604 SURGERY
 - 604/890.1 .CONTROLLED RELEASE THERAPEUTIC DEVICE OR SYSTEM
- 4 424/422 (0 OR, 4 XR)
 - Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
 - 424/422 ..Implant or insert
- 4 424/486 (0 OR, 4 XR)
 - Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
 - 424/484 ..Matrices
 - 424/486 ...Synthetic polymer
- 3 455/557 (1 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/73 .TRANSMITTER AND RECEIVER AT SAME STATION (E.G., TRANSCEIVER)
 - 455/550.1 ..Radiotelephone equipment detail
 - 455/557 ...Interface attached device (e.g., interface with modem, facsimile, computer, etc.)
- 3 370/442 (0 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/431 .CHANNEL ASSIGNMENT TECHNIQUES
 - 370/442 ..Combining or distributing information via time channels using multiple access technique (e.g., TDMA)
- 3 370/441 (0 OR, 3 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/431 .CHANNEL ASSIGNMENT TECHNIQUES
 - 370/441 ..Combining or distributing information via code word channels using multiple access techniques

(e.g., CDMA)

3 370/330 (2 OR, 1 XR)

Class 370 MULTIPLEX COMMUNICATIONS

370/310 .COMMUNICATION OVER FREE SPACE

370/328 ..Having a plurality of contiguous regions served by respective fixed stations

370/329 ...Channel assignment

370/330 Having both time and frequency assignment

3 455/438 (1 OR, 2 XR)

Class 455 TELECOMMUNICATIONS

455/403 .RADIOTELEPHONE SYSTEM

455/422.1 ..Zoned or cellular telephone system

455/436 ...Handoff

455/438 Serving site initiated

3 455/422.1 (0 OR, 3 XR)

Class 455 TELECOMMUNICATIONS

455/403 .RADIOTELEPHONE SYSTEM

455/422.1 ..Zoned or cellular telephone system

3 455/424 (0 OR, 3 XR)

Class 455 TELECOMMUNICATIONS

455/403 .RADIOTELEPHONE SYSTEM

455/422.1 ..Zoned or cellular telephone system

455/423 ...Diagnostic testing, malfunction indication, or electrical condition measurement

455/424 System equipment

3 455/426.2 (0 OR, 3 XR)

Class 455 TELECOMMUNICATIONS

455/403 .RADIOTELEPHONE SYSTEM

455/422.1 ..Zoned or cellular telephone system

455/426.2 ...Wireless service for fixed premises equipment (e.g., Wireless Local Loop (WLL) Telco emulator, etc.)

3 455/425 (0 OR, 3 XR)

Class 455 TELECOMMUNICATIONS

455/403 .RADIOTELEPHONE SYSTEM

455/422.1 ..Zoned or cellular telephone system

455/423 ...Diagnostic testing, malfunction indication, or electrical condition measurement

455/425 Subscriber equipment

3 455/550.1 (0 OR, 3 XR)

Class 455 TELECOMMUNICATIONS

455/73 .TRANSMITTER AND RECEIVER AT SAME STATION (E.G., TRANSCEIVER)

455/550.1 ..Radiotelephone equipment detail

3 709/225 (2 OR, 1 XR)

Class 709 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING

709/223 .COMPUTER NETWORK MANAGING

709/225 ..Computer network access regulating

3 178/18.09 (3 OR, 0 XR)

- Class 178 TELEGRAPHY
- 178/2R .SYSTEMS
- 178/18.01 ..Position coordinate determination for writing (e.g., writing digitizer pad, stylus, or circuitry)
- 178/18.03 ...Writing digitizer pad
- 178/18.09 Optical

- 3 514/63 (2 OR, 1 XR)
- Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
- 514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
- 514/63 ..Silicon containing DOAI

- 3 178/18.05 (3 OR, 0 XR)
- Class 178 TELEGRAPHY
- 178/2R .SYSTEMS
- 178/18.01 ..Position coordinate determination for writing (e.g., writing digitizer pad, stylus, or circuitry)
- 178/18.03 ...Writing digitizer pad
- 178/18.05 Resistive

- 3 178/18.01 (2 OR, 1 XR)
- Class 178 TELEGRAPHY
- 178/2R .SYSTEMS
- 178/18.01 ..Position coordinate determination for writing (e.g., writing digitizer pad, stylus, or circuitry)

- 3 435/280 (2 OR, 1 XR)
- Class 435 CHEMISTRY: MOLECULAR BIOLOGY AND MICROBIOLOGY
- 435/262 .PROCESS OF UTILIZING AN ENZYME OR MICRO-ORGANISM TO DESTROY
HAZARDOUS OR TOXIC WASTE, LIBERATE, SEPARATE, OR PURIFY A PREEXISTING COMPOUND OR
COMPOSITION THEREFORE; CLEANING OBJECTS OR TEXTILES
- 435/280 ..Resolution of optical isomers or purification of organic compounds or composition containing same

- 3 178/19.01 (1 OR, 2 XR)
- Class 178 TELEGRAPHY
- 178/2R .SYSTEMS
- 178/18.01 ..Position coordinate determination for writing (e.g., writing digitizer pad, stylus, or circuitry)
- 178/19.01 ...Writing digitizer stylus

- 3 178/18.03 (0 OR, 3 XR)
- Class 178 TELEGRAPHY
- 178/2R .SYSTEMS
- 178/18.01 ..Position coordinate determination for writing (e.g., writing digitizer pad, stylus, or circuitry)
- 178/18.03 ...Writing digitizer pad

- 3 106/31.86 (0 OR, 3 XR)
- Class 106 COMPOSITIONS: COATING OR PLASTIC
- 106/1**1 .COATING OR PLASTIC COMPOSITIONS
- 106/31.01 ..Marking
- 106/31.13 ...Inks
- 106/31.6 Pigment containing
- 106/31.85 Specified vehicle, solvent, or dispersing medium containing
- 106/31.86 Organic oxygen compound containing

- 3 178/18.07 (3 OR, 0 XR)
- Class 178 TELEGRAPHY
- 178/2R .SYSTEMS

- 178/18.01 ..Position coordinate determination for writing (e.g., writing digitizer pad, stylus, or circuitry)
- 178/18.03 ...Writing digitizer pad
- 178/18.07 Inductive
- 3 106/31.43 (2 OR, 1 XR)
 - Class 106 COMPOSITIONS: COATING OR PLASTIC
 - 106/1**1 .COATING OR PLASTIC COMPOSITIONS
 - 106/31.01 ..Marking
 - 106/31.13 ...Inks
 - 106/31.27 Organic dye containing
 - 106/31.43 Organic nitrogen compound containing
- 2 455/456.5 (2 OR, 0 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/456.1 ...Location monitoring
 - 455/456.5 At system equipment (i.e., base station)
- 2 455/456.1 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/456.1 ...Location monitoring
- 2 455/456.6 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/456.1 ...Location monitoring
 - 455/456.6 At remote station (i.e., mobile station)
- 2 455/414.2 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/414.1 ..Special service
 - 455/414.2 ...User location independent information retrieval
- 2 370/432 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/431 .CHANNEL ASSIGNMENT TECHNIQUES
 - 370/432 ..Messages addressed to multiple destinations
- 2 455/343.3 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/130 .RECEIVER OR ANALOG MODULATED SIGNAL FREQUENCY CONVERTER
 - 455/334 ..With particular receiver circuit
 - 455/343.1 ...Having particular power or bias supply (including self-powered or battery saving means)
 - 455/343.2 Battery saving based on received signal
 - 455/343.3 Based on identification
- 2 455/343.4 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/130 .RECEIVER OR ANALOG MODULATED SIGNAL FREQUENCY CONVERTER

- 455/334 ..With particular receiver circuit
- 455/343.1 ...Having particular power or bias supply (including self-powered or battery saving means)
- 455/343.2 Battery saving based on received signal
- 455/343.4 Based on schedule information
- 2 370/280 (1 OR, 1 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/276 .DUPLEX
 - 370/277 ..Communication over free space
 - 370/280 ...Time division
- 2 370/324 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/315 ..Repeater
 - 370/316 ...Airborne or space satellite repeater
 - 370/319 Multiple access (e.g., FDMA)
 - 370/321 Time division (TDMA)
 - 370/324 Synchronization
- 2 455/13.4 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/7 .CARRIER WAVE REPEATER OR RELAY SYSTEM (I.E., RETRANSMISSION OF SAME INFORMATION)
 - 455/11.1 ..Portable or mobile repeater
 - 455/12.1 ...Space satellite
 - 455/13.4 Power control
- 2 370/350 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/345 ..Combining or distributing information via time channels
 - 370/350 ...Synchronization
- 2 455/13.2 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/7 .CARRIER WAVE REPEATER OR RELAY SYSTEM (I.E., RETRANSMISSION OF SAME INFORMATION)
 - 455/11.1 ..Portable or mobile repeater
 - 455/12.1 ...Space satellite
 - 455/13.2 With synchronizing of satellites or system
- 2 709/228 (1 OR, 1 XR)
 - Class 709 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING
 - 709/227 .COMPUTER-TO-COMPUTER SESSION/CONNECTION ESTABLISHING
 - 709/228 ..Session/connection parameter setting
- 2 455/517 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/39 .TRANSMITTER AND RECEIVER AT SEPARATE STATIONS
 - 455/500 ..Plural transmitters or receivers (i.e., more than two stations)
 - 455/507 ...Central station (e.g., master, etc.)
 - 455/517 To or from mobile station

- 2 709/227 (0 OR, 2 XR)
 - Class 709 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING
 - 709/227 .COMPUTER-TO-COMPUTER SESSION/CONNECTION ESTABLISHING
- 2 370/352 (1 OR, 1 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/351 .PATHFINDING OR ROUTING
 - 370/352 ..Combined circuit switching and packet switching
- 2 370/389 (1 OR, 1 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/351 .PATHFINDING OR ROUTING
 - 370/389 ..Switching a message which includes an address header
- 2 370/341 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 .COMMUNICATION OVER FREE SPACE
 - 370/340 ..Using trunking
 - 370/341 ...Channel assignment
- 2 375/222 (0 OR, 2 XR)
 - Class 375 PULSE OR DIGITAL COMMUNICATIONS
 - 375/219 .TRANSCIVERS
 - 375/222 ..Modems (data sets)
- 2 455/63.1 (1 OR, 1 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/39 .TRANSMITTER AND RECEIVER AT SEPARATE STATIONS
 - 455/63.1 ..Distortion, noise, or other interference prevention, reduction, or compensation
- 2 455/432.3 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/432.1 ...Roaming
 - 455/432.3 Service profile
- 2 455/435.1 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 .RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/435.1 ...Registration
- 2 375/219 (1 OR, 1 XR)
 - Class 375 PULSE OR DIGITAL COMMUNICATIONS
 - 375/219 .TRANSCIVERS
- 2 455/343.5 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/130 .RECEIVER OR ANALOG MODULATED SIGNAL FREQUENCY CONVERTER
 - 455/334 ..With particular receiver circuit
 - 455/343.1 ...Having particular power or bias supply (including self-powered or battery saving means)

- 455/343.5 Battery saving based on detected power source level
- 2 375/220 (0 OR, 2 XR)
 - Class 375 PULSE OR DIGITAL COMMUNICATIONS
 - 375/219 ..TRANSCIVERS
 - 375/220 ..Transmission interface between two stations or terminals
- 2 455/343.1 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/130 ..RECEIVER OR ANALOG MODULATED SIGNAL FREQUENCY CONVERTER
 - 455/334 ..With particular receiver circuit
 - 455/343.1 ...Having particular power or bias supply (including self-powered or battery saving means)
- 2 455/418 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 ..RADIOTELEPHONE SYSTEM
 - 455/418 ..Programming control
- 2 370/332 (1 OR, 1 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/310 ..COMMUNICATION OVER FREE SPACE
 - 370/328 ..Having a plurality of contiguous regions served by respective fixed stations
 - 370/329 ...Channel assignment
 - 370/331 Hand-off control
 - 370/332 Based upon a particular signal quality measurement
- 2 455/434 (2 OR, 0 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 ..RADIOTELEPHONE SYSTEM
 - 455/422.1 ..Zoned or cellular telephone system
 - 455/434 ...Control or access channel scanning
- 2 455/464 (0 OR, 2 XR)
 - Class 455 TELECOMMUNICATIONS
 - 455/403 ..RADIOTELEPHONE SYSTEM
 - 455/462 ..Including private cordless extension system
 - 455/464 ...Channel selection or allocation
- 2 713/324 (0 OR, 2 XR)
 - Class 713 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: SUPPORT
 - 713/300 ..COMPUTER POWER CONTROL
 - 713/320 ..Power conservation
 - 713/324 ...By shutdown of only part of system
- 2 713/320 (0 OR, 2 XR)
 - Class 713 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: SUPPORT
 - 713/300 ..COMPUTER POWER CONTROL
 - 713/320 ..Power conservation
- 2 709/243 (0 OR, 2 XR)
 - Class 709 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING
 - 709/238 ..COMPUTER-TO-COMPUTER DATA ROUTING
 - 709/243 ..Decentralized controlling

- 2 709/238 (0 OR, 2 XR)
 - Class 709 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING
 - 709/238 .COMPUTER-TO-COMPUTER DATA ROUTING
- 2 370/400 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/351 .PATHFINDING OR ROUTING
 - 370/389 ..Switching a message which includes an address header
 - 370/400 ...Having a plurality of nodes performing distributed switching
- 2 370/406 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/351 .PATHFINDING OR ROUTING
 - 370/389 ..Switching a message which includes an address header
 - 370/400 ...Having a plurality of nodes performing distributed switching
 - 370/406 Plurality of rings or loops to form a mesh network
- 2 709/229 (1 OR, 1 XR)
 - Class 709 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MULTICOMPUTER DATA TRANSFERRING
 - 709/227 .COMPUTER-TO-COMPUTER SESSION/CONNECTION ESTABLISHING
 - 709/229 ..Network resources access controlling
- 2 370/242 (2 OR, 0 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/241 .DIAGNOSTIC TESTING (OTHER THAN SYNCHRONIZATION)
 - 370/242 ..Fault detection
- 2 375/316 (1 OR, 1 XR)
 - Class 375 PULSE OR DIGITAL COMMUNICATIONS
 - 375/316 .RECEIVERS
- 2 370/445 (0 OR, 2 XR)
 - Class 370 MULTIPLEX COMMUNICATIONS
 - 370/431 .CHANNEL ASSIGNMENT TECHNIQUES
 - 370/445 ..Carrier sense multiple access (CSMA)
- 2 710/5 (2 OR, 0 XR)
 - Class 710 ELECTRICAL COMPUTERS AND DIGITAL DATA PROCESSING SYSTEMS: INPUT/OUTPUT
 - 710/1 .INPUT/OUTPUT DATA PROCESSING
 - 710/5 ..Input/Output command process
- 2 713/321 (1 OR, 1 XR)
 - Class 713 ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: SUPPORT
 - 713/300 .COMPUTER POWER CONTROL
 - 713/320 ..Power conservation
 - 713/321 ...Programmable calculator with power saving feature
- 2 715/781 (0 OR, 2 XR)
 - Class 715 DATA PROCESSING: PRESENTATION PROCESSING OF DOCUMENT, OPERATOR INTERFACE PROCESSING, AND SCREEN SAVER DISPLAY PROCESSING

