

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/AIA82B 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	January 13, 2015
First Named Inventor	Robert Bruce Ganton
Title	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	32716-00519/143971

SIGNATURE of Applicant or Patent Practitioner

Signature	/Eugene R. Worley/	Date (Optional)	01/13/2015
Name	Eugene R. Worley	Registration Number	47,186
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	QUALCOMM Incorporated		

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 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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.**

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):

15763

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 above-identified patent 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

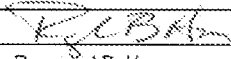
Telephone

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 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	11 SEP 2012
Name	Raymond B. Horn	Telephone	858-651-3679
Title and Company	Vice President, Patent Counsel and QUALCOMM Incorporated		

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

- ☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2015-01-13
	First Named Inventor	GANTON, Robert Bruce	
	Art Unit	N/A	
	Examiner Name	N/A	
	Attorney Docket Number	32716-00519/143971	

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6996732		2006-02-07	KOTLOW; Daniel B. et al.	
	2	7844265		2010-11-30	KUCHIBHOTLA; Ravi et al.	
	3	8311594		2012-11-13	ISLAM; Khaledul M. et al.	
	4	8779729		2014-07-15	SHIRAISHI; Takeyuki	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040180702		2004-09-16	HUGHES; Brent	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2015-01-13
	First Named Inventor	GANTON, Robert Bruce	
	Art Unit	N/A	
	Examiner Name	N/A	
	Attorney Docket Number	32716-00519/143971	

	1							☐
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If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

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

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

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2015-01-13
First Named Inventor	GANTON, Robert Bruce
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	32716-00519/143971

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Eugene R. Worley/	Date (YYYY-MM-DD)	2015-01-13
Name/Print	Eugene R. Worley	Registration Number	47,186

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

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.

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	32716-00519/143971
		Application Number	
Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		
<p>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.</p> <p>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.</p>			

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.)
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Inventor Information:

Inventor 1					Remove		
Legal Name							
Prefix	Given Name		Middle Name		Family Name		Suffix
	Robert		Bruce		Ganton		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service							
City	San Diego		State/Province	CA	Country of Residence ⁱ	US	
Mailing Address of Inventor:							
Address 1		5775 Morehouse Drive					
Address 2							
City	San Diego			State/Province	CA		
Postal Code	92121-1714		Country ⁱ	US			
Inventor 2					Remove		
Legal Name							
Prefix	Given Name		Middle Name		Family Name		Suffix
	Robert		Scott		Ballam		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service							
City	Eatons Hill		Country of Residence ⁱ			AU	
Mailing Address of Inventor:							
Address 1		5775 Morehouse Drive					
Address 2							
City	San Diego			State/Province	CA		
Postal Code	92121-1714		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:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	32716-00519/143971
		Application Number	
Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		

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	15763		
Email Address	dcdocketing@novakdruce.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		
Attorney Docket Number	32716-00519/143971	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	1

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	15763		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	32716-00519/143971
		Application Number	
Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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 blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Claims benefit of provisional	61992039	2014-05-12
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			

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(d). 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(h)(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.			

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	32716-00519/143971
		Application Number	
Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices
<p>If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.</p> <p>In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.</p> <p>In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.</p>

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		
<p>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.</p>		
<input type="button" value="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	QUALCOMM, Incorporated	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	32716-00519/143971
		Application Number	
Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		

Mailing Address Information For Applicant:			
Address 1		5775 Morehouse Drive	
Address 2			
City	San Diego	State/Province	CA
Country ⁱ	US	Postal Code	92121-1714
Phone Number	(858) 845-2505	Fax Number	(858) 658-2502
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

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.				
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.				

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	32716-00519/143971
		Application Number	
Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.					
Signature	/Eugene R. Worley/			Date (YYYY-MM-DD)	2015-01-13
First Name	Eugene R.	Last Name	Worley	Registration Number	47186
Additional Signature may be generated within this form by selecting the Add button.					

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

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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.