- 715/700 .OPERATOR INTERFACE (E.G., GRAPHICAL USER INTERFACE)
- 715/764 ..On-screen workspace or object
- 715/781 ...Window or viewpoint
- 2 345/168 (0 OR, 2 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/156 .DISPLAY PERIPHERAL INTERFACE INPUT DEVICE
 - 345/168 ..Including keyboard
- 2 348/51 (0 OR, 2 XR)
 - Class 348 TELEVISION
 - 348/42 .STEREOSCOPIC
 - 348/51 ..Stereoscopic display device
- 2 540/302 (0 OR, 2 XR)
 - Class 540 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES
 - 540/1**1 .ORGANIC COMPOUNDS (Class 532, Subclass 1)
 - 540/1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS
 - 540/200 ...Hetero ring is four-membered containing nitrogen and having chalcogen double bonded directly to a ring carbon which is adjacent to the ring nitrogen
 - 540/203 Polycyclo ring system containing the hetero ring as one of the cyclos
 - 540/302 The ring nitrogen is shared by a five-membered ring
- 2 514/210.09 (1 OR, 1 XR)
 - Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 - 514/183 ..Heterocyclic carbon compounds containing a hetero ring having chalcogen (i.e., O,S,Se or Te) or nitrogen as the only ring hetero atoms DOAI
 - 514/210.01 ...Hetero ring is four-membered and includes at least one ring nitrogen
 - 514/210.02 Chalcogen double bonded directly to a ring carbon of the four-membered hetero ring which is adjacent to the ring nitrogen
 - 514/210.03 Polycyclo ring system having the four-membered hetero ring as one of the cyclos
 - 514/210.04 Bicyclo ring system having the four-membered hetero ring as one of the cyclos
 - 514/210.09 The other cyclo of the bicyclo ring system is five-membered
- 2 540/200 (0 OR, 2 XR)
 - Class 540 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES
 - 540/1**1 .ORGANIC COMPOUNDS (Class 532, Subclass 1)
 - 540/1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS
 - 540/200 ...Hetero ring is four-membered containing nitrogen and having chalcogen double bonded directly to a ring carbon which is adjacent to the ring nitrogen
- 2 428/331 (1 OR, 1 XR)
 - Class 428 STOCK MATERIAL OR MISCELLANEOUS ARTICLES
 - 428/221 .WEB OR SHEET CONTAINING STRUCTURALLY DEFINED ELEMENT OR COMPONENT
 - 428/323 ..Including a second component containing structurally defined particles
 - 428/331 ...Silicic material
- 2 430/537 (0 OR, 2 XR)
 - Class 430 RADIATION IMAGERY CHEMISTRY: PROCESS, COMPOSITION, OR PRODUCT THEREOF

- 430/495.1 ..RADIATION SENSITIVE PRODUCT
- 430/523 ..Identified backing or protective layer containing
- 430/531 ...Synthetic resin or cellulose derivative containing
- 430/536 Polymer of unsaturated monomer
- 430/537 In nonradiation-sensitive layer including gelatin

- 2 430/538 (0 OR, 2 XR)
 - Class 430 RADIATION IMAGERY CHEMISTRY: PROCESS, COMPOSITION, OR PRODUCT THEREOF
 - 430/495.1 ..RADIATION SENSITIVE PRODUCT
 - 430/523 ..Identified backing or protective layer containing
 - 430/538 ...Fibrous, e.g., paper, textile, etc.

- 2 544/240 (1 OR, 1 XR)
 - Class 544 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES
 - 544/1**2 ..ORGANIC COMPOUNDS (Class 532, subclass 1)
 - 544/1**1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM, OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS (Class 540, subclass 1)
 - 544/1 ...Hetero ring is six-membered having two or more ring hetero atoms of which at least one is nitrogen (e.g., selenazines, etc.)
 - 544/224 The six-membered hetero ring consists of two nitrogens and four carbons (e.g., 1,2-diazines, etc.)
 - 544/239 Chalcogen bonded directly to ring carbon of a 1,2-diazine ring
 - 544/240 Plural chalcogens bonded directly

- 2 514/16.9 (1 OR, 1 XR)
 - Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 514/1 ..DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 - 514/1.1 ..Peptide (e.g., protein, etc.) containing DOAI
 - 514/16.7 ...Bone affecting
 - 514/16.9 Osteoporosis

- 2 345/174 (1 OR, 1 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/156 ..DISPLAY PERIPHERAL INTERFACE INPUT DEVICE
 - 345/173 ..Touch panel
 - 345/174 ...Including impedance detection

- 2 106/31.65 (1 OR, 1 XR)
 - Class 106 COMPOSITIONS: COATING OR PLASTIC
 - 106/1**1 ..COATING OR PLASTIC COMPOSITIONS
 - 106/31.01 ..Marking
 - 106/31.13 ...Inks
 - 106/31.6 Pigment containing
 - 106/31.65 Specified particle size or coated particle containing

- 2 348/E13.014 (0 OR, 2 XR)
 - Class 348 TELEVISION
 - 348/E13.001 ..STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
 - 348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
 - 348/E13.003 ...Stereoscopic image signal generation (EPO)
 - 348/E13.004 Using a stereoscopic image camera (EPO)
 - 348/E13.014 Having two 2D image pickup sensors representing the interocular distance (EPO)

- 2 348/E13.016 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.003 ...Stereoscopic image signal generation (EPO)
348/E13.004 Using a stereoscopic image camera (EPO)
348/E13.016 Calibration aspects (EPO)
- 2 348/E13.019 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.003 ...Stereoscopic image signal generation (EPO)
348/E13.019 Color aspects (EPO)
- 2 348/E13.025 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.003 ...Stereoscopic image signal generation (EPO)
348/E13.025 Synchronization or controlling aspects (EPO)
- 2 348/E13.037 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.026 ...Stereoscopic image displaying (EPO)
348/E13.036 For viewing by the user with the aid of special glasses or head mounted displays (HMD), i.e., stereoscopic displaying (EPO)
348/E13.037 With spectral multiplexing, i.e., simultaneously displaying left and right images separated using glasses with different spectral characteristics, e.g., anaglyph method or Pullfrich method (EPO)
- 2 348/E13.04 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.026 ...Stereoscopic image displaying (EPO)
348/E13.036 For viewing by the user with the aid of special glasses or head mounted displays (HMD), i.e., stereoscopic displaying (EPO)
348/E13.04 With temporal multiplexing, i.e., alternatively displaying left and right images separated in time and using glasses to alternatively block the right and left eye (EPO)
- 2 348/E13.044 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.026 ...Stereoscopic image displaying (EPO)
348/E13.044 For displaying monoscopic and stereoscopic images or mixed monoscopic/stereoscopic images,

e.g., monoscopic and stereoscopic image displaying modes or a stereoscopic image overlay window in a monoscopic image background (EPO)

2 348/E13.047 (0 OR, 2 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.045 Using observer tracking (EPO)

348/E13.047 For tracking with gaze detection, i.e., detecting the lines of sight of the observers eyes (EPO)

2 348/E13.058 (0 OR, 2 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.026 ...Stereoscopic image displaying (EPO)

348/E13.058 Using an image projection screen (EPO)

2 348/E13.061 (0 OR, 2 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.06 ...Stereoscopic image signal coding, multiplexing, processing, recording or transmission (EPO)

348/E13.061 Color aspects (EPO)

2 348/E13.062 (0 OR, 2 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.06 ...Stereoscopic image signal coding, multiplexing, processing, recording or transmission (EPO)

348/E13.062 Coding or decoding stereoscopic image signals (EPO)

2 348/E13.069 (0 OR, 2 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.06 ...Stereoscopic image signal coding, multiplexing, processing, recording or transmission (EPO)

348/E13.064 Processing stereoscopic image signals (EPO)

348/E13.069 Equalizing the characteristics of different image components in stereoscopic images, e.g., average brightness or color balance (EPO)

2 348/E13.072 (0 OR, 2 XR)

Class 348 TELEVISION

348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)

348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)

348/E13.06 ...Stereoscopic image signal coding, multiplexing, processing, recording or transmission (EPO)

348/E13.072 Multiplexing or demultiplexing different image signal components in stereoscopic image signals (EPO)

- 2 348/E13.073 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.06 ...Stereoscopic image signal coding, multiplexing, processing, recording or transmission (EPO)
348/E13.073 Synchronization or controlling aspects (EPO)
- 2 348/E5.141 (0 OR, 2 XR)
Class 348 TELEVISION
348/E5.001 .DETAILS OF TELEVISION SYSTEMS (EPO)
348/E5.137 ..Projection arrangements for image reproduction, e.g., using eidophor (EPO)
348/E5.139 ...Involving the use of a spatial light modulator, e.g., a light valve, controlled by a video signal (EPO)
348/E5.141 The modulator being an array of liquid crystal cells (EPO)
- 2 348/E5.143 (0 OR, 2 XR)
Class 348 TELEVISION
348/E5.001 .DETAILS OF TELEVISION SYSTEMS (EPO)
348/E5.137 ..Projection arrangements for image reproduction, e.g., using eidophor (EPO)
348/E5.143 ...Constructional details of television projection apparatus (EPO)
- 2 348/E5.145 (0 OR, 2 XR)
Class 348 TELEVISION
348/E5.001 .DETAILS OF TELEVISION SYSTEMS (EPO)
348/E5.137 ..Projection arrangements for image reproduction, e.g., using eidophor (EPO)
348/E5.143 ...Constructional details of television projection apparatus (EPO)
348/E5.145 Of head mounted projectors (EPO)
- 2 349/86 (0 OR, 2 XR)
Class 349 LIQUID CRYSTAL CELLS, ELEMENTS AND SYSTEMS
349/56 .PARTICULAR STRUCTURE
349/84 ..Having significant detail of cell structure only
349/86 ...Microencapsulated or polymer dispersed liquid crystal
- 2 348/E13.004 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.003 ...Stereoscopic image signal generation (EPO)
348/E13.004 Using a stereoscopic image camera (EPO)
- 2 348/E13.007 (0 OR, 2 XR)
Class 348 TELEVISION
348/E13.001 .STEREOSCOPIC TELEVISION SYSTEMS; DETAILS THEREOF (EPO)
348/E13.002 ..Systems where the three-dimensional effect is obtained by means of at least two 2D image signals from different viewpoint locations representing the interocular distance (EPO)
348/E13.003 ...Stereoscopic image signal generation (EPO)
348/E13.004 Using a stereoscopic image camera (EPO)
348/E13.005 Having a single 2D image pickup sensor (EPO)
348/E13.007 Using spatial multiplexing, i.e., simultaneously capturing several geometrical viewpoints on different parts of the image pickup sensor (EPO)

- 2 424/434 (2 OR, 0 XR)
 - Class 424 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 424/400 .PREPARATIONS CHARACTERIZED BY SPECIAL PHYSICAL FORM
 - 424/422 ..Implant or insert
 - 424/434 ...Mucosal (e.g., nasal, etc.)
- 2 514/11.9 (0 OR, 2 XR)
 - Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 - 514/1.1 ..Peptide (e.g., protein, etc.) containing DOAI
 - 514/9.7 ...Hormone or derivative affecting or utilizing
 - 514/11.9 Calcitonin or derivative
- 2 514/975 (0 OR, 2 XR)
 - Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 514/975 .CHARACTERIZED BY THE DESIGNATED SURFACTANT USED
- 2 514/808 (0 OR, 2 XR)
 - Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 514/808 .CALCITONIN OR DERIVATIVES
- 2 514/970 (0 OR, 2 XR)
 - Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 - 514/970 .CONTAINING DESIGNATED INGREDIENT TO STABILIZE AN ACTIVE INGREDIENT
- 2 435/131 (0 OR, 2 XR)
 - Class 435 CHEMISTRY: MOLECULAR BIOLOGY AND MICROBIOLOGY
 - 435/41 .MICRO-ORGANISM, TISSUE CELL CULTURE OR ENZYME USING PROCESS TO SYNTHESIZE A DESIRED CHEMICAL COMPOUND OR COMPOSITION
 - 435/131 ..Preparing organic compound containing a metal or atom other than H, N, C, O, or halogen
- 2 435/106 (0 OR, 2 XR)
 - Class 435 CHEMISTRY: MOLECULAR BIOLOGY AND MICROBIOLOGY
 - 435/41 .MICRO-ORGANISM, TISSUE CELL CULTURE OR ENZYME USING PROCESS TO SYNTHESIZE A DESIRED CHEMICAL COMPOUND OR COMPOSITION
 - 435/106 ..Preparing alpha or beta amino acid or substituted amino acid or salts thereof
- 2 345/157 (0 OR, 2 XR)
 - Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS
 - 345/156 .DISPLAY PERIPHERAL INTERFACE INPUT DEVICE
 - 345/157 ..Cursor mark position control device
- 2 715/856 (0 OR, 2 XR)
 - Class 715 DATA PROCESSING: PRESENTATION PROCESSING OF DOCUMENT, OPERATOR INTERFACE PROCESSING, AND SCREEN SAVER DISPLAY PROCESSING
 - 715/700 .OPERATOR INTERFACE (E.G., GRAPHICAL USER INTERFACE)
 - 715/764 ..On-screen workspace or object
 - 715/856 ...Cursor
- 2 349/12 (1 OR, 1 XR)
 - Class 349 LIQUID CRYSTAL CELLS, ELEMENTS AND SYSTEMS
 - 349/1 .LIQUID CRYSTAL SYSTEM
 - 349/12 ..Liquid crystal writing tablet

- 2 715/863 (0 OR, 2 XR)
 Class 715 DATA PROCESSING: PRESENTATION PROCESSING OF DOCUMENT, OPERATOR INTERFACE PROCESSING, AND SCREEN SAVER DISPLAY PROCESSING
 715/700 .OPERATOR INTERFACE (E.G., GRAPHICAL USER INTERFACE)
 715/863 ..Gesture-based
- 2 106/31.35 (1 OR, 1 XR)
 Class 106 COMPOSITIONS: COATING OR PLASTIC
 106/1**1 .COATING OR PLASTIC COMPOSITIONS
 106/31.01 ..Marking
 106/31.13 ...Inks
 106/31.27 Organic dye containing
 106/31.34 Fat, fatty oil, fatty acid, or derivative thereof containing
 106/31.35 Fatty acid or derivative containing
- 2 341/5 (0 OR, 2 XR)
 Class 341 CODED DATA GENERATION OR CONVERSION
 341/1 .DIGITAL PATTERN READING TYPE CONVERTER
 341/5 ..For X or Y coordinate determination (e.g., stylus-pad)
- 2 514/703 (0 OR, 2 XR)
 Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 514/693 ..Aldehyde DOAI
 514/703 ...Carbon to carbon unsaturation
- 2 514/192 (2 OR, 0 XR)
 Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 514/183 ..Heterocyclic carbon compounds containing a hetero ring having chalcogen (i.e., O,S,Se or Te) or nitrogen as the only ring hetero atoms DOAI
 514/192 ...1-thia-4-aza-bicyclo (3.2.0) heptane ring containing (including dehydrogenated) (e.g., penicillins, etc.)
- 2 540/313 (1 OR, 1 XR)
 Class 540 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES
 540/1**1 .ORGANIC COMPOUNDS (Class 532, Subclass 1)
 540/1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS
 540/200 ...Hetero ring is four-membered containing nitrogen and having chalcogen double bonded directly to a ring carbon which is adjacent to the ring nitrogen
 540/203 Polycyclo ring system containing the hetero ring as one of the cyclos
 540/302 The ring nitrogen is shared by a five-membered ring
 540/303 The five-membered ring contains an additional hetero atom
 540/304 1-thia-4-aza-bicyclo(3.2.0)hep-tane (including unsaturated; e.g., penam, etc.)
 540/310 Having -C(=X)-, wherein X is chalcogen, bonded directly at the 3-position of the bicyclo ring system
 540/312 Nitrogen bonded directly at the 6-position of the bicyclo ring system
 540/313 The 2-position substituent contains chalcogen, nitrogen or halogen
- 2 346/139R (1 OR, 1 XR)
 Class 346 RECORDERS

346/139R .MARKERS AND/OR DRIVING MEANS THEREFOR

2 33/1M (0 OR, 2 XR)

Class 33 GEOMETRICAL INSTRUMENTS

33/1R .MISCELLANEOUS

33/1M ..X-Y motion

2 430/523 (0 OR, 2 XR)

Class 430 RADIATION IMAGERY CHEMISTRY: PROCESS, COMPOSITION, OR PRODUCT THEREOF

430/495.1 .RADIATION SENSITIVE PRODUCT

430/523 ..Identified backing or protective layer containing

2 347/86 (2 OR, 0 XR)

Class 347 INCREMENTAL PRINTING OF SYMBOLIC INFORMATION

347/1 .INK JET

347/84 ..Fluid or fluid source handling means

347/85 ...Fluid supply system

347/86 Cartridge

2 345/207 (0 OR, 2 XR)

Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS

345/204 .DISPLAY DRIVING CONTROL CIRCUITRY

345/207 ..Light detection means (e.g., with photodetector)

2 548/253 (1 OR, 1 XR)

Class 548 ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES

548/100**2 .ORGANIC COMPOUNDS (Class 532, Subclass 1)

548/100**1 ..HETEROCYCLIC CARBON COMPOUNDS CONTAINING A HETERO RING HAVING CHALCOGEN (I.E., OXYGEN, SULFUR, SELENIUM, OR TELLURIUM) OR NITROGEN AS THE ONLY RING HETERO ATOMS (Class 540, subclass 1)

548/100 ...Hetero ring is five-membered having two or more ring hetero atoms of which at least one is nitrogen (e.g., selenazoles, etc.)

548/250 Tetrazoles (including hydrogenated)

548/252 Chalcogen attached indirectly to the tetrazole ring by nonionic bonding

548/253 The chalcogen, X, is in a -C(=X)- group

2 106/31.75 (0 OR, 2 XR)

Class 106 COMPOSITIONS: COATING OR PLASTIC

106/1**1 .COATING OR PLASTIC COMPOSITIONS

106/31.01 ..Marking

106/31.13 ...Inks

106/31.6 Pigment containing

106/31.75 Organic nitrogen compound containing

2 345/104 (0 OR, 2 XR)

Class 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DISPLAY SYSTEMS

345/30 .PLURAL PHYSICAL DISPLAY ELEMENT CONTROL SYSTEM (E.G., NON-CRT)

345/55 ..Display elements arranged in matrix (e.g., rows and columns)

345/84 ...Light-controlling display elements

345/87 Liquid crystal display elements (LCD)

345/104 Input/output liquid crystal display panel

2 514/383 (1 OR, 1 XR)

Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS

514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 514/183 ..Heterocyclic carbon compounds containing a hetero ring having chalcogen (i.e., O,S,Se or Te) or
 nitrogen as the only ring hetero atoms DOAI
 514/359 ...Five-membered hetero ring containing at least one nitrogen ring atom (e.g., 1,2,3-triazoles, etc.)
 514/383 1,2,4-triazoles (including hydrogenated)

 2 514/619 (0 OR, 2 XR)
 Class 514 DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS
 514/1 .DESIGNATED ORGANIC ACTIVE INGREDIENT CONTAINING (DOAI)
 514/579 ..Nitrogen containing other than solely as a nitrogen in an inorganic ion of an addition salt, a nitro or
 a nitroso DOAI
 514/613 ...Carboxamides (i.e., R-C(=O)-N, wherein R is a radical having carbon bonded directly to the
 C(=O)-N or is hydrogen and wherein any substituent attached to nitrogen will be referred to as E)
 514/617 R contains benzene ring
 514/619 Nitrogen in R

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PLUS Search Results for S/N 15047773 Searched Sep 05, 2017.

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15/047,773	02/19/2016	2621	2080	38018/196002; 150081US02	26	3

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CORRECTED FILING RECEIPT



Date Mailed: 04/27/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Jeff Lukanc, San Jose, CA;
Kirk Hargreaves, San Jose, CA;
David Sobel, San Jose, CA;
Joseph Kurth Reynolds, San Jose, CA;

Applicant(s)

Synaptics Incorporated, San Jose, CA;

Power of Attorney: The patent practitioners associated with Customer Number 111408

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/120,856 02/25/2015
and claims benefit of 62/207,249 08/19/2015

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/03/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/047,773**

Projected Publication Date: 08/25/2016

Non-Publication Request: No

Early Publication Request: No

Title

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

Preliminary Class

345

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Jeff Lukanc et al.

Application No.: 15/047,773

Confirmation No.: 1009

Filed: February 19, 2016

Art Unit: 2621

For: ACTIVE PEN WITH BIDIRECTIONAL
COMMUNICATION

Examiner: Not Yet Assigned

REQUEST FOR CORRECTED FILING RECEIPT

MS Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby requests that a Corrected Filing Receipt be issued in the above-identified patent application. The Official Filing Receipt received by Applicant, a copy of which is attached hereto, has an error in the Applicant's residence. Applicant respectfully requests that the residence of the Applicant be changed from Residence Not Provided to San Jose, California. Applicant encloses a copy of the original Application Data Sheet, downloaded from PAIR, which correctly indicates the residence as San Jose, California. Applicant notes that the error occurred in the Office.

Applicant additionally requests that all pertinent U.S. Patent and Trademark Office records relating to the subject application be changed to reflect this correction.

Applicant believes no fee is due with this request. However, if a fee is due, please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 38018/196002).

Dated: April 20, 2016

Respectfully submitted,

By /Robert P. Lord/
Robert P. Lord
Registration No.: 46,479
OSHA LIANG LLP
909 Fannin Street, Suite 3500
Houston, Texas 77010
(713) 228-8600
(713) 228-8778 (Fax)
lord@oshaliang.com (Email)
Attorney for Applicant

Enclosures (Official Filing Receipt)
(Originally Filed ADS)



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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/047,773	02/19/2016	2621	2080	38018/196002; 150081US02	26	3

CONFIRMATION NO. 1009

FILING RECEIPT

111408

Osha Liang LLP/Synaptics
909 Fannin Street, Suite 3500
Houston, TX 77010



Date Mailed: 03/07/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

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Jeff Lukanc, San Jose, CA;
Kirk Hargreaves, San Jose, CA;
David Sobel, San Jose, CA;
Joseph Kurth Reynolds, San Jose, CA;

Applicant(s)

Synaptics Incorporated, Residence Not Provided;

Assignment For Published Patent Application

Synaptics Incorporated, San Jose, CA

Power of Attorney: The patent practitioners associated with Customer Number 111408

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/120,856 02/25/2015
and claims benefit of 62/207,249 08/19/2015

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Permission to Access Search Results: Yes

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/047,773**

Projected Publication Date: 08/25/2016

Non-Publication Request: No

Early Publication Request: No
Title

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

Preliminary Class

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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NOT GRANTED

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SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
Mr. ▾	Jeff		Lukanc	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City		State/Province		Country of Residence	

Mailing Address of Inventor:

Address 1	c/o Synaptics Incorporated				
Address 2	1251 McKay Dr.				
City	San Jose	State/Province	CA		
Postal Code	95131	Country i	US		

Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
▾	Kirk		Hargreaves	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	San Jose	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	1251 McKay Dr.				
Address 2					
City	San Jose	State/Province	CA		
Postal Code	95131	Country i	US		

Inventor	3				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
Mr. ▾	David		Sobel	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

Petitioner Shenzhen Qianfengyi Intelligent Technology Co., Ltd.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02	
		Application Number		
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION			

City		State/Province		Country of Residence	
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Mailing Address of Inventor:

Address 1	c/o Synaptics Incorporated				
Address 2	1251 McKay Dr.				
City	San Jose	State/Province	CA		
Postal Code	95131	Country	US		
Inventor	4				Remove
Legal Name					

Prefix	Given Name	Middle Name	Family Name	Suffix	
Mr. ▾	Joseph	Kurth	Reynolds	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	San Jose	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o Synaptics Incorporated				
Address 2	1251 McKay Dr.				
City	San Jose	State/Province	CA		
Postal Code	95131	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add					

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	111408		
Email Address	docketing@oshaliang.com	Add Email	Remove Email

Application Information:

Title of the Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		
Attorney Docket Number	38018/196002; 150081US02	Small Entity Status Claimed	☐
Application Type	Nonprovisional ▾		
Subject Matter	Utility ▾		
Total Number of Drawing Sheets (if any)	7	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	111408		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62/120856	2015-02-25

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02	
		Application Number		
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION			
Prior Application Status	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
	Claims benefit of provisional	62/207249	2015-08-19	
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.				Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. ☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section. Clear		
☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor:		
If the Applicant is an Organization check here. ☒		
Organization Name	Synaptics Incorporated	
Mailing Address Information For Applicant:		
Address 1	1251 McKay Drive	
Address 2		
City	San Jose	State/Province
Country	US	Postal Code
Phone Number		Fax Number
Email Address	IPdocs@synaptics.com	
Additional Applicant Data may be generated within this form by selecting the Add button. Add		

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Assignee	1
-----------------	---

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1				
Address 2				
City		State/Province		
Country ⁱ		Postal Code		
Phone Number		Fax Number		
Email Address				

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Robert P. Lord/		Date (YYYY-MM-DD)	2016-02-19
First Name	Robert	Last Name	Lord	Registration Number
				46479

Additional Signature may be generated within this form by selecting the Add button.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
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.

Electronic Acknowledgement Receipt

EFS ID:	25545453
Application Number:	15047773
International Application Number:	
Confirmation Number:	1009
Title of Invention:	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION
First Named Inventor/Applicant Name:	Jeff Lukanc
Customer Number:	111408
Filer:	Rober Lord/Kate Ohale
Filer Authorized By:	Rober Lord
Attorney Docket Number:	38018/196002; 150081US02
Receipt Date:	20-APR-2016
Filing Date:	19-FEB-2016
Time Stamp:	14:26:05
Application Type:	Utility under 35 USC 111(a)

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	Request for Corrected Filing Receipt	38018196002RFCFR.pdf	503711 10a55e92016635e9fc113241dfbcf170770b6e97	no	14

Warnings:

Information:

Petitioner Shenzhen Qianfenyi Intelligent Technology Co., Ltd.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/047,773	02/19/2016	2621	2080	38018/196002; 150081US02	26	3

CONFIRMATION NO. 1009

FILING RECEIPT



111408
Osha Liang LLP/Synaptics
909 Fannin Street, Suite 3500
Houston, TX 77010

Date Mailed: 03/07/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Jeff Lukanc, San Jose, CA;
Kirk Hargreaves, San Jose, CA;
David Sobel, San Jose, CA;
Joseph Kurth Reynolds, San Jose, CA;

Applicant(s)

Synaptics Incorporated, Residence Not Provided;

Assignment For Published Patent Application

Synaptics Incorporated, San Jose, CA

Power of Attorney: The patent practitioners associated with Customer Number 111408

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/120,856 02/25/2015
and claims benefit of 62/207,249 08/19/2015

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/03/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/047,773**

Projected Publication Date: 08/25/2016

Non-Publication Request: No

Early Publication Request: No
Title

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

Preliminary Class

345

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/047,773				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720			
TOTAL CLAIMS (37 CFR 1.16(j))	26	minus 20 = * 6				x 80 =	480			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = * 0				x 420 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							0.00			
							0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
			TOTAL			TOTAL	2080			
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										

UTILITY PATENT APPLICATION TRANSMITTAL		Attorney Docket No. 38018/196002; 150081US02	
		First Named Inventor Jeff Lukanc	
(Only for new nonprovisional applications under 37 CFR 1.53(b))		Title ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION	
		Express Mail Label No.	

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
---	--

1. ☐ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☐ Applicant asserts small entity status. See 37 CFR 1.27 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages <u>37</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>7</u>] 6. Inventor's Oath or Declaration [Total Pages <u>4</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☒ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	ACCOMPANYING APPLICATION PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee Synaptics Incorporated 11. ☐ 37 CFR 3.73(c) Statement (when there is an assignee) ☒ Power of Attorney 12. ☐ English Translation Document (if applicable) 13. ☐ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☒ Other: Power of Attorney Transmittal (1 page)
--	---

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
 (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS			
☒ The address associated with Customer Number: <u>111408</u>		OR ☐ Correspondence address below	
Name			
Address			
City	State	Zip Code	
Country	Telephone	Email	

Signature	/Robert P. Lord/	Date	February 19, 2016
Name (Print/Type)	Robert P. Lord	Registration No. (Attorney/Agent)	46,479

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

As the below named inventor, I hereby declare that:

This declaration ☒ The attached application, or
is directed to:

☐ United States application or PCT international application number _____
filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

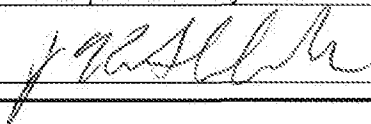
Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Joseph Kurth Reynolds

Date (Optional): Feb 4th 2016

Signature:



Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

111408

PATENT TRADEMARK OFFICE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention**

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

As the below named inventor, I hereby declare that:

This declaration ☒ The attached application, or
is directed to:☐ United States application or PCT international application number _____
filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: _____ Jeff Lukanc _____ Date (Optional) : _____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

111408

PATENT TRADEMARK OFFICE

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

As the below named inventor, I hereby declare that:

This declaration ☒ The attached application, or
is directed to:

☐ United States application or PCT international application number _____
filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Kirk Hargreaves

Date (Optional): 3 Feb 2016

Signature: [Signature]

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

111408

PATENT TRADEMARK OFFICE

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**

**Title of
Invention**

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

As the below named inventor, I hereby declare that:

This declaration ☒ The attached application, or
is directed to:

☐ United States application or PCT international application number _____
filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: _____ David Sobel

Date (Optional): 2/4/16

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

111408

PATENT TRADEMARK OFFICE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	Not Yet Assigned		
Filing Date	Concurrently Herewith		
First Named Inventor	Jeff Lukanc		
Title	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		
Art Unit	N/A		
Examiner Name	Not Yet Assigned		
Attorney Docket Number	38018/196002; 150081 US02		
SIGNATURE of Applicant or Patent Practitioner			
Signature	/Robert P. Lord/	Date (Optional)	February 19, 2016
Name	Robert P. Lord	Registration Number	46,479
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			
NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.			
☐ *Total of <u>1</u> forms are submitted.			

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the attached transmittal letter.