100

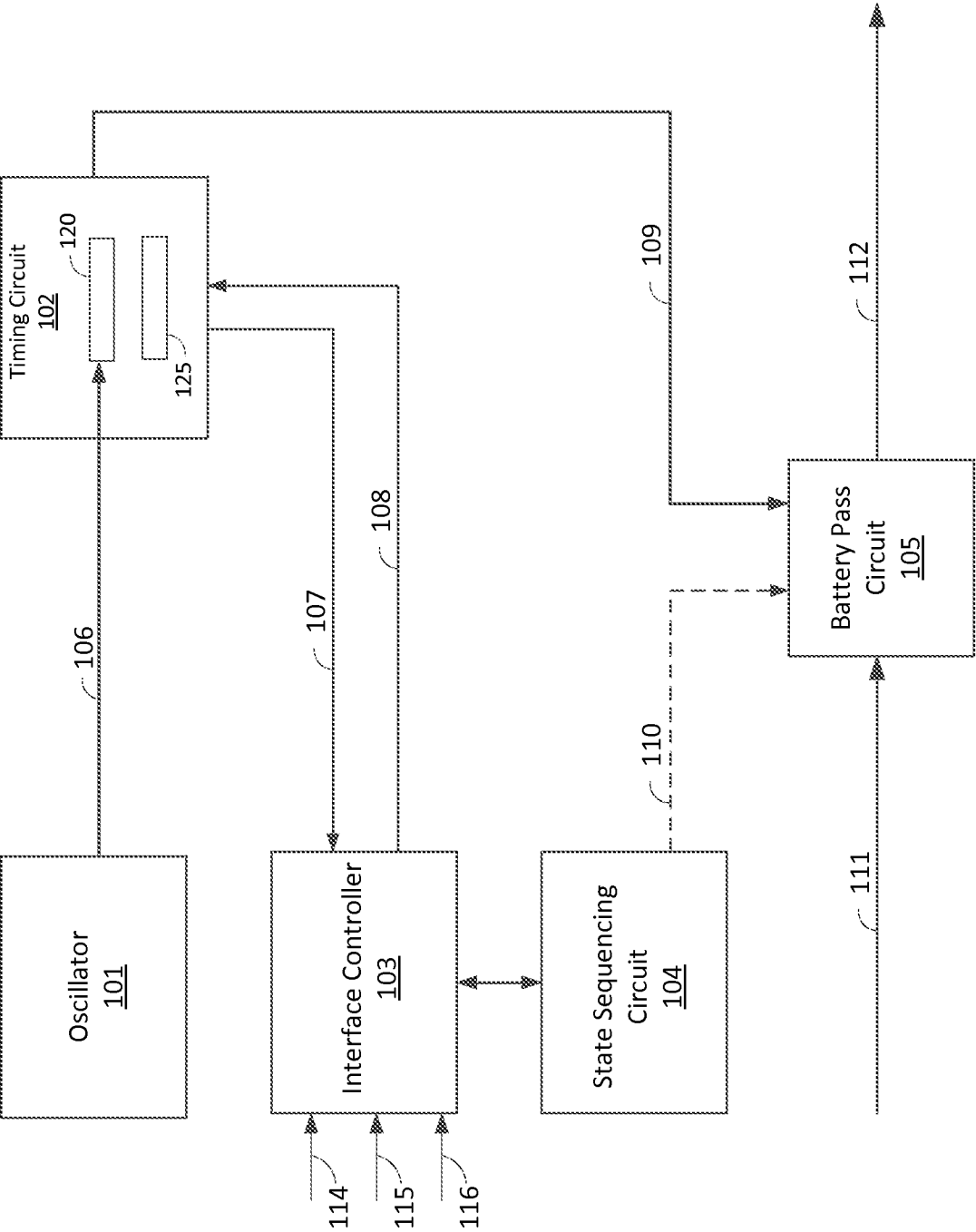


FIG. 1

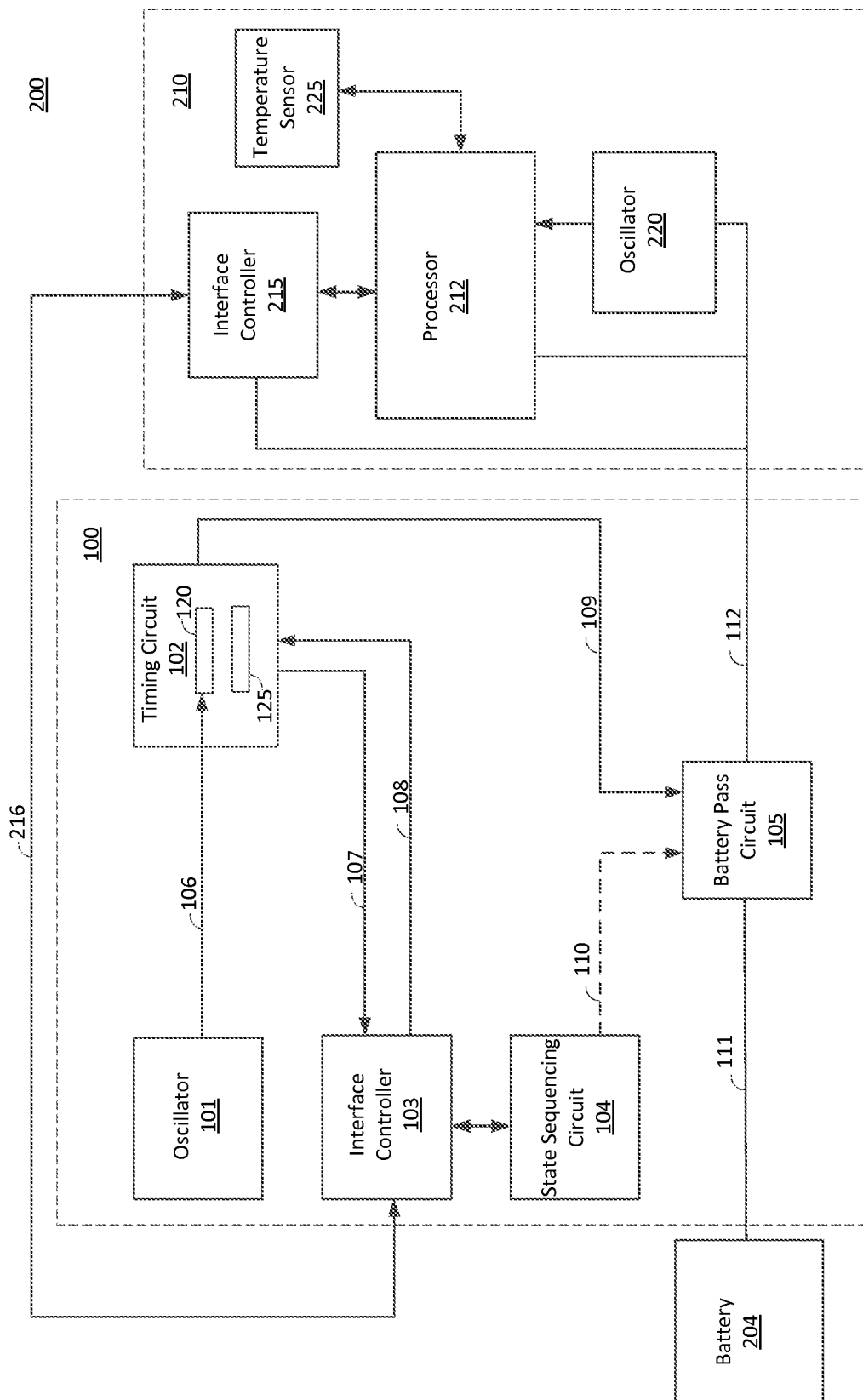


FIG. 2

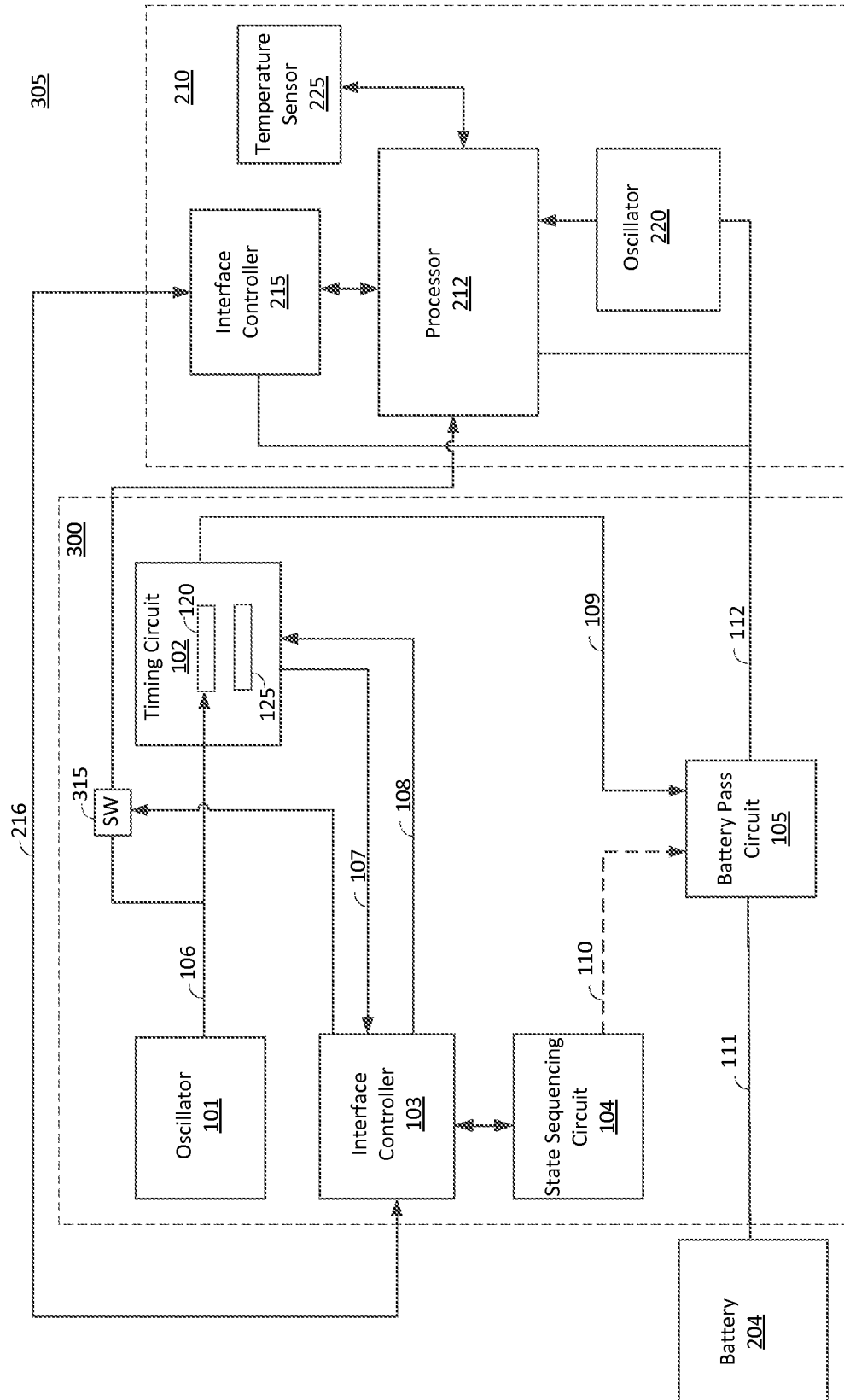


FIG. 3

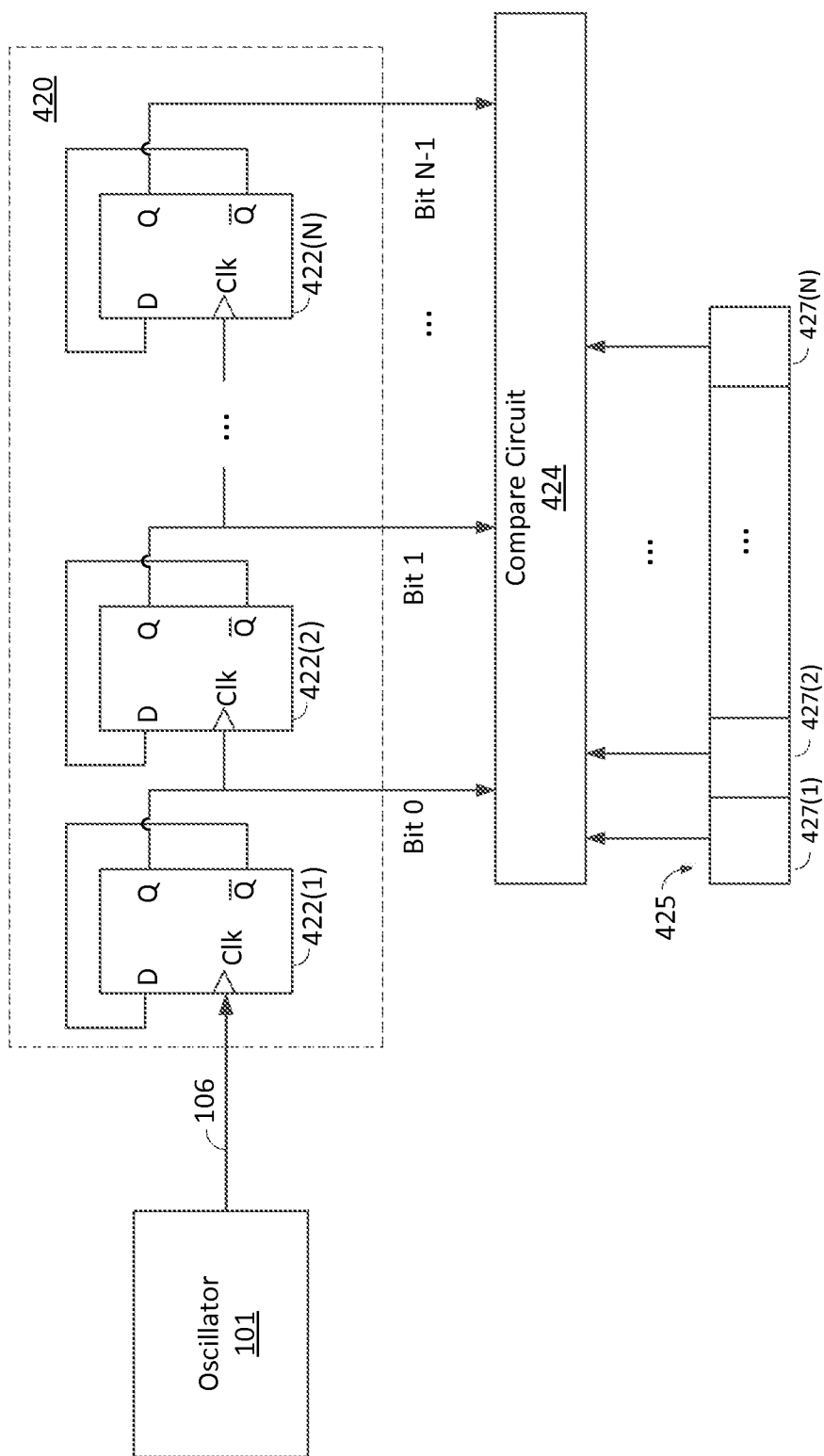


FIG. 4



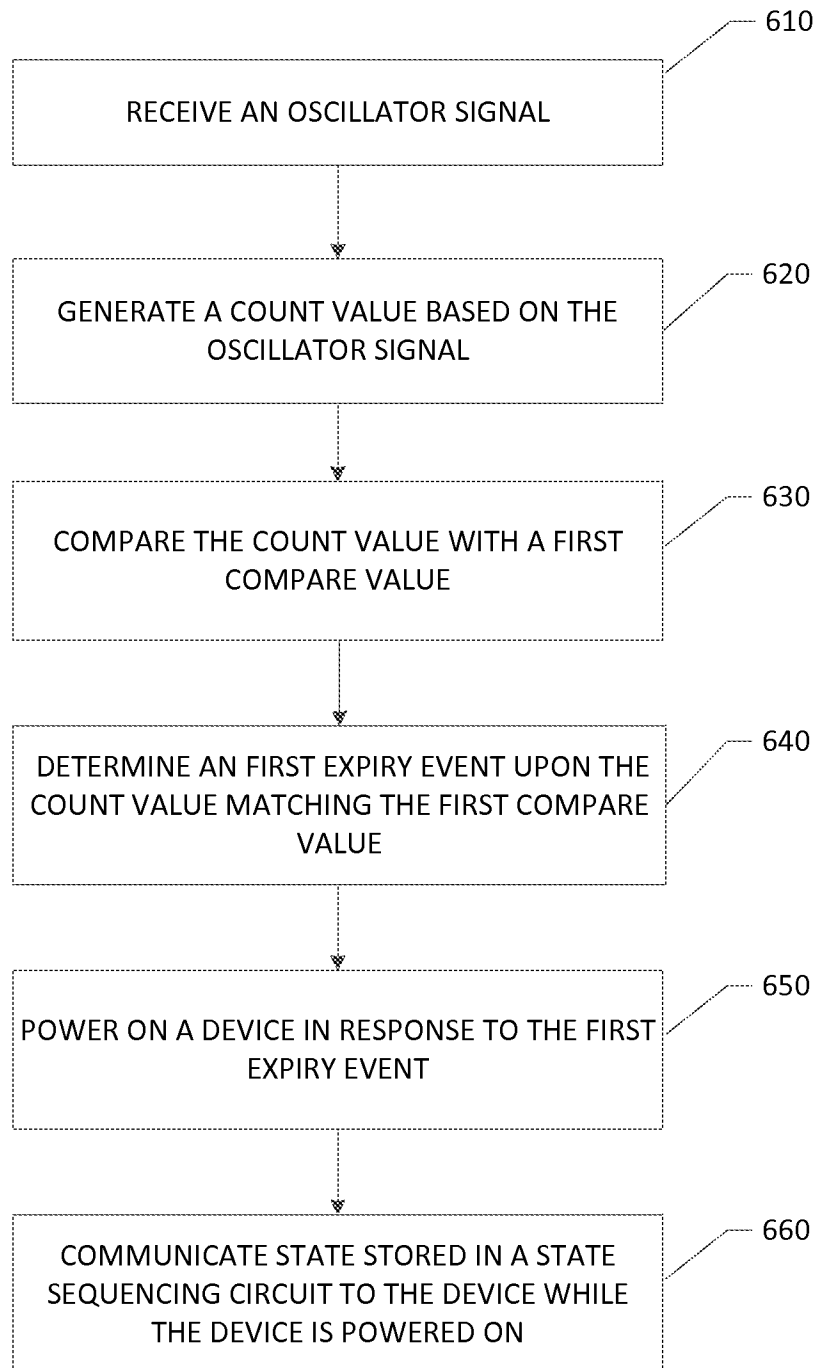
600

FIG. 6

ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS

RELATED APPLICATION

[0001] This application claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Application No. 61/992,039 filed on May 12, 2014, the entire specification of which is incorporated herein by reference.

BACKGROUND

Field

[0002] Aspects of the present disclosure relate generally to power management systems, and more particularly, to electronic devices for extending battery life in mobile applications.

Background

[0003] In order to improve the battery lifetime of a wireless device which is intended to be worn (e.g., as in the case of a medical patch), extreme low power methods are necessary. A large percentage of the battery energy (e.g., 97+%) of a wireless device may be wasted in a low power state (e.g., idle state) waiting to be activated. A reduction in power consumption (e.g., factor of 2 improvement in power consumption) in this state will allow a reduced battery size and form factor, or a longer shelf life. In the case where the electronics is the limiting factor for shelf life, this may be extremely desirable.

SUMMARY

[0004] The following presents a simplified summary of one or more embodiments in order to provide a basic understanding of such embodiments. This summary is not an extensive overview of all contemplated embodiments, and is intended to neither identify key or critical elements of all embodiments nor delineate the scope of any or all embodiments. Its sole purpose is to present some concepts of one or more embodiments in a simplified form as a prelude to the more detailed description that is presented later.

[0005] According to an aspect, an electronic device is described herein. The electronic device comprises an oscillator configured to generate an oscillator signal, and a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to

the first expiry event. The electronic device also comprises a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device. The electronic device further comprises a state sequencing circuit configured to store a state of the main device, and an interface circuit configured to communicate the stored state to the main device.

[0006] A second aspect relates to a method for extending battery life in a mobile application. The method comprises receiving an oscillator signal from an oscillator, generating a count value based on the oscillator signal, comparing the count value with a first compare value, and determining a first expiry event upon the count value matching the first compare value. The method also comprises powering on a device in response to the first expiry event, and communicating a state stored in a state sequencing circuit to the device while the device is powered on.

[0007] A third aspect relates to an apparatus for extending battery life in a mobile application. The apparatus comprises means for receiving an oscillator signal from an oscillator, means for generating a count value based on the oscillator signal, means for comparing the count value with a first compare value, and means for determining a first expiry event upon the count value matching the first compare value. The apparatus also comprises means for powering on a device in response to the first expiry event, and means for communicating a state stored in a state sequencing circuit to the device while the main device is powered on.