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

111408

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

Name	Registration Number	Name	Registration Number

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☒ The address associated with the above-mentioned Customer Number:

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant:

☐ Inventor or Joint Inventor

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor

☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign

☐ Person Who Otherwise Shows a Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document)

SIGNATURE of Applicant for Patent

Signature

Date

Name

Telephone

Title and Company

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature, see below *.

☐ *Total of 1 forms are submitted.

111408
PATENT TRADEMARK OFFICE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
Mr. ▾	Jeff		Lukanc	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City		State/Province		Country of Residence	

Mailing Address of Inventor:

Address 1	c/o Synaptics Incorporated				
Address 2	1251 McKay Dr.				
City	San Jose	State/Province	CA		
Postal Code	95131	Country	US		

Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
▾	Kirk		Hargreaves	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	San Jose	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	1251 McKay Dr.				
Address 2					
City	San Jose	State/Province	CA		
Postal Code	95131	Country	US		

Inventor	3				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
Mr. ▾	David		Sobel	▾	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

Petitioner Shenzhen Qianfeng Intelligent Technology Co., Ltd.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02	
		Application Number		
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION			

City		State/Province		Country of Residence	
------	--	----------------	--	----------------------	--

Mailing Address of Inventor:

Address 1	c/o Synaptics Incorporated			
Address 2	1251 McKay Dr.			
City	San Jose	State/Province	CA	
Postal Code	95131	Country i	US	
Inventor 4				Remove
Legal Name				

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr. ▾	Joseph	Kurth	Reynolds	▾
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service				
City	San Jose	State/Province	CA	Country of Residence
		US		

Mailing Address of Inventor:

Address 1	c/o Synaptics Incorporated			
Address 2	1251 McKay Dr.			
City	San Jose	State/Province	CA	
Postal Code	95131	Country i	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	111408		
Email Address	docketing@oshaliang.com	Add Email	Remove Email

Application Information:

Title of the Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		
Attorney Docket Number	38018/196002; 150081US02	Small Entity Status Claimed	☐
Application Type	Nonprovisional ▾		
Subject Matter	Utility ▾		
Total Number of Drawing Sheets (if any)	7	Suggested Figure for Publication (if any)	1

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	111408		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62/120856	2015-02-25

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02	
		Application Number		
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION			
Prior Application Status	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
	Claims benefit of provisional	62/207249	2015-08-19	
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.				Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. ☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section. Clear		
☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor:		
If the Applicant is an Organization check here. ☒		
Organization Name	Synaptics Incorporated	
Mailing Address Information For Applicant:		
Address 1	1251 McKay Drive	
Address 2		
City	San Jose	State/Province
Country	US	Postal Code
Phone Number		Fax Number
Email Address	IPdocs@synaptics.com	
Additional Applicant Data may be generated within this form by selecting the Add button. Add		

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
				Remove
If the Assignee or Non-Applicant Assignee is an Organization check here.				☐
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country ⁱ		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				Add

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Robert P. Lord/		Date (YYYY-MM-DD)	2016-02-19
First Name	Robert	Last Name	Lord	Registration Number
				46479
Additional Signature may be generated within this form by selecting the Add button.				Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	38018/196002; 150081US02
		Application Number	
Title of Invention	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION		

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
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.

APPLICATION
FOR
UNITED STATES LETTERS PATENT

TITLE: **ACTIVE PEN WITH BIDIRECTIONAL
COMMUNICATION**

INVENTOR: **Jeff LUKANC
Kirk HARGREAVES
David SOBEL
Joseph Kurth REYNOLDS**

APPLICANT: **Synaptics Incorporated**

111408

PATENT TRADEMARK OFFICE

ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a non-provisional application of U.S. Provisional Patent Application Serial No. 62/120,856, filed on February 25, 2015. This application is also a non-provisional application of U.S. Provisional Patent Application Serial No. 62/207,249, filed on August 19, 2015. Accordingly, this application claims priority to both U.S. Provisional Patent Application Serial No. 62/120,856 and U.S. Provisional Patent Application Serial No. 62/207,249 under 35 U.S.C. § 119(e). U.S. Provisional Patent Application Serial Nos. 62/120,856 and 62/207,249 are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] This invention generally relates to electronic devices.

BACKGROUND

[0003] Input devices including proximity sensor devices (also commonly called touchpads or touch sensor devices) are widely used in a variety of electronic systems. A proximity sensor device typically includes a sensing region, often demarked by a surface, in which the proximity sensor device determines the presence, location and/or motion of one or more input objects. Proximity sensor devices may be used to provide interfaces for the electronic system. For example, proximity sensor devices are often used as input devices for larger computing systems (such as opaque touchpads integrated in, or peripheral to, notebook or desktop computers). Proximity sensor devices are also often used in

smaller computing systems (such as touch screens integrated in cellular phones). Proximity sensor devices may be used to detect styli or pens.

SUMMARY

[0004] In general, in one aspect, embodiments of the invention relate to a processing system for an input device. The processing system comprises: a sensor module coupled to sensor circuitry and configured to: initiate a current beacon period comprising a plurality of timeslots by broadcasting a current beacon signal to a plurality of active pens; receive, during a first timeslot, a first downstream packet from a first active pen transceiver; and receive, during a second timeslot, a second downstream packet from a second active pen transceiver; and a determination module configured to: determine an attribute of a first active pen comprising the first active pen transceiver from at least the first downstream packet.

[0005] In general, in one aspect, embodiments of the invention relate to a method for operating a processing system of an input device. The method comprises: initiating a current beacon period comprising a plurality of timeslots by broadcasting a current beacon signal to a plurality of active pens; receiving, during a first timeslot, a first downstream packet from a first active pen transceiver over a first frequency; receiving, during a second timeslot, a second downstream packet from a second active pen transceiver over a second frequency; and determining an attribute of a first active pen comprising the first active pen transceiver from at least the first downstream packet.

[0006] In general, in one aspect, the invention relates to an active pen. The active pen comprises: an identification (ID) register storing a pen identification (ID); one or more buttons; and a transceiver configured to: receive, from a first input device, a current beacon signal comprising an upstream packet specifying the pen

ID, a timeslot, and a frequency, wherein the current beacon signal initiates a current beacon period comprising a plurality of timeslots; transmit, to the first input device and during the timeslot specified in the upstream packet, a downstream packet comprising a status of the button using the frequency specified in the upstream packet.

[0007] Other aspects of the invention will be apparent from the following description and the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

[0008] FIG. 1 shows a block diagram of an input device in accordance with one or more embodiments of the invention.

[0009] FIG. 2 shows a block diagram of an active pen in accordance with one or more embodiments of the invention.

[0010] FIG. 3 and FIG. 4 show timing charts in accordance with one or more embodiments of the invention.

[0011] FIGs. 5-7 show flowcharts in accordance with one or more embodiments of the invention.

DETAILED DESCRIPTION

[0012] The following detailed description is merely exemplary in nature and is not intended to limit the invention or the application and uses of the invention. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding technical field, background, brief summary or the following detailed description.

[0013] Various embodiments of the present invention provide input devices and methods that may facilitate improved usability along with various other benefits.

[0014] Turning now to the figures, FIG. 1 is a block diagram of an exemplary input device (100), in accordance with embodiments of the invention. The input device (100) may be configured to provide input to an electronic system (not shown). As used in this document, the term “electronic system” (or “electronic device”) broadly refers to any system capable of electronically processing information. Some non-limiting examples of electronic systems include personal computers of all sizes and shapes, such as desktop computers, laptop computers, netbook computers, tablets, web browsing capable devices, e-book readers, smart phones, and personal digital assistants (PDAs). Additional example electronic systems include composite input devices, such as physical keyboards that include input device (100) and separate joysticks or key switches. Further example electronic systems include peripherals such as data input devices (including remote controls and mice), and data output devices (including display screens and printers). Other examples include remote terminals, kiosks, and video game machines (e.g., video game consoles, portable gaming devices, and the like). Other examples include communication devices (including cellular phones, such as smart phones), and media devices (including recorders, editors, and players such as televisions, set-top boxes, music players, digital photo frames, and digital cameras). Additionally, the electronic system could be a host or a slave to the input device.

[0015] The input device (100) can be implemented as a physical part of the electronic system, or can be physically separate from the electronic system. As appropriate, the input device (100) may communicate with parts of the electronic system using any one or more of the following: buses, networks, and other wired or wireless interconnections. Examples include I²C, SPI, PS/2, Universal Serial Bus (USB), MIPI D-PHY, MIPI I3C, Bluetooth, RF, a capacitive communication method, and IRDA.

[0016] In FIG. 1, the input device (100) is shown as a proximity sensor device (also often referred to as a “touchpad” or a “touch sensor device”) configured to sense input provided by one or more input objects in a sensing region (120). Example input objects include fingers and styli (also known as pens), as shown in FIG. 1. Input objects may include passive pens (not shown) and active pens (e.g., paired active pens (140), unpaired active pen (145)). Active pens (140, 145) typically include a transmitter that is driven by a power source in the pen in contrast to passive pens which are detected by the proximity sensor device without having an active transmitter on the pen. A transmitter may provide a means for identification of the position of the active pen, reception of data (e.g., configuration data, time slot information, frequency information, etc.) and sending data (e.g., pressure, color, or button status information)

[0017] Sensing region (120) encompasses any space above, around, in and/or near the input device 100 in which the input device (100) is able to detect user input (e.g., user input provided by one or more input objects (140, 145)). The sizes, shapes, and locations of particular sensing regions may vary widely from embodiment to embodiment. In some embodiments, the sensing region (120) extends from a surface of the input device (100) in one or more directions into space until signal-to-noise ratios prevent sufficiently accurate object detection. The distance to which this sensing region (120) extends in a particular direction, in various embodiments, may be on the order of less than a millimeter, millimeters, centimeters, or more, and may vary significantly with the type of sensing technology used and the accuracy desired. Thus, some embodiments sense input that comprises no contact with any surfaces of the input device (100), contact with an input surface (e.g. a touch surface) of the input device (100), contact with an input surface of the input device (100) coupled with some amount of applied force or pressure, and/or a combination thereof. In various embodiments, input surfaces may be provided by surfaces of casings within

which the sensor electrodes reside, by face sheets applied over the sensor electrodes or any casings, etc. In some embodiments, the sensing region (120) has a rectangular shape when projected onto an input surface of the input device (100).

[0018] The input device (100) may utilize any combination of sensor components and sensing technologies to detect user input in the sensing region (120). The input device (100) comprises one or more sensing elements for detecting user input. As several non-limiting examples, the input device (100) may use capacitive, elastive, resistive, inductive, magnetic, acoustic, ultrasonic, and/or optical techniques.

[0019] Some implementations are configured to provide images that span one, two, three, or higher dimensional spaces. Some implementations are configured to provide projections of input along particular axes or planes. Further, some implementations may be configured to provide a combination of one or more images and one or more projections.

[0020] In some resistive implementations of the input device (100), a flexible and conductive first layer is separated by one or more spacer elements from a conductive second layer. During operation, one or more voltage gradients are created across the layers. Pressing the flexible first layer may deflect it sufficiently to create electrical contact between the layers, resulting in voltage outputs reflective of the point(s) of contact between the layers. These voltage outputs may be used to determine positional information.

[0021] In some inductive implementations of the input device (100), one or more sensing elements pick up loop currents induced by a resonating coil or pair of coils. Some combination of the magnitude, phase, and frequency of the currents may then be used to determine positional information.

[0022] In some capacitive implementations of the input device (100), voltage or current is applied to create an electric field. Nearby input objects cause changes in the electric field, and produce detectable changes in capacitive coupling that may be detected as changes in voltage, current, or the like.

[0023] Some capacitive implementations utilize arrays or other regular or irregular patterns of capacitive sensing elements to create electric fields. In some capacitive implementations, separate sensing elements may be ohmically shorted together to form larger sensor electrodes. Some capacitive implementations utilize resistive sheets, which may be uniformly resistive.

[0024] Some capacitive implementations utilize “self-capacitance” (or “absolute capacitance”) sensing methods based on changes in the capacitive coupling between sensor electrodes and an input object. In various embodiments, an input object near the sensor electrodes alters the electric field near the sensor electrodes, thus changing the measured capacitive coupling. In one implementation, an absolute capacitance sensing method operates by modulating sensor electrodes with respect to a reference voltage (e.g. system ground), and by detecting the capacitive coupling between the sensor electrodes and input objects.

[0025] Some capacitive implementations utilize “mutual capacitance” (or “transcapacitance”) sensing methods based on changes in the capacitive coupling between sensor electrodes. In various embodiments, an input object near the sensor electrodes alters the electric field between the sensor electrodes, thus changing the measured capacitive coupling. In one implementation, a transcapacitive sensing method operates by detecting the capacitive coupling between one or more transmitter sensor electrodes (also “transmitter electrodes”) and one or more receiver sensor electrodes (also “receiver electrodes”). Transmitter sensor electrodes may be modulated relative to the receiver sensor

electrodes. For example, the transmitter sensor electrodes may be modulated relative to a reference voltage to transmit transmitter signals and the receiver sensor electrodes may be held substantially constant relative to the reference voltage to facilitate receipt of resulting signals. The reference voltage may be a substantially constant voltage or a varying voltage. In various embodiments, the reference voltage may be system ground. A resulting signal may comprise effect(s) corresponding to one or more transmitter signals, and/or to one or more sources of environmental interference (e.g. other electromagnetic signals). Sensor electrodes may be dedicated transmitters or receivers, or may be configured to both transmit and receive.

[0026] In FIG. 1, a processing system (110) is shown as part of the input device (100). The processing system (110) is configured to operate the hardware of the input device (100) to detect input in the sensing region (120). The processing system (110) comprises parts of or all of one or more integrated circuits (ICs) and/or other circuitry components. For example, a processing system for a mutual capacitance sensor device may comprise transmitter circuitry configured to transmit signals with transmitter sensor electrodes, and/or receiver circuitry configured to receive signals with receiver sensor electrodes). In some embodiments, the processing system (110) also comprises electronically-readable instructions, such as firmware code, software code, and/or the like. In some embodiments, components composing the processing system (110) are located together, such as near sensing element(s) of the input device (100). In other embodiments, components of processing system (110) are physically separate with one or more components close to sensing element(s) of input device (100), and one or more components elsewhere. For example, the input device (100) may be a peripheral coupled to a computing device, and the processing system (110) may comprise software configured to run on a central processing unit of the computing device and one or more ICs (perhaps with associated firmware)

separate from the central processing unit. As another example, the input device (100) may be physically integrated in a mobile device, and the processing system (110) may comprise circuits and firmware that are part of a main processor of the mobile device. In some embodiments, the processing system (110) is dedicated to implementing the input device (100). In other embodiments, the processing system (110) also performs other functions, such as operating display screens, driving haptic actuators, etc.

[0027] The processing system (110) may be implemented as a set of modules that handle different functions of the processing system (110). Each module may comprise circuitry that is a part of the processing system (110), firmware, software, or a combination thereof. In various embodiments, different combinations of modules may be used. Example modules include hardware operation modules for operating hardware such as sensor electrodes and display screens, data processing modules for processing data such as sensor signals and positional information, and reporting modules for reporting information. Further example modules include sensor operation modules configured to operate sensing element(s) to detect input, identification modules configured to identify gestures such as mode changing gestures, and mode changing modules for changing operation modes. In one or more embodiments, one or more modules may be comprised in separate integrated circuit. For example, a first module may be comprised within a first integrated circuit and a separate module may be comprised within a second integrated circuit. Further, a single module may be comprised within multiple integrated circuits.

[0028] In some embodiments, the processing system (110) responds to user input (or lack of user input) in the sensing region (120) directly by causing one or more actions. Example actions include changing operation modes, as well as GUI actions such as cursor movement, selection, menu navigation, and other

functions. In some embodiments, the processing system (110) provides information about the input (or lack of input) to some part of the electronic system (e.g. to a central processing system of the electronic system that is separate from the processing system (110), if such a separate central processing system exists). In some embodiments, some part of the electronic system processes information received from the processing system (110) to act on user input, such as to facilitate a full range of actions, including mode changing actions and GUI actions.

[0029] For example, in some embodiments, the processing system 110 operates the sensing element(s) of the input device 100 to produce electrical signals indicative of input (or lack of input) in the sensing region 120. The processing system 110 may perform any appropriate amount of processing on the electrical signals in producing the information provided to the electronic system. For example, the processing system 110 may digitize analog electrical signals obtained from the sensor electrodes. As another example, the processing system 110 may perform filtering or other signal conditioning. As yet another example, the processing system 110 may subtract or otherwise account for a baseline, such that the information reflects a difference between the electrical signals and the baseline. As yet further examples, the processing system 110 may determine positional information, recognize inputs as commands, recognize handwriting, and the like.

[0030] “Positional information” as used herein broadly encompasses absolute position, relative position, velocity, acceleration, and other types of spatial information. Exemplary “zero-dimensional” positional information includes near/far or contact/no contact information. Exemplary “one-dimensional” positional information includes positions along an axis. Exemplary “two-dimensional” positional information includes motions in a plane. Exemplary “three-dimensional” positional information includes instantaneous or average

velocities in space. Further examples include other representations of spatial information. Historical data regarding one or more types of positional information may also be determined and/or stored, including, for example, historical data that tracks position, motion, or instantaneous velocity over time.

[0031] In some embodiments, the input device 100 is implemented with additional input components that are operated by the processing system 110 or by some other processing system. These additional input components may provide redundant functionality for input in the sensing region 120, or some other functionality. FIG. 1 shows buttons 130 near the sensing region 120 that can be used to facilitate selection of items using the input device 100. Other types of additional input components include sliders, balls, wheels, switches, and the like. Conversely, in some embodiments, the input device 100 may be implemented with no other input components.

[0032] In some embodiments, the input device 100 comprises a touch screen interface, and the sensing region 120 overlaps at least part of an active area of a display screen (155). For example, the input device 100 may comprise substantially transparent sensor electrodes overlaying the display screen (155) and provide a touch screen interface for the associated electronic system. The display screen may be any type of dynamic display capable of displaying a visual interface to a user, and may include any type of light emitting diode (LED), organic LED (OLED), cathode ray tube (CRT), liquid crystal display (LCD), plasma, electroluminescence (EL), or other display technology. The input device 100 and the display screen may share physical elements. For example, some embodiments may utilize some of the same electrical components for displaying and sensing. In various embodiments, the input device 100 may comprise one or more sensor electrodes configured for both display updating and input sensing. In some embodiments, the described active pen may be used with an opaque

surface rather than a display. Further, the surface which the active pen interacts with in the sensing region may be a fixed surface or a curved and/or flexible surface. As another example, the display screen may be operated in part or in total by the processing system 110. In some embodiments, sensing input objects capacitively may be synchronized to display updates or a portion of display updates.

[0033] It should be understood that while many embodiments of the invention are described in the context of a fully functioning apparatus, the mechanisms of the present invention are capable of being distributed as a program product (e.g., software) in a variety of forms. For example, the mechanisms of the present invention may be implemented and distributed as a software program on information bearing media that are readable by electronic processors (e.g., non-transitory computer-readable and/or recordable/writable information bearing media readable by the processing system 110). Additionally, the embodiments of the present invention apply equally regardless of the particular type of medium used to carry out the distribution. Examples of non-transitory, electronically readable media include various discs, memory sticks, memory cards, memory modules, and the like. Electronically readable media may be based on flash, optical, magnetic, holographic, or any other storage technology.

[0034] In one or more embodiments, data is wirelessly transmitted by an active pen (140, 145) to the processing system (110). This transmitted data may specify one or more attributes of the active pen (140, 145). For example, the data may specify a measured pressure or force at the tip of the active pen (140, 145). As another example, the data may specify the button status (e.g., pressed, not pressed, etc.) of each button of the active pen (140, 145). As another example, the data may specify the tilt of the pen and/or the acceleration of the pen. As yet

another example, the data may specify a mode (*e.g.*, erasure mode) in which the active pen (140, 145) is operating.

[0035] In one or more embodiments, the transmitted data may include a unique ID (*e.g.*, serial number), a vendor part number, a version ID, or any value that may be set by the manufacturer of the active pen (140, 145). In one or more embodiments, the transmitted data includes the operating condition(s) of the active pen (140, 145) including, for example, the battery level, a low-battery level warning, or other error messages.

[0036] In one or more embodiments, the transmitted data includes messages associated with a communications protocol. Example messages include “ACK” messages indicating proper reception by the active pen (140, 145) of an incoming message and “REJECT” messages indicating a refusal of the active pen (140, 145) to accept an incoming message

[0037] In one or more embodiments, the active pen (140, 145) transmits miscellaneous sensor data. For example, the active pen (140, 145) may be embedded with a fingerprint sensor (*e.g.*, for user authentication of signatures), and the transmitted data may include data associated with the fingerprint sensor. Those skilled in the art, having the benefit of this detailed description, will appreciate that the transmitted data may include various sorts of data that is not traditionally assorted with handwriting and electronic pens.

[0038] This data may be transmitted from the active pen (140, 145) to the processing system (110) in one or more downstream packets (discussed below). These attributes may be specified within fields of the downstream packets. The processing system (110) may determine the attributes of the active pens (140, 145) based on the received downstream packets. These determined attributes may impact the manner in which positional information is processed and/or reported to a host. These determined attributes may also trigger various actions

(discussed above) to occur. Attributes may also include a pen color that is currently associated with the active pen (140) and should be displayed when drawing input from the active pen on the display screen (155). Attributes can also specify a pen tip that is used in a similar manner as pen color to affect how input from the active pen (140) is displayed on display screen (155). For example, one pen tip might be similar to highlighter and result in a thick line being drawn, while another pen tip might be similar to a pencil and result in a thin line being drawn. Further, the pen tip may affect how much of an effect tilting the active pen has on the resulting displayed drawing. Attribute data may also include data not apparent to the user such as a user ID that is constant for a period of time. Many attributes that may be transmitted downstream from the active pen (140) to the processing system (110) may also be transmitted upstream from the processing system to the active pen (140). For example, ink color may be selectable via a button on the active pen, or by a selection via the sensing region of a smartphone. It may be beneficial to communicate the current color state to both devices regardless of where the selection was made.

[0039] In one or more embodiments of the invention, active pens are classified as paired active pens (140) or unpaired active pens (145). Each paired active pen (140) is assigned a unique pen identification (ID). Each unpaired active pen (145) has not been assigned a pen ID and/or is set to a default pen ID (*e.g.*, pen ID = 0). An active pen that is currently classified as a paired active pen may become an unpaired active pen at a future point. Similarly, an active pen that is currently classified as an unpaired active pen may become a paired active pen at a future point. In one or more embodiments of the invention, an active pen must be paired before it can transmit downstream packets to the processing system (110).

[0040] In one or more embodiments of the invention, data is exchanged between the processing system (110) and the active pens (140, 145) within the context of a repeated beacon period. The sensor module (160) is configured to initiate a beacon period by broadcasting a beacon signal (*i.e.*, a single wideband communication packet). For example, the beacon signal may use the Code division multiple access (CDMA) direct-sequence spread spectrum (DSSS) format with a 64-chip spreading code and 1MHz chip rate (0-500kHz bandwidth). As another example, communication may be accomplished via a 31-chip spread code and/or a 3-bit Barker code preamble. Moreover, each beacon signal may last approximately 1.28ms and have an amplitude in excess of 3V. Of course, beacon signal duration may vary according to the specific configuration selected.

[0041] In one or more embodiments, the beacon signal provides a timing reference to all active pens (140, 145). A predetermined number of timeslots (*e.g.*, 16, 32, 64, etc.) follow the beacon signal and are referenced from the end of the beacon signal. Each timeslot may be of the same duration (*e.g.*, 0.25ms, 0.5ms, 1ms, etc.). Additionally or alternatively, different timeslots may be of different durations. It is during these timeslots that the paired active pens (140) transmit their downstream packets. Each downstream packet may be, for example, 21-bits in length (1 start bit, 16-bits of data, 4-bits cyclic redundancy check (CRC)). In one or more embodiments, a single downstream packet is transmitted over multiple (*e.g.*, 2, 4, 8, etc.) concatenated timeslots.

[0042] In one or more embodiments, different active pens transmit their downstream packets during different timeslots. Additionally or alternatively, multiple active pens transmit their downstream packets during the same timeslot(s), but with each active pen using a carrier signal having a different frequency. Additionally or alternatively, the multiple active pens transmit their

downstream packets during the same timeslot(s), but with each active pen using a different, orthogonal coding sequence (e.g., CDMA) to modulate the pen signal transmission. In one or more embodiments, each active pen transmits its downstream packet by modulating (e.g., using on-off keying (OOK), binary phase-shift keying (BPSK), etc.) a carrier signal with the content of the downstream packet. In one or more embodiments, a single frequency (e.g., 60 Hz, 120 Hz, 180Hz, etc.) pilot tone (for position and synchronization) is transmitted by the active pen before transmitting its downstream packet. The downstream packets may be received (e.g., demodulated) by the sensor module (160). The determination module (150) may parse these downstream packets to determine the one or more attributes of the active pens (140, 145).

[0043] FIG. 3 shows a timing diagram in accordance with one or more embodiments. Specifically, FIG. 3 shows a beacon period (302). The beacon period (302) starts with a beacon signal (304). Multiple timeslots follow the beacon signal (304). It is during these timeslots that the paired active pens (e.g., Pen #1, Pen #2, Pen #3, Pen #4) transmit their downstream packets (306). As shown in FIG. 3, there are multiple timeslots wherein both Pen #1 and Pen #4 are transmitting their downstream packets (306). However, Pen #1 is using a carrier signal with a frequency of F1, while Pen #4 is using a carrier signal with a frequency of F2. As also shown in FIG. 3, Pen #1 and Pen #2 each use a carrier signal having the same frequency (i.e., F1). However, Pen #1 and Pen #2 transmit their downstream packets (306) during different timeslots. The beacon period (302) may be repeated multiple times.

[0044] In one or more embodiments, the beacon signal (304) includes an upstream packet (308). The upstream packet (308) may target one of the active pens by specifying a pen ID. In one or more embodiments, only the active pen with the matching pen ID utilizes the upstream packet (308). In other words, the

upstream packet (308) may be discarded/ignored by active pens that do not have the matching ID. The upstream packet (308) may specify one or more timeslots and one or more frequencies. The upstream packet (308) may also specifying downstream packet size, number of downstream packets, downstream packet rates, etc. Upon receiving the upstream packet (308), the active pen may reconfigure itself to transmit its downstream packets during the timeslot(s) and at the frequency/frequencies specified in the upstream packet (308).

[0045] Those skilled in the art, having the benefit of this detailed description, will appreciate that the processing system (110) may use the upstream packet (308) to dynamically configure and reconfigure one or more of the active pens. In one or more embodiments, the need to reconfigure arises when noise is detected at one of the carrier signal frequencies. A new carrier signal frequency may be selected in order to mitigate noise.

[0046] As discussed above, the beacon signal (304) is received by all active pens, including unpaired active pens. An unpaired active pen may listen for the beacon signal (304) with a programmable on/off duty cycle. In some embodiments, an on/off duty cycle may be utilized to reduce the power consumption of an active pen. In one or more embodiments of the invention, an unpaired active pen responds to the beacon signal (304) with an acknowledgement (ACK). The ACK may be transmitted on a default frequency in the timeslot immediately following the beacon signal (304). Other timeslots may be used as well. In some embodiments, the ACK frequency is variable. It may also be set by the uplink beacon.

[0047] In one or more embodiments, the upstream packet (308) is used to pair an unpaired active pen (*e.g.*, unpaired active pen (145)) following the receipt of the ACK. In such embodiments, the upstream packet (308) may include the default pen ID (*i.e.*, pen ID = 0), a new pen ID to be assigned to the unpaired active pen,

and one or more timeslots and carrier signal frequencies to be used by the unpaired active pen to transmit its downstream packets. Once the unpaired active pen is assigned a (non-zero) pen ID, timeslots, and carrier signal frequencies, the unpaired active pen is now classified as a paired active pen. This is illustrated in FIG. 4 (discussed below).

[0048] FIG. 4 shows a timing diagram in accordance with one or more embodiments. As shown in FIG. 4, there is a beacon period (402) that starts with an initial beacon signal (422) followed by multiple timeslots (*i.e.*, t1, t2, ..., t14) (416). In the timeslot immediately following the beacon signal (*i.e.*, t1), the processing system (110) receives an ACK (425) from the unpaired active pen in response to the initial beacon signal (422). Then, in the subsequent beacon period, the beacon signal (430) includes an upstream packet with the new pen ID to be assigned to the unpaired active pen, timeslots, and carrier frequencies for the now paired active pen to transmit its downstream packets. In some embodiments, the beacon may also request the pen to transmit in the current beacon period. That is, the pen need not wait until the next beacon period.

[0049] Referring back to FIG. 1, in one or more embodiments of the invention, the processing system (110) includes a quiet ID list (152). The quiet ID list (152) may be implemented in hardware, software, firmware, or any combination thereof. As discussed above, the processing system (110) is expecting downstream packets from various paired active pens at different timeslots. In one or more embodiments of the invention, if the determination module (150) detects one or more missing downstream packets over one or more beacon periods for a paired active pen, the determination module (150) assumes the paired active pen is no longer in range. The determination module (150) then adds the pen ID of the paired active pen to the quiet ID list (152). Moreover, when it is time to assign a new pen ID to an unpaired active pen, the

determination module (150) may select the oldest pen ID in the quiet ID list (152) for use as the new pen ID. Although FIG. 1 discloses a list, other data structures may also be used.

[0050] FIG. 2 shows a block diagram of an active pen (240) in accordance with one or more embodiments of the invention. The active pen (240) may be essentially the same as the active pens (140, 145) discussed above in reference to FIG. 1. As shown in FIG. 2, the active pen (240) includes a tip (229), a button (226), a transceiver (228), an ID register (230), and a determination module (222). Moreover, the active pen (240) may have additional sensors (*e.g.*, force sensor, accelerometer, barrel-grip sensor, fingerprint sensor, battery status sensor, etc.) (not shown). As discussed above, the status of each button (226), the measured pressure or force against the tip (229), the acceleration of the active pen (240), etc. are all potential attributes that may be encoded in a downstream packet and transmitted to the processing system (110).