[0008] To the accomplishment of the foregoing and related ends, the one or more embodiments comprise the features hereinafter fully described and particularly pointed out in the claims. The following description and the annexed drawings set forth in detail certain illustrative aspects of the one or more embodiments. These aspects are indicative, however, of but a few of the various ways in which the principles of various embodiments may be employed and the described embodiments are intended to include all such aspects and their equivalents.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 shows an electronic device for extending battery life in mobile applications according to an embodiment of the present disclosure.

[0010] FIG. 2 shows an example of a system including the electronic device according to an embodiment of the present disclosure.

[0011] FIG. 3 shows an example of a system including the electronic device according to another embodiment of the present disclosure.

[0012] FIG. 4 shows an example of a ripple counter according to an embodiment of the present disclosure.

[0013] FIG. 5 shows a system including the electronic device and one or more sensors according to an embodiment of the present disclosure.

[0014] FIG. 6 is a flowchart illustrating a method for extending battery life in mobile applications according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0015] The detailed description set forth below, in connection with the appended drawings, is intended as a description of various configurations and is not intended to represent the only configurations in which the concepts described herein may be practiced. The detailed description includes specific details for the purpose of providing a thorough understanding of the various concepts. However, it will be apparent to those skilled in the art that these concepts may be practiced without these specific details. In some instances, well-known structures and components are shown in block diagram form in order to avoid obscuring such concepts.

[0016] In order to improve the longevity of a wireless device to achieve medical grade capabilities, significant low power methods are necessary. A comparatively large percentage of energy (e.g., 97%) is wasted when the device sits in an idle state while only a small percentage of the energy (e.g., 3%) is used in an active state. In this respect, a new method is required to further improve battery performance in medical wirelessly connected patches or other small disposable therapeutic electronic devices. The need to extend battery life for wireless electronic connected patches is significantly important.

[0017] In order to achieve this goal, the main method for improvement over conventional methods is to implement a very low power oscillator to keep time for a wireless device (e.g., wireless patch). This can be implemented in a main system-on-chip (SoC) and/or another chip in the device to manage power for the device. Embodiments of the present disclosure provide techniques to deliver order of magnitude improvement over traditional commercial off-the-shelf electronics that are used in these devices. In order to deliver better performance, a wireless device includes a small low power device (e.g., application-specific integrated circuit (ASIC)) and a main device (e.g., SoC). The small

low power device consumes far less power than the main device (e.g., SoC), which allows the battery life to be extended greatly. The low power device may have one primary task, manage time and keep power at a minimum during all times except when the main device needs to act. This is usually at pre-determined times or at predetermined rates. Typically the duty cycle of activity is quite low so the opportunity for great improvements in battery life is quite high.