[0051] In one or more embodiments, the active pen (240) includes the transceiver (228). The transceiver (228) is configured to receive the broadcast beacon signal. The transceiver (228) is also configured to transmit the downstream packets of the active pen (240) during the assigned timeslots and using the assigned carrier signal frequencies. Although FIG. 2 shows only one transceiver (228), the active pen (240) may have multiple transceivers (not shown). Each of the multiple transceivers (not shown) may transmit downstream packets. Moreover, one of the active pen's attributes (*e.g.*, pen tilt, etc.) may be determined by the processing system (110) based on the relative strengths of the signals from the multiple transceivers and/or the multiple downstream packets from different transceivers.

[0052] In one or more embodiments, the second transceiver (not shown) transmits a pilot tone that is the same or different from the first transceiver (228), using a

timeslot that is the same or different than the timeslot used by the first transceiver (228). In such embodiments, both transceivers are configured by the host via the beacon signal using the same pen ID. If the first transmitter (228) is detected by the processing system at a first position (*e.g.*, x_1, y_1), the second transmitter is detected by the processing system (110) at a second position (x_2, y_2), and the distance between the first and second transmitters is known, then the tilt angle could be determined by the processing system (110).

[0053] While FIG. 2 illustrates an active pen with a single transceiver, it should be appreciated that active pens, or other input objects, with multiple transceivers/transmitters may also be used. Multiple transceivers may be paired with the processing system (110) concurrently. This may be useful in a variety of circumstances. For example, having multiple transceivers in an active pen may allow the processing system to determine the tilt of an active pen. The processing system may detect the location of both transceivers in the sensing region. Depending on their placement on the active pen, the distance between horizontal distance, as observed in the sensing region, will vary with the tilt of the pen. This will occur if one transceiver is placed at the tip of the pen and a second transceiver is disposed further up the body of the pen. By determining the location of each transceiver in the sensing region, the processing system can determine the approximate angle of tilt of then pen. This enables the processing system to determine X-Y position and angle on a flat surface. In a 3D or curved sensing region, the processing system may determine position and tilt. Other devices may also benefit from multiple transceivers. For example, multiple transceivers may allow a user to specific a line in the sensing region allowing indication of a straight line similar to common use of a physical ruler for drawing straight lines.

[0054] In one or more embodiments of the invention, the active pen (240) includes the ID register (230). The ID register (230) stores the pen ID of the active pen (240) as assigned by the processing system (110) (e.g., assigned by the upstream packet (308)). In one or more embodiment, if the active pen (240) is unpaired, the pen ID = 0. In contrast, if the active pen (240) is paired, the pen ID $\neq$ 0. Those skill in the art, having the benefit of this detailed description, will appreciate that as the active pen (240) moves away from the input device (100), it is increasingly likely that the active pen (240) will be out of range of the beacon signal. In one or more embodiments, the active pen (240) includes the determination module (222). The determination module (222) detects a missing (i.e., not received) signal beacon. If one or more missing signal beacons are detected, the determination module (222) may un-pair the active pen (240) by setting the ID register to zero.

[0055] Referring back to FIG. 1, although the detailed description has focused on the active pens (140, 145) transmitting downstream packets to the processing system (110), in one or more embodiments, data is transmitted from the processing system (110) to one or more active pens (140, 145). In other words, transmission of the downstream packets may be temporarily halted, and the active pens (140, 145) enter a special receive mode for one or more beacon periods. While in receive mode, the sensor module (160) may transmit new or updated firmware data for installation on the active pens (140, 145) via upstream data packets. In this manner, rather than transmitting physical attributes such as color, the processing system (110) may transmit updated firmware to the active pen via one or more upstream data packets. In one embodiment, the active pen may immediately install the updated firmware after completing reception of the firmware data. In other embodiments, the active pen may delay installation of the firmware so as to not interfere with standard operation or risk installation failure. For example, the active pen may wait until it has been unpaired for a

period of time, it is above a battery threshold, and/or until its battery is connected to a power source to initiate installation. After installation of updated firmware, the active pen may resume standard operation and attempt to pair upon detecting a beacon signal. Those skilled in the art, having the benefit of this detailed description, will appreciate that the firmware executing on the active pens (140, 145) controls various operations of the active pens (140, 145).

[0056] In one or more embodiments of the invention, multiple unpaired active pens exist within the range of the processing system (110). In other words, the multiple unpaired active pens may receive the beacon signal broadcasted by the sensor module (160). A collision may exist if two (or more) unpaired active pens attempt to pair with the processing system (110) at the same time (*i.e.*, each of the unpaired active pens sends an ACK) in response to a beacon signal. In one or more embodiments, the determination module (150) is configured to detect a collision between the multiple active pens. Moreover, the determination module (150) may generate a collision packet that is sent by the sensor module (160) to the multiple unpaired active pens. In some embodiments, the collision packet may be sent to all pens, as it may be unknown how many pens are paired and unpaired, and whether each pen believes it is paired. In response to receiving the collision packets, each of the unpaired active pens may wait a random time interval (*e.g.*, a random number of beacon periods) before re-attempting to pair with the processing system (110). In other words, the unpaired active pens might not send any acknowledgement to any received beacon signal during the random time interval.

[0057] In one or more embodiments of the invention, there may be a collision between two or more paired active pens (140). Collisions may be detected by noting that responses are being received at the same timeslot and frequency, but at different locations (either in X or Y or both). In this case, the sensor module

may broadcast a collision packet to these paired active pens. In response, the active pens would un-pair, wait for a random number of sensor beacons, and try and re-establish communication.

[0058] In one or more embodiments of the invention, each user of an active pen (140, 145) is associated with a user ID (*e.g.*, an alphanumeric value). The user ID may be hardcoded into the active pen of the user. Additionally or alternatively, the user may input the user ID into the processing system (110). For example, entering the user ID may be part of a login procedure for an application. The processing system (110) may transmit the user ID to the active pen operated by the user (*e.g.*, in the upstream packet (308), discussed above in reference to FIG. 3). The user ID may be transmitted by the active pen during subsequent pairings with the processing system (110) or the processing system of another input device (not shown). Similarly, a user's preferred or otherwise associated ink color, pen tip, or other attribute may be determined by the processing system (110) and utilized and/or transmitted to the active pen. Such attributes may also be stored or hardcoded into the active pen.

[0059] FIG. 5 shows a flowchart in accordance with one or more embodiments of the invention. The flowchart depicts a process for operating an input device (*e.g.*, input device (100)). Specifically, the depicted process may be used to pair an unpaired active pen to the input device. One or more of the steps in FIG. 5 may be performed by the components of the input system (100), discussed above in reference to FIG. 1. In one or more embodiments of the invention, one or more of the steps shown in FIG. 5 may be omitted, repeated, and/or performed in a different order than the order shown in FIG. 5. Accordingly, the scope of the invention should not be considered limited to the specific arrangement of steps shown in FIG. 5.

[0060] Initially, a beacon period is initiated by broadcasting a beacon signal to multiple active pens (APs) (STEP 505). The beacon signal may be broadcasted by a sensor module of the processing system. The beacon signal is received by both paired APs and unpaired APs within a range of the processing system. The beacon signal provides a timing reference to all APs. A predetermined number of timeslots (*e.g.*, 16, 32, 64, etc.) follow the beacon signal and are referenced from the end of the beacon signal.

[0061] In STEP 510, an ACK is received from an unpaired AP. The ACK may be received in the timeslot immediately following the beacon signal. The ACK may be received on a default frequency used by all unpaired APs. Alternatively, the ACK may be received on a frequency that is indicated by the data message sent by the beacon signal to the pen. The unpaired AP may have a pen ID = 0. In some embodiments, an AP may both reply to the ACK and transmit during assigned timeslots during the same beacon period.

[0062] In STEP 515, downstream packets are received from the paired APs during the timeslots of the beacon period. Each paired AP transmits its downstream packets during its assigned timeslots and at its assigned frequencies. The processing system may determine one or more attributes of each paired AP based on the contents (*e.g.*, fields) of the downstream packets.

[0063] In STEP 520, a subsequent beacon period is initiated by broadcasting another beacon signal. This beacon signal may include an upstream packet targeting the unpaired AP that sent the ACK. The upstream packet may specify a new pen ID for the unpaired AP, one or more timeslots, and one or more frequencies for the AP to transmit its downstream packets. The unpaired AP is now a paired AP.

[0064] In STEP 530, downstream packets are received from the paired APs, including the newly paired AP, during the assigned timeslots and at the assigned

frequencies. Like before, the processing system may determine one or more attributes of each paired AP based on the contents (*e.g.*, fields) of the downstream packets.

[0065] FIG. 6 shows a flowchart in accordance with one or more embodiments of the invention. The flowchart depicts a process for operating an input device (*e.g.*, input device (100)). Specifically, the depicted process may be used to manage pen IDs. One or more of the steps in FIG. 6 may be performed by the components of the input device (100), discussed above in reference to FIG. 1. In one or more embodiments of the invention, one or more of the steps shown in FIG. 6 may be omitted, repeated, and/or performed in a different order than the order shown in FIG. 6. Accordingly, the scope of the invention should not be considered limited to the specific arrangement of steps shown in FIG. 6. Further, the process depicted in FIG. 6 may be executed before, during, or after the process depicted in FIG. 5.

[0066] Initially, one or more missing downstream packets from a paired AP are detected (STEP 605). As discussed above, each paired AP is assigned timeslots and frequencies for transmission of its downstream packets. Accordingly, if packets do not arrive from a paired AP during one or more expected timeslot, it is possible the paired AP has been relocated outside the transmission range of the input device.

[0067] In STEP 610, the pen ID of the paired AP is added to a quiet ID list. The quiet ID list records previously paired APs from whom downstream packets are no longer received. The pen IDs are recycled for future pairings.

[0068] In STEP 615, the oldest pen ID in the quiet ID list is selected. Specifically, the oldest pen ID is selected by the input device in response to an unpaired AP attempting to pair with the input device. For example, the unpaired AP may send an ACK in response to a beacon signal broadcasted by the input device.

Alternatively, a pen ID that is not the oldest pen ID is selected. In one or more embodiments, the selected pen ID is sufficiently old such that there is some confidence that the active pen previously assigned the selected pen ID has left the system (*e.g.*, no longer in range of the processing system (110)).

[0069] In STEP 620, an upstream packet is generated. The upstream packet includes the selected pen ID. The upstream packet targets the unpaired AP that is attempting to pair and assigns the unpaired AP the selected pen ID. The upstream packet is transmitted in the subsequent signal beacon. Upon receiving the upstream packet, the unpaired AP effectively becomes a paired AP and can transmit its downstream packets during its assigned timeslots and at its assigned frequencies.

[0070] FIG. 7 shows a flowchart in accordance with one or more embodiments of the invention. The flowchart depicts a process for operating an active pen (*e.g.*, active pen (240)). One or more of the steps in FIG. 7 may be performed by the components of the active pen (240), discussed above in reference to FIG. 2. In one or more embodiments of the invention, one or more of the steps shown in FIG. 7 may be omitted, repeated, and/or performed in a different order than the order shown in FIG. 7. Accordingly, the scope of the invention should not be considered limited to the specific arrangement of steps shown in FIG. 7. Further, the process depicted in FIG. 7 may be executed before, during, or after the processes depicted in FIG. 5 and in FIG. 6.

[0071] Initially, an upstream packet is received by the active pen (STEP 705). The upstream packet is received during a beacon signal broadcasted by an input device. The upstream packet may assign/specify a pen ID (*e.g.*, pen ID = 5), one or more timeslots, and one or more frequencies at which to transmit downstream packets. The active pen is now paired.

[0072] In STEP 710, the active pen transmits its downstream packets to the input device during its assigned timeslots and at its assigned frequencies. The downstream packets may be transmitted by one or more transceivers in the active pen. The downstream packets may include one or more attributes of the active pen.

[0073] In STEP 715, during a subsequent beacon signal, another upstream packet is received by the active pen. This new upstream packet is targeted for the active pen because the upstream packet specifies the same pen ID (*i.e.*, pen ID = 5) as the pen ID assigned to the active pen. The upstream packet also specifies a new timeslot and/or a new frequency. In other words, the input device is attempting to reconfigure the active pen. The reconfiguration may be in response to detected noise and an attempt to mitigate the noise.

[0074] In STEP 720, the reconfigured active pen now transmits its downstream packets during the newly assigned timeslots and/or at the newly assigned carrier signal frequency.

[0075] In STEP 725, the active pen no longer receives the beacon signal. In other words, the active pen detects one or more missing beacon signals. For example, the active pen may be relocated outside the range of the input device.

[0076] In STEP 730, after detecting one or more missing beacon signals, the active pen may un-pair itself by setting its pen ID to zero. In one or more embodiments, the active pen may un-pair itself only after a threshold number/count (*e.g.*, 5, 7, 12, etc.) of beacon signals are missed.

[0077] Thus, the embodiments and examples set forth herein were presented in order to best explain the present invention and its particular application and to thereby enable those skilled in the art to make and use the invention. However, those skilled in the art will recognize that the foregoing description and examples have been presented for the purposes of illustration and example only. The

description as set forth is not intended to be exhaustive or to limit the invention to the precise form disclosed.

[0078] While the invention has been described with respect to a limited number of embodiments, those skilled in the art, having benefit of this disclosure, will appreciate that other embodiments can be devised which do not depart from the scope of the invention as disclosed herein. Accordingly, the scope of the invention should be limited only by the attached claims.

CLAIMS

What is claimed is:

1. A processing system for an input device, the processing system comprising:
a sensor module coupled to sensor circuitry and configured to:
initiate a current beacon period comprising a plurality of timeslots by
broadcasting a current beacon signal to a plurality of active pens;
receive, during a first timeslot, a first downstream packet from a first active
pen transceiver; and
receive, during a second timeslot, a second downstream packet from a
second active pen transceiver; and
a determination module configured to:
determine an attribute of a first active pen comprising the first active pen
transceiver from at least the first downstream packet.
2. The processing system of claim 1, wherein the first active pen further comprises
the second active pen transceiver, and wherein the attribute of the first active pen
is further determined from the second downstream packet.
3. The processing system of claim 1, wherein the attribute is at least one selected
from a group consisting of pen tilt, color, and erasure mode.
4. The processing system of claim 1, wherein the determination module is further
configured to:
determine an attribute of a second active pen comprising the second active pen
transceiver from the second downstream packet.

5. The processing system of claim 1, wherein the attribute of the first active pen is at least one selected from a group consisting of a force measurement at a tip of the first active pen and a button status of a button on the first active pen.
6. The processing system of claim 1, wherein the determination module is further configured to:
generate an upstream packet for the first active pen comprising a pen identification (ID) of the first active pen,
wherein the current beacon signal comprises the upstream packet for the first active pen, and
wherein the first active pen decodes the upstream packet in response to the upstream packet comprising the pen ID of the first active pen.
7. The processing system of claim 6, wherein the determination module is further configured to:
obtain a user ID for a user of the first active pen in response to the user logging into an application,
wherein the upstream packet comprises the user ID; and
wherein the first active pen transmits the user ID in subsequent pairings.
8. The processing system of claim 1, wherein the first downstream packet is transmitted using a first frequency and the second downstream packet is transmitted using a second frequency.
9. The processing system of claim 8, wherein:
the sensor module is further configured to:
initiate a prior beacon period by broadcasting a prior beacon; and
receive, during a timeslot of the prior beacon period, an acknowledgement from the first active pen in response to the prior beacon,

wherein the first active pen is unpaired during a portion of the prior beacon period; and

the determination module is further configured to:

generate an upstream packet specifying a pen identification (ID) for the first active pen, the first timeslot, and the first frequency,

wherein the current beacon comprises the upstream packet for the first active pen.

10. The processing system of claim 4, wherein the determination module is further configured to:

detect a missing downstream packet from the second active pen during a subsequent beacon period; and

add a pen ID for the second pen to a quiet ID data structure after detecting the missing downstream packet.

11. The processing system of claim 4, wherein the determination module is further configured to:

detect a collision between the first active pen and the second active pen; and

generate a collision packet for the first active pen and the second active pen,

wherein the sensor module is further configured to send the collision packet, and

wherein each of the first active pen and the second active pen wait a random time interval before reattempting to pair in response to the collision packet.

12. The processing system of claim 1, wherein the sensor module is further configured to:

transmit firmware data to the first active pen over a plurality of timeslots during a subsequent beacon period, the first active pen configured to update pen firmware based on the firmware data.

13. A method for operating a processing system of an input device, comprising:
initiating a current beacon period comprising a plurality of timeslots by
broadcasting a current beacon signal to a plurality of active pens;
receiving, during a first timeslot, a first downstream packet from a first active pen
transceiver over a first frequency;
receiving, during a second timeslot, a second downstream packet from a second
active pen transceiver over a second frequency; and
determining an attribute of a first active pen comprising the first active pen
transceiver from at least the first downstream packet.
14. The method of claim 13, wherein the first active pen further comprises the second
active pen transceiver, and wherein the attribute of the first active pen is further
determined from the second downstream packet.
15. The method of claim 13, further comprising:
determining an attribute of a second active pen comprising the second active pen
transceiver from the second downstream packet.
16. The method of claim 13, wherein the attribute of the first active pen is at least one
selected from a group consisting of a force measurement at a tip of the first active
pen and a button status of a button on the first active pen.
17. The method of claim 13, further comprising:
generating an upstream packet for the first active pen comprising a pen
identification (ID) of the first active pen,
wherein the current beacon signal comprises the upstream packet for the first
active pen, and
wherein the first active pen decodes the upstream packet in response to the
upstream packet comprising the pen ID of the first active pen.

18. The method of claim 13, further comprising:

obtaining a user ID for a user of the first active pen in response to the user logging into an application,
wherein the upstream packet comprises the user ID; and
wherein the first active pen transmits the user ID in subsequent pairings.

19. The method of claim 13, further comprising:

initiating, before initiating the current beacon period, a prior beacon period by broadcasting a prior beacon signal;
receiving, during a timeslot of the prior beacon period, an acknowledgement from the first active pen in response to the prior beacon,
wherein the first active pen is unpaired during at least a portion of the prior beacon period; and
generating, in response to the acknowledgment, an upstream packet specifying a pen ID for the first active pen, the first timeslot, and the first frequency,
wherein the current beacon signal comprises the upstream packet for the first active pen.

20. The method of claim 15, further comprising:

detecting a missing downstream packet from the second active pen during a subsequent beacon period; and
adding a pen ID for the second pen to a quiet ID data structure after detecting the missing downstream packet.

21. The method claim 15, further comprising:

detecting a collision between the first active pen and the second active pen; and
sending a collision packet for the first active pen and the second active pen,
wherein each of the first active pen and the second active pen wait a random time interval before reattempting to pair in response to the collision packet.

22. An active pen, comprising:

an identification (ID) register storing a pen identification (ID);

a button; and

a transceiver configured to:

receive, from a first input device, a current beacon signal comprising an upstream packet specifying the pen ID, a timeslot, and a frequency, wherein the current beacon signal initiates a current beacon period comprising a plurality of timeslots; and

transmit, to the first input device and during the timeslot specified in the upstream packet, a downstream packet comprising a status of the button using the frequency specified in the upstream packet.

23. The active pen of claim 22, wherein the transceiver is further configured to:

receive, before receiving the current beacon signal, a prior beacon from the first input device,

wherein the prior beacon signal initiates a prior beacon period, and

wherein the active pen is unpaired for at least a portion of the prior beacon period; and

send, in response to the prior beacon, an acknowledgment to trigger pairing with the first input device.

24. The active pen of claim 23, wherein the transceiver is further configured to:

receive, from the first input device, a collision packet;

wait a random time interval in response to the collision packet; and

re-attempt pairing with the first input device after the random time interval.

25. The active pen of claim 22, wherein the transceiver is further configured to:

receive, from the first input device, a user ID of a user;

send the user ID to a second input device during a pairing of the second input device.

26. The active pen, of claim 23, further comprising:

a determination module configured to:

detect a missing beacon from the first input device; and

set the ID register to zero in response to the missing beacon to unpair the active pen.

ABSTRACT

A processing system for an input device, the processing system including: a sensor module coupled to sensor circuitry and configured to: initiate a current beacon period including a plurality of timeslots by broadcasting a current beacon signal to a plurality of active pens; receive, during a first timeslot, a first downstream packet from a first active pen transceiver; and receive, during a second timeslot, a second downstream packet from a second active pen transceiver; and a determination module configured to: determine an attribute of a first active pen including the first active pen transceiver from at least the first downstream packet.