[0018] In some aspects, the low power device comprises a low power oscillator and a timing circuit coupled to the low power oscillator, in which the timing circuit automatically activates a battery pass circuit (e.g., one or more PFETs) when the main device needs to be awakened from a sleep state. Activation of the battery pass circuit couples the main device to a battery, thereby powering on the main device.

[0019] In particular, a counter in the timing circuit receives an oscillator signal (e.g., clock signal) from the low power oscillator. The counter counts cycles of the oscillator signal to generate a count value, and the timing circuit compares the count value with a wakeup compare value in a register. The wakeup compare value may correspond to a count value at which the main device is to be awakened from the sleep state. When the count value matches the wakeup compare value, the timing circuit asserts a signal to activate the battery pass circuit. The signal may remain asserted until the timing circuit is programmed with a new wakeup compare value or until the low power device receives a signal or instructions from the main device instructing the low power device to turn off the battery pass circuit.

[0020] FIG. 1 shows an example of a low power electronic device 100 according to an embodiment of the present disclosure. The low power device 100 may be part of a larger device (e.g., wireless patch) that also includes a main device (shown in FIG. 2). As discussed further below, the low power device 100 manages power for the larger device to significantly extend battery life.

[0021] The low power device 100 may comprise a low power oscillator 101, a timing circuit 102, an interface controller 103, a state sequencing circuit 104, and a battery pass circuit 105. The timing circuit 102 is coupled to an output of the oscillator 101 and is configured to receive an oscillator signal 106 from the oscillator 101. The timing circuit 102 includes a counter 120 and a compare register 125. The counter 120 is configured to count cycles of the oscillator signal 106 to generate a count value, and the register 125 is configured to store one or more compare values, as discussed further below.

- [0022] The timing circuit 102 is also coupled to the interface controller 103 to receive a control signal with one or more compare values and send updates related to the count value maintained by the counter 120. The timing circuit 102 is also coupled to the battery pass circuit 105 to send a wakeup signal that causes the battery pass circuit 105 to turn on (activate) in order to couple a battery (e.g., coin cell battery) to the main device to power up the main device. The interface controller 103 is coupled to the state sequencing circuit 104 for tracking a state of the main device and/or the low power device 100.
- [0023] The oscillator 101 is configured to drive the counter 120 to generate the count value. In some aspects, the oscillator 101 may be a crystal oscillator, an inductor-capacitor (LC) oscillator, or a resistor-capacitor (RC) oscillator that provides a suitable low power and low cost implementation. The oscillator 101 may generate the oscillator signal at a rate of 32 kHz or other frequency. Although 32 kHz is mentioned as one example, various topologies may lead to other frequencies being optimal. In this regard, the oscillator 101 may consume current in a range of 100 nA to 250 nA. The oscillator 101 may be bias controlled so that the oscillator 101 runs at the lowest power possible over voltage and temperature variations.
- [0024] The timing circuit 102 is configured to compare the count value from the counter 120 with a wakeup compare value in the register 125 for a match, which corresponds to the occurrence of an expiry event. The goal for the counter 120 is to count 32 kHz ticks, although as mentioned earlier, the frequency may be other than 32 kHz. When the number of ticks (or count value) reaches the wakeup compare value, the timing circuit 102 activates the battery pass circuit 105 that allows the battery to power up the main device. The counter 120 may be a ripple counter, an example of which is discussed below with reference to FIG. 4. The counter 120 may have any length (i.e., number of bits). For example, the length of the counter 120 may depend on the desired duration of a sleep cycle (e.g., a longer length if a longer sleep duration is used or a shorter length if a shorter sleep cycle is used). Accordingly, it is to be appreciated that the present disclosure is not limited to a particular length..
- [0025] When the main device is woken up, the main device may read out the count value from the counter 120 in the timing circuit 102 via the interface controller 103, and add a count corresponding to a desired delay time to the read count value to generate a new wakeup compare value. The desired delay time may correspond to a time delay until

the next wakeup time for the main device. The main device may then write (program) the new wakeup compare value to the register 125 in the timing circuit 102 via the interface controller 103.

[0026] In one aspect, the timing circuit 102 may include a second register (not shown) for storing a sleep compare value. In this aspect, after the main device wakes up, the timing circuit 102 may compare the count value from the counter 120 with the sleep compare value to determine when to place the main device back into the sleep state. When the count value matches the sleep compare value, the timing circuit 102 may turn off the battery pass circuit 105 to power off the main device until the next wakeup (which may correspond to the new wakeup compare value programmed into the register 125 discussed above). In one aspect, the main device may program the sleep compare value by reading the count value from the counter 120 via the interface controller 103, and adding a count to the read count value to generate the sleep compare value, where the count corresponds to a time duration that the main device is to be active. The time duration may be based on an estimate of the amount of time the main device is expected to complete one or more tasks. The main device may then write the sleep compare value to the second register (not shown) via the interface controller 103.

[0027] Alternatively, when the main device completes one or more tasks in the active state, the main device may send a sleep signal via the interface controller 103 instructing the timing circuit 102 to power off the main device until the next wakeup. In this embodiment, instead of powering off the main device when the sleep compare value is reached, the timing circuit 102 powers off the main device upon receiving the sleep signal.

[0028] In another embodiment, the timing circuit 102 may reset the counter 120 to zero each time the main device goes back to sleep. In this embodiment, the same compare value may be used over a plurality of sleep cycles if the duration of each sleep cycle is approximately the same. This is because the counter 120 is reset to zero at the beginning of each sleep cycle. Since the same compare value is used over a plurality of sleep cycles, the compare value in the register 125 does not need to be updated each time the main device wakes up. Thus, the main device does not need to read and update the compare value in the register 125 each time the main device wakes up. This reduces power consumption by reducing the number of transactions (e.g., read and write operations) between the main device and the low power device 100. In this

embodiment, the timing circuit 102 may reset the counter 120 to zero and power off the main device upon receiving a sleep signal (e.g., from the main device). The timing circuit 102 may then power the main device back on when the count value of the counter 120 matches the compare value in the register 125.

[0029] The interface controller 103 may include a register flag to include an indication of the system's power-up status. For example, the register flag may comprise a bit indicating if the system woke up for the first time (e.g., register bit as "0"), or has been running (e.g., load register bit as "1").

[0030] The interface controller 103 may be an I²C interface that receives a serial clock 114, serial data 115, and an address 116. In this example, the interface controller 103 may communicate with the main device over two physical lines: a serial data line and a serial clock line. The serial data line may be used for transferring data between the main device and the low power device, and the serial clock line may carry a clock signal used to synchronize data transfers between the main device and the low power device 100. The main device may address data on the data line to the low power device 100 by transmitting an address of the low power device on the data line. The address of the low power device may be preprogrammed into the low power device, in which the last one or two digits of the address may be set by pulling up or pulling down one or more pins.

[0031] In some aspects, the interface controller 103 includes an I/O voltage input to match the voltage of the main device (e.g., I/O rings) to prevent problems with synchronization and power sequencing. This ensures that the voltage of the interface controller 103 is compatible with the voltage level used by the main device. For example, when the main device is communicating with the electronic device 100, the I/O voltage input can indicate what voltage level the main device will be communicating to interpret signals correctly. In another aspect, the interface may use pull-up resistors and an open drain I/O. In this aspect, a pull-up resistor may pull the data line high, in which the interface controller 103 drives the data line low to send a zero and allows the pull-up resistor to pull up the data line to send a one.

[0032] The interface controller 103 may be configured to have control over a specified number of registers. The interface controller 103 may have control over a wakeup timer, which is a 16-bit register capable of programming wakeup delays in units of 10 ms. When the wakeup timer expires the device will turn on the battery pass circuit 105. The interface controller 103 may have control over a sequencing register that is a 16 bit register

capable of read and write (R/W). The interface controller 103 may have control over a sleep control register that is a 16 bit register, which contains a control mask for enabling/disabling the wakeup timer and other features of the chip. In some aspects, the interface controller 103 has control over an identification register that returns the device slave address.

[0033] The electronic device 100, when powered up, causes the battery pass circuit 105 to initially turn on. The electronic device 100 wakes up, for first time, runs an initialization sequence, then programs the compare register located in the counter 102 with a predetermined time value. In this regard, when the main device turns on, the main device determines that it needs to turn off (or enter a sleep state), and then the main device sends a I²C command to the electronic device 100 to turn off the battery pass circuit 105. The default state for the programmable time is to turn the main device on (e.g., activate the battery pass circuit 105) all the time. For example, upon initial power up, the battery pass circuit 105 is enabled and the sleep timer function is disabled. In this regard, the state sequencing circuit 104 may be initially set to 0x00.

[0034] The state sequencing circuit 104 is configured to determine (or at least keep track of) multiple states relating to the main device including the sleep state and wakeup state. At first power up, the state sequencing circuit 104 comes out of a power on reset state. The state sequencing circuit 104 may include logic to initially turn on the battery pass circuit 105, and to then turn off the main device that reprograms the counter via the interface controller 103. In some aspects, a path between the state sequencing circuit 104 and the battery pass circuit 105 may be added. In this regard, the state sequencing circuit 104 can turn off battery pass circuit 105, and rely upon the timing circuit 102 to keep the battery pass circuit 105 turned on for a duration of time. For example, the timing circuit 102 may provide an indication of the expiry event to the interface controller circuit 103.

[0035] The battery pass circuit 105 is configured to couple the battery to the main device when activated. In this regard, the main device consumes power when necessary and when not necessary, the battery pass circuit 105 does not provide power to the main device. The battery pass circuit 105 may be a power switch (e.g. power head switch) coupled to the power path 111 from the battery and the power path 112 to the main device. In this example, the main device is powered on when the power switch is closed (turned on), and powered off when the power switch is open (turned off). The power switch may

comprise one or more power transistors. For example, the power switch may comprise a p-type field effect transistor (PFET), in which the PFET is turned on (activated) by inputting a logic zero to the gate of the PFET and turned off by inputting a logic one to the gate of the PFET.

[0036] In some aspects, multiple transistors may be included to activate the power path from the battery to the main device. For example, the battery pass circuit 105 may comprise a first transistor located on the same chip as the state sequencing circuit 104 and timing circuit 102 and a second transistor external to the chip. In this example, the chip may include an internal connection to enable the state sequencing circuit 104 and/or timing circuit 102 to drive the first transistor and a pin to enable the state sequencing circuit 104 and/or timing circuit 102 to drive the second transistor. The first and second transistors may be coupled in parallel and may be activated in sequence. For example, when the main device is to be awakened, the first and second transistors may be activated sequential according to a desired power-up sequence for the main device.

[0037] The low power electronic device 100 may be at least a portion of a circuit placed on a corner of a circuit die for the main device, or may be a standalone device on a circuit die that interacts with the main device. If the low power device 100 is part of the circuit die for the main device, then inputs to the interface controller 103 may reach the higher-level infrastructure of the chip to get connections to the interface controller 103. In some aspects, the operating voltage of the low power device 100 may range from 2.0V to 3.3V (optionally 4.25V for Li cell operation). The low power device 100 may exhibit less than 100 nA current consumption during sleep timer operation, and less than 500 nA current consumption during normal operation.

[0038] For the example in which the low power device 100 and the main device are on different dies, the low power device 100 may be fabricated on the respective die using a larger size fabrication process than the main device. For example, the low power device 100 may be fabricated using a 65 nm process and the main device may be fabricated using a 16 nm process or smaller. Using a larger size process for the low power device 100 reduces the leakage current of the low power device 100, thereby reducing power consumption and extending the life of the battery. In this example, the low power device 100 may comprise much fewer logic gates than the main device, and may therefore be implemented with larger dimensioned devices (e.g., transistors) to reduce the leakage current of the low power device.

- [0039]** As discussed above, the low power device 101 may use the low power oscillator 101 to keep track of time. The low power oscillator 101 may comprise a low power crystal oscillator (e.g., 32 KHz crystal oscillator), a low power LC oscillator, a low power RC oscillator, etc. In this example, the oscillator signal 106 from the low power oscillator 101 may not provide timing with sufficient accuracy for certain applications. For example, the frequency of the oscillator signal may deviate from an expected frequency and/or drift (e.g., due to changes in temperature), which reduces the ability of the main device to accurately control the wakeup times of the main device. This is because the main device needs to accurately know the frequency of the oscillator signal in order to accurately compute a wakeup compare value corresponding to a desired wakeup time.
- [0040]** To improve the timing of wakeups, the main device may periodically calibrate the low power oscillator 101. Calibration of the low power oscillator 101 may involve determining the frequency of the low power oscillator 101 using a signal having a known frequency as a reference, and calibrating a count value from the low power oscillator 101 based on the determined frequency, as discussed further below. The signal may be from another oscillator having an accurate frequency compared to the low power oscillator 101. Accordingly, it is to be appreciated that calibration of the low power oscillator 101 does not require adjusting the frequency of the low power oscillator 101.
- [0041]** In this regard, FIG. 2 shows an example of a system 200 comprising the low power device 100, the main device 210 and the battery 204. The system 200 may be part of a wireless device (e.g., wireless patch), in which the low power device 100 manages power for the wireless device to extend the battery life of the wireless device.
- [0042]** In the example shown in FIG. 2, the main device 210 comprises a second oscillator 220, a processor 212 and a second interface controller 215. The processor 212 may be implemented with a microprocessor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, or any combination thereof to perform the functions described herein. The processor 212 may communicate with the low power device 100 via the interface controller 215 (e.g., according to an I²C protocol). Although one communication link 216 is shown between the low power device 100 and the main device 210 for ease of illustration, it is to be appreciated that

the link 216 may comprise multiple links (e.g., a serial clock link and a serial data link according to the I²C protocol).

[0043] In some aspects, the second oscillator 220 consumes more power than the low power oscillator 101, but provides a more accurate oscillator signal (e.g., clock signal). The second oscillator 220 may be used for other purposes in addition to calibration. For example, the second oscillator 220 may provide a clock signal to the processor 212 for timing operations in the processor 212. In another example, the second oscillator 220 may provide an oscillator signal to a radio-frequency (RF) transceiver (shown in FIG. 5) used for wireless communication between the main device 210 and an external device (e.g., mobile device). Thus, calibration may be performed using a preexisting oscillator on the main device. This may reduce power consumption and area compared with using a dedicated oscillator for calibration, although it is appreciated that a dedicated oscillator may be used for calibration.

[0044] As discussed above, the main device 210 may be periodically turned on by the low power device 100 to perform one or more tasks during each wakeup cycle, and may spend most of the time in the sleep state to conserve power. Thus, the second oscillator 220 may be turned on only a small fraction of the time to conserve power. In contrast, the low power oscillator 101, which requires less power and is less accurate than the second oscillator 220, may remain turned on without interruption to maintain continuous timing for the low power device 100.

[0045] In some aspects, the low power oscillator 101 may be calibrated on a periodic basis. For example, the low power oscillator 101 may be calibrated each time the main device 210 wakes up. In another example, the low power oscillator 101 may be calibrated every Nth wakeup of the main device 210, where N is an integer greater than one, as discussed further below.

[0046] Methods for calibrating the low power oscillator 101 using the second oscillator 220 will now be described according to various embodiments of the present disclosure. The low power oscillator 101 is referred to as the first oscillator in the discussion below.

[0047] During calibration, a number of cycles of the first oscillator 101 and a number of cycles of the second oscillator 220 are counted over approximately the same time period to generate a first count value and a second count value, respectively. In one example, the time period corresponds to a predetermined number of cycles of the second oscillator 220. In this example, cycles of the first oscillator 101 are counted over the

predetermined number of cycles of the second oscillator 220. In another example, the time period corresponds to a predetermined number of cycles of the first oscillator 101. In this example, cycles of the second oscillator 220 are counted over the predetermined number of cycles of the first oscillator 101. Since the frequency of the second oscillator 220 is accurately known (relative to the first oscillator 101), the frequency of the first oscillator 101 may be estimated as:

$$F_1 = \frac{\text{Count1}}{\text{Count2}} \cdot F_2 \quad (1)$$

where F_1 is the estimated frequency of the first oscillator 101, F_2 is the known frequency of the second oscillator 220, count1 is the count value of the first oscillator 101, and count2 is the count value of the second oscillator 220.

[0048] In this aspect, the estimated frequency of the first oscillator 101 may be compared to an expected frequency of the first oscillator 101 to determine whether the oscillator 101 is running fast or slow with respect to the expected frequency and to adjust the wakeup compare value for the next wakeup accordingly. For example, if the oscillator 101 is running faster than expected, then the wakeup compare value for the next wakeup may be increased, and, if the oscillator 101 is running slower than expected, then the wakeup compare value for the next wakeup may be decreased. The calibration procedure discussed above may be performed by the timing circuit 102 and/or the processor 212, as discussed further below.

[0049] In one aspect, when the main device 210 wakes up, the processor 212 may perform a calibration of the first oscillator 101 as follows. The processor 212 may count a predetermined number of cycles of the second oscillator 220. At the start of the count, the processor 212 may read the count value of the counter 120 via the interface controllers 103 and 215 or a dedicated link (not shown). When the count for the second oscillator 220 reaches the predetermined number, the processor 212 may read the count value of the counter 120 again, and subtract the previously read count value from the most recently read count value to determine a count value for the first oscillator 101 corresponding to the predetermined count of the second oscillator 220. The processor 212 may then estimate the frequency of the first oscillator 101 according to equation (1), in which the predetermined count for the second oscillator 220 corresponds to count2 and the determined count value for the first oscillator 101 corresponds to count1. The processor 212 may then adjust the wakeup compare value for the next wakeup time

accordingly (e.g., increase the wakeup compare value if the first oscillator 101 is running faster than expected).