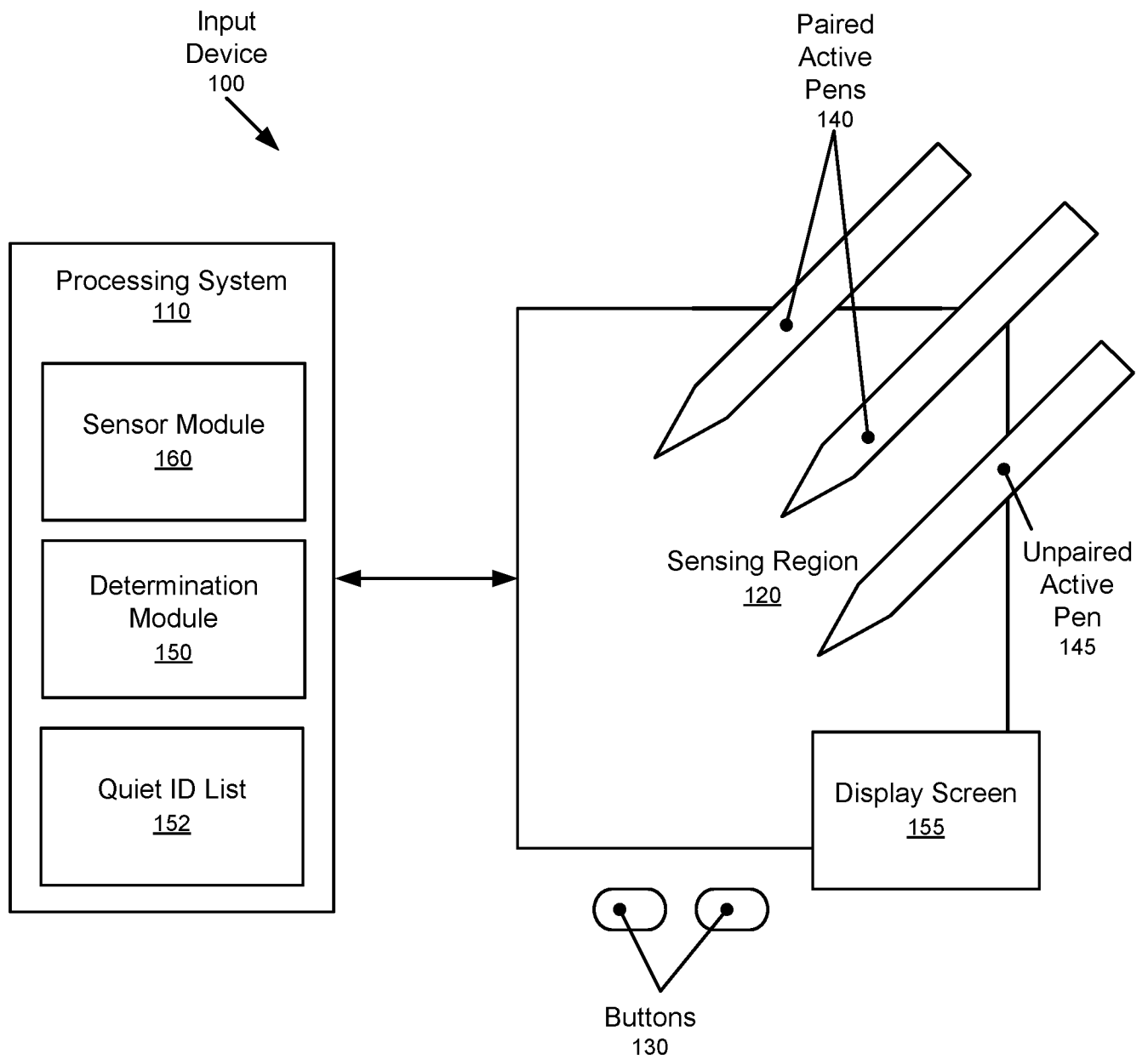


FIG. 1

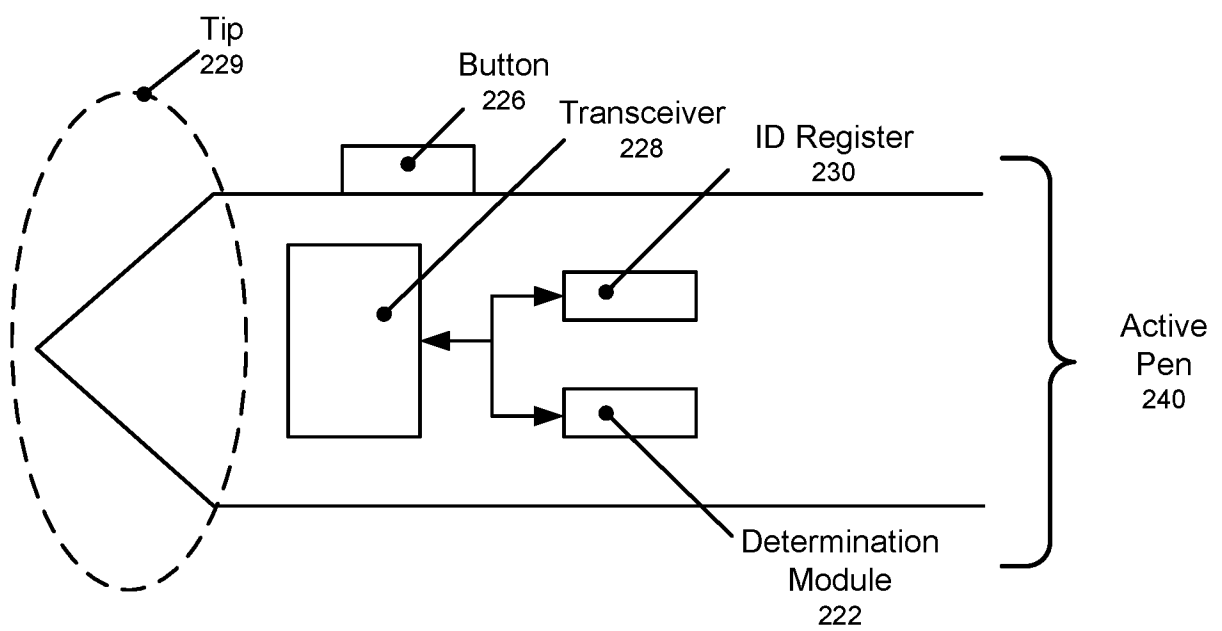


FIG. 2

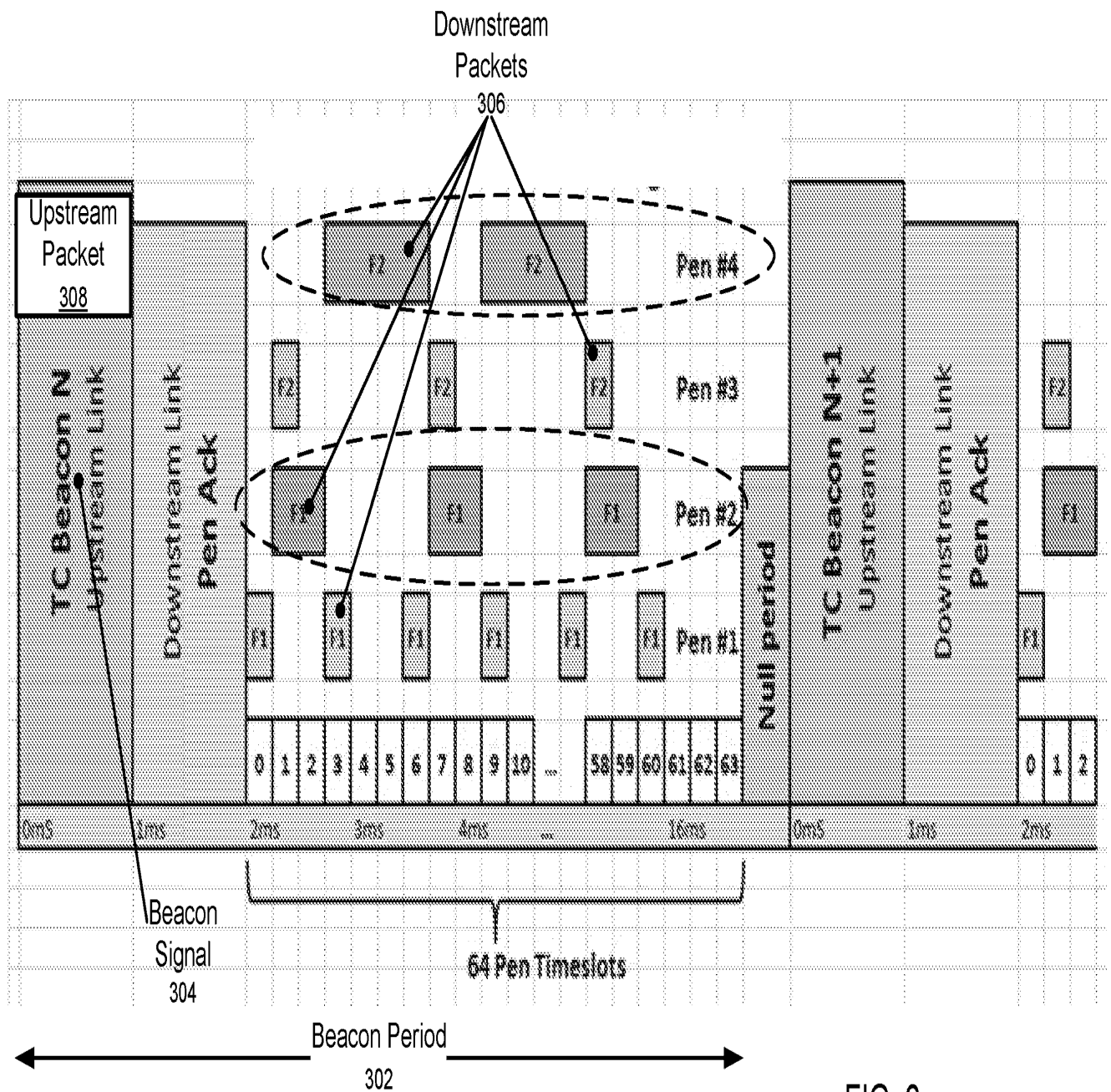


FIG. 3

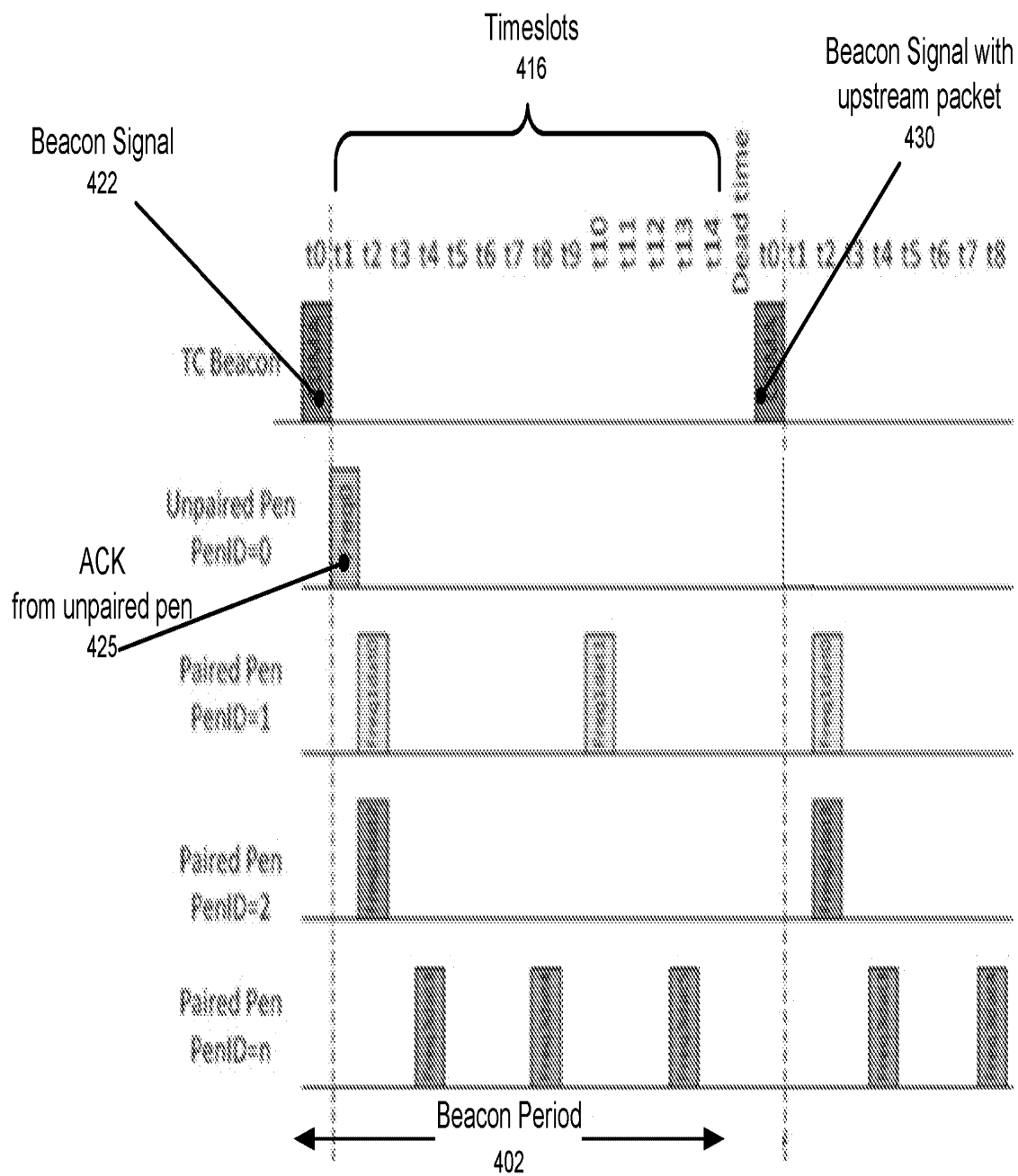


FIG. 4

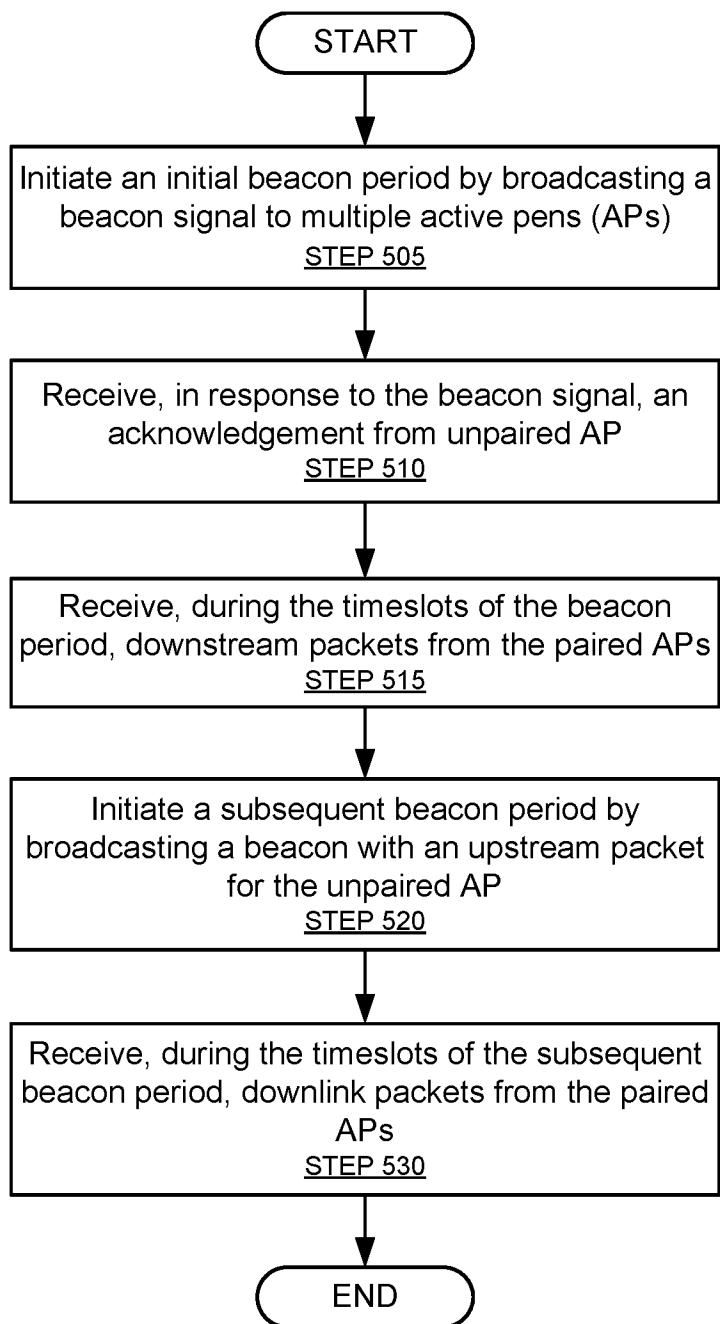


FIG. 5

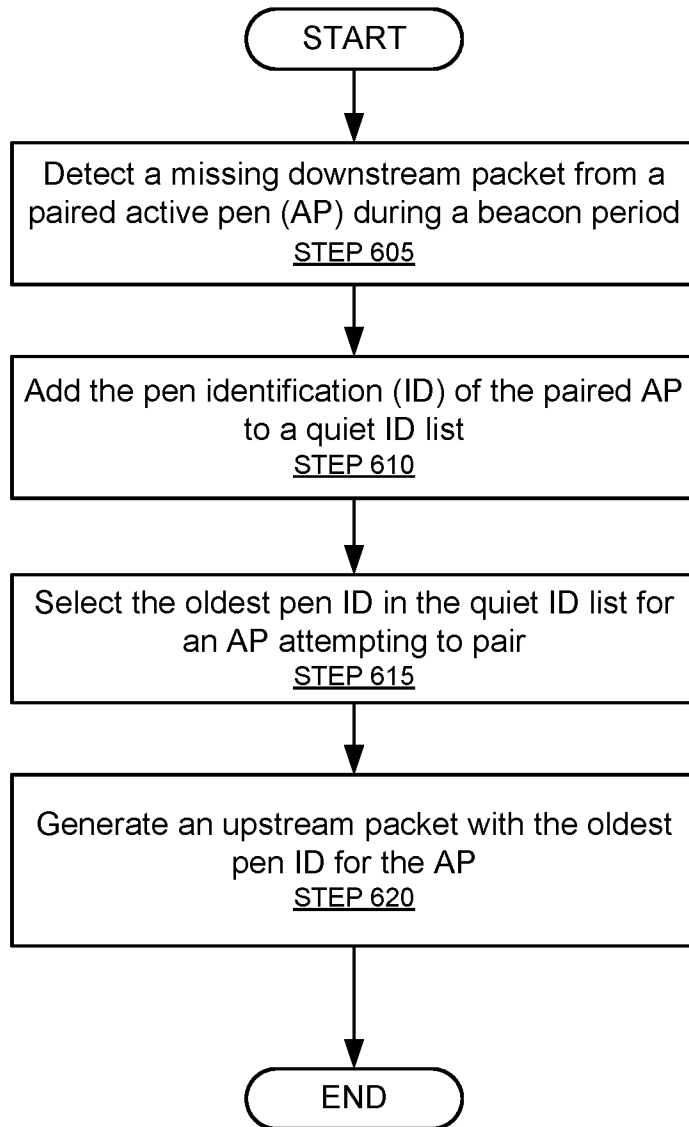


FIG. 6

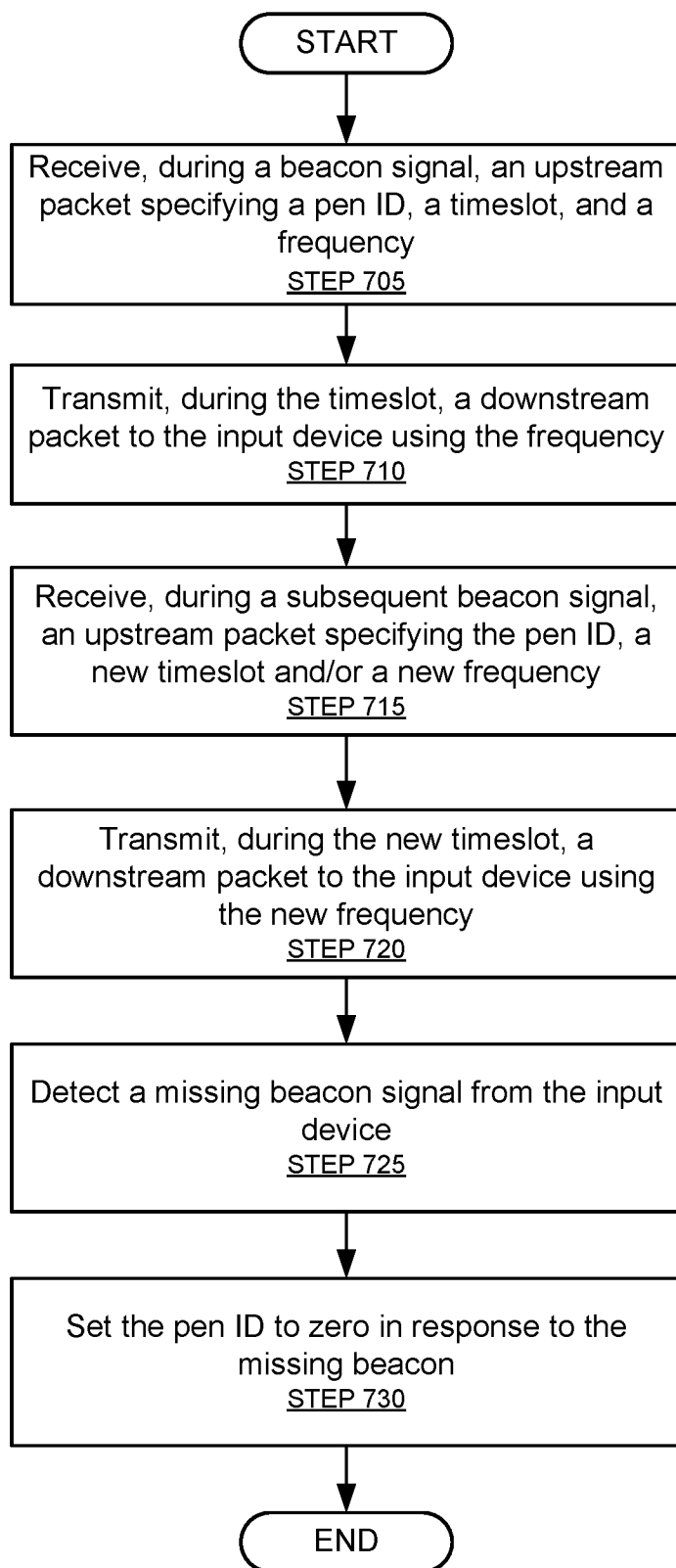


FIG. 7

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION			
First Named Inventor/Applicant Name:	Jeff Lukanc			
Filer:	Thomas K. Scherer/Kate Ohale			
Attorney Docket Number:	38018/196002			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Claims in Excess of 20	1202	6	80	480
Miscellaneous-Filing:				
Petition:				

Petitioner Shenzhen Qianfenyi Intelligent Technology Co., Ltd.

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2080

Electronic Acknowledgement Receipt

EFS ID:	24960685
Application Number:	15047773
International Application Number:	
Confirmation Number:	1009
Title of Invention:	ACTIVE PEN WITH BIDIRECTIONAL COMMUNICATION
First Named Inventor/Applicant Name:	Jeff Lukanc
Customer Number:	111408
Filer:	Thomas K. Scherer/Kate Ohale
Filer Authorized By:	Thomas K. Scherer
Attorney Docket Number:	38018/196002
Receipt Date:	19-FEB-2016
Filing Date:	
Time Stamp:	11:07:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$2080
RAM confirmation Number	8648
Deposit Account	500591
Authorized User	LORD, ROBERT P.

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 CFR 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

Petitioner Shenzhen Qianfeng Intelligent Technology Co., Ltd.

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	38018196002TRANS.pdf	32736	no	1
			53a0bc43f0da909307783cf2cd8448583e4021b1		
Warnings:					
Information:					
2	Oath or Declaration filed	38018196002OATH.pdf	2420584	no	4
			04c0e5165d4cce73ffd6aea7c8888187bf26d474		
Warnings:					
Information:					
3	Power of Attorney	38018196002POATRANS.pdf	93070	no	2
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Warnings:					
Information:					
4	Application Data Sheet	38018196002ADS.PDF	2337021	no	9
			08c3099c8d252e29e62fa4fd134a4867c887d0d8		
Warnings:					
Information:					
5		38018196002SPECS.pdf	160922	yes	37
			d8617917da3043f88c1638c7153b88de3dfbec45		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	29	
	Claims		30	36	
	Abstract		37	37	
Warnings:					
Information:					
6	Drawings-only black and white line drawings	38018196002FIG.pdf	171550	no	7
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7	Fee Worksheet (SB06)	fee-info.pdf	37098	no	2
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Warnings:					
Information:					
Total Files Size (in bytes):			5252981		
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SCORE Placeholder Sheet for IFW Content

Application Number: 15047773

Document Date: 02/19/2016

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