[0050] To facilitate calibration of the first oscillator 101, the processor 212 may receive the oscillation signal 106 from the first oscillator 101, and use the oscillation signal 106 to count cycles of the first oscillator 101 directly. In this regard, FIG. 3 shows an example of a system 305 comprising the low power device 300, the main device 210 and the battery 204. In this example, the oscillator signal 106 of the first oscillator 101 is selectively coupled to the processor 212 of the main device 210 using a switch 315, which may reside on the low power device 300. When the switch 315 is closed (turned on), the processor 212 is coupled to the first oscillator 101, and when the switch is opened (turned off), the processor 212 is decoupled from the first oscillator 101.

[0051] In one embodiment, the processor 212 may control the switch 315 via the interface controllers 103 and 215 or a direct control link (not shown) between the main device 210 and the switch 315. In this embodiment, when the processor 212 needs to calibrate the first oscillator 101, the processor 212 may turn on the switch 315 to couple the oscillator signal 106 to the processor 212.

[0052] During calibration, the processor 212 may count cycles of the first oscillator 101 to determine the count value count1 for the first oscillator 101. For example, the processor 212 may count a number of cycles of the first oscillator 101 over a predetermined number of cycles of the second oscillator 220. In this example, the count value count2 for the second oscillator 220 is equal to the predetermined number of cycles, and the count value count1 for the first oscillator 101 is equal to the number of cycles of the oscillation signal 106 counted over the predetermined number of cycles of the second oscillator 220. In another example, the processor 212 may count a number of cycles of the second oscillator 220 over a predetermined number of cycles of the first oscillator 101. In this example, the count value count1 for the first oscillator 101 is equal to the predetermined number of cycles, and the count value count2 for the second oscillator 220 is equal to the number of cycles of the second oscillator 220 counted over the predetermined number of cycles of the first oscillator 101.

[0053] After calibrating the first oscillator 101, the processor 212 may turn off the switch 315 to decouple the first oscillator 101 from the processor 212. Thus, the first oscillator 101 may be coupled to the processor 212 during calibration, and decoupled from the

processor 212 the rest of the time, including when the main device 210 is in the sleep state.

[0054] In some embodiments, the processor 212 may compute a scaling factor based on the calibration of the first oscillator 101 as follows:

$$SF = \frac{F_1}{F_{\text{expected}}} \quad (2)$$

where F_1 is the estimated frequency of the first oscillator 101 in equation (1), F_{expected} is the expected frequency of the first oscillator 101, and SF is the scaling factor. In this aspect, the processor 212 may determine a count value corresponding to a time delay until the next wakeup time based on the expected frequency of the first oscillator 101, and multiply the determined count value by the scaling factor SF. The scaled count value may then be added to the current count value of the counter 120 to generate the wakeup compare value for the next wakeup cycle.

[0055] It is to be appreciated that other scaling factors may be generated based on the calibration procedure discussed above, and therefore that the present disclosure is not limited to the exemplary scaling factor in equation (2). For example, the scaling factor may be computed as follows:

$$SF' = \frac{\text{Count1}}{\text{Count2}} \quad (3)$$

[0056] where count1 and count2 are the count values of the first and second oscillators, respectively, over the same period of time, and SF' is the scaling factor. In this aspect, the processor 212 may determine a count value corresponding to a time delay until the next wakeup time based on the frequency of the second oscillator 220. The processor 212 may then determine the count value for the first oscillator 101 corresponding to the time delay by multiplying the count value based on the frequency of the second oscillator 212 by the scaling factor SF'. The processor 212 may then determine the wakeup compare value for the next wakeup time by adding the scaled count value to the current count value of the counter 120 (which the processor 212 may read from the timing circuit 102). The processor 212 may then write (program) the wakeup compare value to the compare register 125 via the interface controllers 103 and 215.

[0057] In another example, the scaling factor may be computed as follows:

$$SF'' = \frac{\text{Count1}}{\text{Count1}'} \quad (4)$$

where count1 is the actual the count value of the first oscillator 101, count1' the expected count value based on the expected frequency of the first oscillator 101, and SF'' is the scaling factor. The expected count value count1' represents the number of cycles of the first oscillator 101 that would have been counted over a predetermined number of cycles of the second oscillator 220 if the first oscillator 101 were running at the expected frequency. In this aspect, the processor 212 may determine a count value corresponding to a time delay until the next wakeup time based on the expected frequency of the first oscillator 101, and multiply the determined count value by the scaling factor SF''. The scaled count value may then be added to the current count value of the counter 120 to generate the wakeup compare value for the next wakeup cycle.

[0058] In one embodiment, the processor 212 may send the scaled count value corresponding to the time delay until the next wakeup to the timing circuit 102 instead of generating the corresponding wakeup compare value. In this embodiment, the timing circuit 102 may add the received count value to the current count value of the counter 120 to generate the corresponding wakeup compare value. The timing circuit 102 may then write the wakeup compare value to the compare register 125.

[0059] As discussed above, the first oscillator 101 may be calibrated each time the main device 210 wakes up. In another aspect, the first oscillator 101 may be calibrated less frequently to reduce power consumption. For example, the first oscillator 101 may be calibrated every Nth wakeup of the main device 210, where N is an integer greater than one. In this example, the low power device 100 may include a wakeup register that keeps track of the number of times the main device 210 has been woken up. Each time the main device 210 wakes up, the processor 212 may increment the wakeup register by one. Each time the count in the wakeup register reaches N, the processor 212 may calibrate the first oscillator 101 and reset the wakeup register to zero. Alternatively, the processor 212 may calibrate the first oscillator 101 each time the count in the wakeup register is a multiple of N. In either case, the processor 212 may read the wakeup register each time the main device 210 wakes up to determine whether the first oscillator 101 needs to be calibrated.

[0060] In this example, each time the processor 212 calibrates the first oscillator 101, the processor 212 may write the corresponding scaling factor to a calibration register (not shown) in the low power device 100 or the main device 210. When the processor 212

turns on during a wakeup cycle in which the first oscillator 101 is not calibrated, the processor 212 may read the scaling factor from the calibration register. The processor 212 may then use the read scaling factor to adjust the count value corresponding to the time delay until the next wakeup cycle (e.g., multiply the count value by the scaling factor). If the main device 210 wakeups at predetermined intervals, then the count value corresponding to the time delay until the next wakeup cycle may be predetermined and stored in a memory (e.g., register).

[0061] Thus, in this example, the processor 212 may calibrate the first oscillator 101 during every Nth wakeup of the main device 210 to update the scaling factor in the calibration register. During wakeup cycles in which the first oscillator 101 is not calibrated, the processor 212 may read the most-recently updated scaling factor from the calibration register and use the read scaling factor to determine the wakeup compare value for the next wakeup cycle, as discussed above.

[0062] It is to be appreciated that the present disclosure is not limited to calibrating the first oscillator 101 at predetermined intervals (e.g., every Nth wakeup). For example, the main device 210 may comprise a temperature sensor 225 coupled to the processor 212. In this example, when the processor 212 calibrates the first oscillator 101 for the first time, the processor 212 may receive a temperature reading from the temperature sensor 225, and write the temperature reading to a temperature register (not shown) in the low power device 100 or main device 210. On the next wakeup cycle, the processor 212 may receive a current temperature reading from the temperature sensor 225, retrieve the temperature reading from the temperature register, and compare the two temperature readings. If the difference between the temperature readings is below a temperature threshold, then the processor 212 may use the scaling factor in the calibration register to determine the wakeup compare value for the next wakeup cycle. If the difference is equal to or above the temperature threshold, then the processor 212 may calibrate the first oscillator 101 to update the scaling factor in the calibration register, and use the updated scaling factor to determine the wakeup compare value for the next wakeup cycle. The scaling factor may be updated according to this embodiment, for example, when the frequency of the first oscillator 101 is sensitive to changes in temperature.

[0063] It is to be appreciated that the temperature sensor 225 may be integrated on the low power device 100 instead of the main device 210. For example, the temperature sensor 225 may be located near the first oscillator 101 to get an accurate temperature reading

for the first oscillator 101. In this embodiment, temperature readings from the temperature sensor 225 may be communicated to the processor 212 via communication link 216 or another link.

[0064] As discussed above, instead of sending the wake compare value for the next wakeup cycle to the timing circuit 102, the processor 212 may send a scaled count value corresponding to the time delay until the next wakeup cycle to the timing circuit 102. In this embodiment, the timing circuit 102 may add the received count value to the current count value of the counter 120 to generate the wakeup compare value for the next wakeup cycle, and write the wakeup compare value to the compare register 125.

[0065] In some aspects, the calibration register may include an offset value. The offset value may be used to adjust the wakeup compare value to account for delays in communicating signals between the low power device 100 and the main device 210. For example, in the embodiment in which the processor 212 reads the count value of the counter 120 to generate the wakeup compare value, the offset value may correspond to the time delay between reading the count value from the counter 120 and the read count value reaching the processor 212. In this example, the processor 212 may adjust the read count value by the offset value to account for the delay. In another example, in the embodiment in which the processor 212 generates a count value corresponding to the time delay until the next wakeup cycle and sends the count value to the low power circuit 100, the offset may correspond to the time delay between sending the count value from the processor 212 and the corresponding wakeup compare value being written to the compare register 125. In this example, the offset value may adjust the count value to account for the delay. In some aspects, the offset value may be in the form of an offset count value and may be scaled by the scaling factor. For example, for the scaling factor SF in equation (2), the offset count value before scaling may be computed by multiplying the expected frequency of the first oscillator 101 by the corresponding time delay (e.g., delay of writing from the processor 212 to the compare register 125).

[0066] As discussed above, in one embodiment, the timing circuit 102 may reset the counter 120 to zero each time the main device goes back to sleep. In this embodiment, the wakeup compare value in the register 125 may stay the same between calibrations. When the main device is awoken in a wakeup cycle in which the oscillator 101 is not calibrated, the main device may leave the wakeup compare value in the register 125 alone. In this case, the main device does not read and update the wakeup compare

value, thereby reducing power consumption. When the main device is awoken in a wakeup cycle in which the oscillator 101 is calibrated, the main device may compute a new wakeup compare value based on the calibration. For example, the main device may compute the new wakeup compare value based on a desired duration for a sleep cycle and the estimated frequency of the oscillator 101 determined during the calibration. The main device may then write the new wakeup compare value to the register 125. In this case, when the main device goes back to sleep, the timing circuit 102 may reset the counter 120 to zero and power the main device back on when the count value of the counter 120 matches the new wakeup compare value in the register 125.

[0067] In the example shown in FIG. 2, the interface controller 215, the processor 212 and the second oscillator 220 of the main device 210 are coupled to the battery 204 when the battery pass circuit 105 is turned on (activated) and decoupled from the battery 204 when the battery pass circuit 105 is turned off. In contrast, the low power device 100 may be continuously powered on by the battery 204. For example, the first oscillator 101 may be continuously powered on by the battery 204 to maintain timing for the low power device 100. For ease of illustration, the power paths between the various components of the low power device 100 and the battery 204 are not explicitly shown.

[0068] As discussed above, the counter 120 may be implemented using a ripple counter. In this regard, FIG. 4 shows an example of a ripple counter 420 that may be used to implement the counter 120. The ripple counter 420 comprises a plurality of flip-flops 422(1) to 422(N), in which each flip-flop has a clock input (denoted “clk”), a data input (denoted “D”), a first output (denoted “Q”) and a second output (denoted “ $\bar{Q}$ ”). Each flip-flop is configured to latch the logic state at the respective data input D on a rising edge of the respective clock clk, and to output the latched logic state at the respective first output Q and the inverse of the latched logic state at the respective second output $\bar{Q}$. As shown in FIG. 4, the data input D and second output $\bar{Q}$ of each flip-flop are tied together. This causes the first output Q of each flip-flop to toggle (change logic states) on each rising edge of the respective clock clk.

[0069] The clock input clk of the first flip-flop 422(1) is driven by the oscillator signal 106 from the first oscillator 101. The clock input clk of each of the other flip-flops 422(2) to 422(N) is driven by the first output Q of the previous flip-flop in the ripple counter 420. As a result, the output frequency of the first flip-flop 422(1) is half the frequency of the

oscillator signal 106, and the output frequency of each of the other flip-flops 422(2) to 422(N) is half the output frequency of the previous flip-flop in the ripple counter 420. In other words, each flip-flop divides the input frequency (i.e., frequency at the respective clock input clk) by two at the respective first output Q.

[0070] The flip-flops 422(1) to 422(N) output N output signals, where N is the number of flip-flops and the output of each flip-flop is taken at the respective first output Q. The N output signals provide the count value for the counter 420, in which the count value comprises N bits with a maximum count value of 2^n . The output signal of the first flip-flop 422(1) provides the least significant bit (denoted “Bit 0”) of the count value and the output signal of the last flip-flop 422(N) provides the most significant bit (denoted “Bit N-1”) of the count value. For the embodiment in which the counter is reset to zero, the counter 420 may be reset to zero by resetting one or more of the flip-flops 422(1) to 422(N).

[0071] FIG. 4 also shows an example of a register 425 that may be used to implement the compare register 125. The register 425 is configured to store an N-bit compare value, and comprises N bit cells 427(1) to 427(N), where each bit cell is configured to store one bit of the compare value. The bit cells may be implemented with flip-flops or other type of storage cells. In the example shown in FIG. 4, bit cell 427(1) stores the least significant bit of the compare value and bit cell 427(N) stores the most significant bit of the compare value.

[0072] In the example in FIG. 4, the timing circuit 102 also comprises a compare circuit 424 configured to compare the count value of the ripple counter 420 with the compare value in the register 425. For the example in which the compare value is used to wake up the main device 210, the compare circuit 424 may activate the battery pass circuit 105 to power on the main device 210 when the compare value matches the count value. The compare circuit 424 may be configured to compare the compare value in the register 425 with the count value of the ripple counter 420 by comparing each bit of the count value with the corresponding bit of the compare value in the register 425. For example, the compare circuit 424 may compare Bit 0 of the count value with the bit stored in bit cell 427(1) of the register 425, compare Bit 1 of the count value with the bit stored in bit cell 427(2) of the register 425, and so forth. In this example, the compare circuit 424 may determine that the count value and compare value match when each bit of the count value matches the corresponding bit of the compare value. In another example, the

compare circuit 424 may compare only a subset of the bits of the count value with a subset of the bits of the compare value to determine whether there is a match. In this example, the compare circuit 424 determines a match when the subset of the bits of the count value matches the subset of the bits of the compare value.

[0073] As discussed, the oscillation signal 106 may be coupled to the processor 212 during calibration to enable the processor 212 to directly count cycles of the first oscillator 101. In another embodiment, the output signal of one of the flip-flops of the ripple counter 420 may be coupled to the processor 212 instead. For example, the output signal of the first flip-flop 422(1) may be coupled to the processor 212. In this example, the output frequency of the first flip-flop 422(1) is half the frequency of the oscillator signal 106. Therefore, when the processor 212 counts a number of cycles of the output signal of the first flip-flop 422(1), the processor 212 may double the resulting count value to determine the equivalent count value for the oscillation signal 106.

[0074] As discussed above, the low power electronic device 100 may be used to manage power in a wireless medical device or other type of wireless device to improve battery performance. In this regard, FIG. 5 shows an example of a system 500 which may be incorporated into a wireless medical device or type of device. The system 500 comprises the low power device 100, the main device 510 and the battery 204. The system 500 may further comprise an antenna 530 for wireless communication with another device (e.g., mobile device, cellular device, laptop, tablet, etc.), and one or more sensors 511 to 515 configured to measure one or more physiological conditions of a patient. In one example, the wireless device may be worn by the patient (e.g., placed on the skin of the patient).

[0075] The one or more sensors 511 to 515 may include a temperature sensor for measuring the patient's temperature, a pulse oximeter for measuring the patient's O₂ saturation, a pressure sensor for measuring the patient's blood pressure, an accelerometer for measuring movement of the patient, a blood sugar sensor for measuring the patient's blood sugar level, etc. It is to be appreciated that the one or more sensors 511 to 515 are not limited to the examples given above. The one or more sensors 511 and 515 may also include a contact sensor to determine whether the wireless device has been placed on a patient, as discussed further below.

[0076] In the example in FIG. 5, the main device 510 further comprises a transceiver 525 and a sensor interface 520. The transceiver 525 is configured to convert signals (e.g.,

baseband signals) from the processor 212 into radio-frequency (RF) signals for transmission to the other device (e.g., mobile device) via the antenna 530, and to convert RF signals received by the antenna 530 into signals (e.g., baseband signals) for processing by the processor 212. Thus, the transceiver 525 and the antenna 530 facilitate wireless communication between the other device and the processor 212. The sensor interface 520 is configured to interface the processor 212 with the one or more sensors 511 to 515. For example, the sensor interface 520 may convert a signal (e.g., analog signal) from one of the sensors into a digital sensor reading that can be processed by the processor 212. Also, the processor 212 may provide power to a sensor that requires power to operate (e.g., active sensor) via the sensor interface 520.

[0077] As shown in FIG. 5, the second oscillator 220 may be coupled to the transceiver 525 to provide an oscillator signal to the transceiver 525. The transceiver 525 may use the oscillator signal for frequency up-conversion, frequency down-conversion, etc. Thus, in this example, the second oscillator 220 may be used for both calibration of the first oscillator 101 (as discussed above) and radio communication.

[0078] As discussed above, the main device 510 may spend most of the time in the sleep state, in which the low power device 100 periodically wakes up the main device 510 to perform one or more task during each wakeup cycle. More particularly, the low power device 100 may wake up the main device 510 when an expiry event occurs (e.g., the count value of the counter 120 matches the wakeup compare value in the compare register 125) by activating the battery pass circuit 105. After waking up, the processor 212 may program the wakeup compare value for the next wakeup cycle into the low power device 100, as discussed above. The processor 212 may also perform one or more tasks, and upon completion of the one or more tasks, send a sleep signal to the low power device 100 to turn off the main device 510 until the next wakeup cycle. The one or more tasks may include receiving sensor data from one or more of the sensors 511 to 515 via the sensor interface 520 and transmitting the sensor data to the other device (e.g., mobile device) via the transceiver 525 and antenna 530.

[0079] Thus, in this example, the low power device 100 may periodically wake up the main device 510 to take one or more sensor readings and transmit corresponding sensor data to the other device (e.g., mobile device). The duty cycle of activity of the main device 510 may be made very small to extend the battery life of the wireless device (e.g. wireless medical device).

- [0080] It is to be appreciated that the main device 510 is not limited to transmitting sensor data to the other device (e.g., mobile device) during each wakeup cycle. For example, the processor 212 may transmit sensor data to the other device during every Mth wakeup cycle, where M is an integer greater than one. In this example, the processor 212 may collect sensor data from one or more of the sensors 511 to 515 during each wakeup cycle and store the sensor data in a memory on the low power device 100 or the main device 510. The sensor data for each wakeup cycle may be time stamped to identify when the corresponding sensor readings were taken. During each Mth wakeup cycle, the processor 212 may retrieve the sensor data collected since the last transmission to the other device, and transmit the sensor data to the other device via the transceiver 525 and the antenna 530. This may further reduce power consumption by reducing the frequency at which the transceiver 525 is powered on.
- [0081] In this example, the processor 212 may keep track of the number of times the main device 210 has been woken up using a wakeup register. Each time the main device 210 wakes up, the processor 212 may increment the wakeup register by one. Each time the count in the wakeup register reaches M, the processor 212 may transmit sensor data to the other device and reset the wakeup register to zero. Alternatively, the processor 212 may transmit sensor data to the other device each time the count in the wakeup register is a multiple of M. In either case, the processor 212 may read the wakeup register each time the main device 510 wakes up to determine whether to transmit sensor data to the other device.
- [0082] In some aspects, the processor 212 may process sensor data to determine whether to transmit the sensor data to the other device. For example, the processor 212 may process the sensor data to determine whether the sensor data is within a normal range. If the sensor data is within the normal range, then the processor 212 may determine not to transmit the sensor data or to transmit the sensor data during a later wakeup cycle (e.g., Mth wakeup cycle). If the sensor data is outside the normal range, then the processor 212 may decide to transmit the sensor data to the other device during the current wakeup cycle (e.g., to alert the patient, medical personal, etc.). This may assume that the other device (e.g., mobile device) has a user interface (e.g., display) for communicating with the patient.
- [0083] As discussed above, the state sequencing circuit 104 may keep track of a state of the wireless device (e.g., wireless medical patch). In one embodiment, the wireless device

may sequentially transition through a plurality of states (modes) during the lifetime of the wireless device. In this embodiment, the one or more tasks performed by the main device 510 during a wakeup cycle may depend on which state (mode) the wireless device is in. Thus, when the main device 510 wakes up, the main device 510 may need to determine which state (mode) the wireless device is in in order to determine which task(s) to perform during the current wakeup cycle. In this regard, the state sequencing circuit 104 may include a state register configured to store the current state (mode) of the wireless device. In one example, each state may correspond to a different numeral value, and the state register may store the numerical value of the current state. In this example, when the main device 510 wakes up, the main device 510 may read the numerical value stored in the state register and identify the current state (mode) of the wireless device based on the read numerical value. Exemplary states of the wireless device (e.g., wireless medical device) are discussed below according to various embodiments of the present disclosure.

[0084] In one example, when the low power device 100 is initially powered on, the state sequentially circuit 104 may be initially set to a first state (mode). In this state, the low power device 100 may automatically turn on the battery pass circuit 105 by default without comparing the count value of the counter 120 to a wakeup compare value. This may be done, for example, by initially disabling the sleep timer function. Upon waking up, the processor 212 may read the state in the state register and determine that the wireless device is in the first state. The processor 212 may then place the wireless device in a second state (mode) by setting the state in the state register to the second state (mode).

[0085] In one embodiment, the second state may involve the main device 510 going back to sleep for an extended period of time (e.g., one or more days). For example, the low power device 100 may be initially powered on in a manufacturing plant, in which the wireless device is being assembled. In this example, after the low power device 100 is initially powered on, the wireless device may not be expected to be worn by a patient for at least a certain period of time. The period of time may include expected shipping time from the manufacturing plant to a facility (e.g., hospital, pharmacy, etc.) at which the wireless device is to be given to the patient. In this example, when the processor 212 wakes up in the first state, the processor 212 may place the low power device 100 in the second state, program a wakeup compare value in the compare register, and send a

control signal to the low power device 100 to turn off the battery pass circuit 105 to put the main device 510 back to sleep. The processor 212 may also enable the sleep timer function, which may be initially disabled, as discussed above. The wakeup compare value may be a count value corresponding to the period of time that the main device 510 is to remain off in the second state. The second state may be referred to as a factory state or mode.

[0086] In the second state, the timing circuit 102 may turn on the main device 510 when the count value of the counter 120 reaches the wakeup compare value in the compare register 125. After waking up, the processor 212 may read the state in the state register and determine that the wireless device is in the second state (e.g., factory state). After determining that the wireless device is in the second state, the processor 212 may transition the wireless device to a third state (mode).

[0087] In another embodiment, the time duration of the second state (e.g., factory state) may exceed the maximum count of the counter 120. Thus, in this embodiment, the main device 510 may need to be woken up multiple times in the second state. For example, the low power device 100 may include a wakeup register that keeps track of the number of times that the main device 510 has been woken up in the second state. In this example, the time duration of the second state may be approximately equal to:

$$T = S \cdot \Delta t \quad (5)$$

where T is the time duration of the second state, S is the number of wakeup cycles in the second state, and Δt is the sleep time between adjacent wakeup cycles (duration of a sleep cycle), in which the sleep time does not exceed the maximum count of the counter 120. In this example, each time the processor 212 wakes up in the second state, the processor 212 reads the state in the stage register and determines that the wireless device is in the second state. The processor 212 may then check the wakeup register to determine whether the main device 510 has been woken up S times in the second state. If not, then the processor 212 may increment the wakeup register, program a new wakeup compare value into the compare register corresponding to the next wakeup cycle, and send a sleep signal to the low power device 100 to turn off the battery pass circuit 105 to put the main device 510 back to sleep. If the main device 510 has been woken up S times in the second state (e.g., factory state), then the processor 212 may transition the wireless device to the third state (mode) by setting the state in the state

register to the third state. In this example, the counter 120 may roll over each time the counter 120 reaches the maximum count of the counter 120.

[0088] In another embodiment, the timing circuit 102 may reset the counter 120 to zero each time the main device is awoken in the second state (mode). In this embodiment, the wakeup compare value in the register 125 may stay the same in the second state. Each time the processor 212 wakes up in the second state, the processor 212 reads the state in the state register and determines that the wireless device is in the second state. The processor 212 may then check the wakeup register to determine whether the main device 510 has been woken up S times in the second state. If not, then the processor 212 may increment the wakeup register and send a sleep signal to the low power device 100 to turn off the battery pass circuit 105 to put the main device 510 back to sleep. In this embodiment, the processor 212 does not read and update the compare value since the compare value stays the same, thereby reducing power consumption. If the main device 510 has been woken up S times in the second state (e.g., factory state), then the processor 212 may transition the wireless device to the third state (mode) by setting the state in the state register to the third state.

[0089] In yet another embodiment, the timing circuit 102 may automatically increment the wakeup register when the count value of the counter 120 reaches the compare value and reset to the counter to zero without waking up the main device. The timing circuit 102 may wake up the main device when the count in the wakeup register reaches S , indicating that the low power device has been in the second state (mode) for the desired duration. This allows the timing circuit 102 to keep track of a long period of time without having to wake up the main device, thereby reducing power consumption.

[0090] In the third state, the low power device 100 may periodically wake up the main device 510 to determine whether the wireless device has been placed on a patient. For example, each time the main device 510 wakes up in the third state, the processor 212 may receive a sensor reading from a contact sensor to determine whether the wireless device has been placed on a patient. In one embodiment, the contact sensor may comprise a planar capacitor that is orientated approximately horizontally with respect to a patient's skin when the wireless device (e.g., wireless medical device) is placed on the patient's skin. In this embodiment, the capacitance of the capacitor may change significantly depending on whether the wireless device is placed on the patient's skin.

- [0091] If the processor 212 determines that the wireless device is not on a patient, then the processor 212 may program a new wakeup compare value into the compare register 125 corresponding to the next wakeup cycle, and send a sleep signal to the low power device 100 to put the main device 510 back to sleep. In this case, the timing circuit 102 wakes up the main device 510 when the count value of the counter 120 reaches the new wakeup compare value. If the processor 212 determines that the wireless device is on a patient, then the then the processor 212 may transition the wireless device to a fourth state (mode) by setting the state in the state register to the fourth state.
- [0092] For the embodiment in which the timing circuit 102 resets the counter 120 to zero each time the main device goes back to sleep, the compare value may stay the same in the third state (mode). In this example, the processor 212 may write the compare value to the register 125 when the wireless device first enters the third state (mode), in which the compare value corresponds to a desired duration between wakeups in the third state (mode). After the compare value is initially written to the register 125, the compare value may stay the same for the duration of the third state. In this example, each time the counter 120 reaches the compare value, the timing circuit 102 may wake up the main device and the processor 212 may determine whether the wireless device has been placed on a patient. If the wireless device has not been placed on a patient, then the main device may send a sleep signal to the low power device. The timing circuit 102 may then power off the main device and reset the counter 120 to zero.
- [0093] Thus, the wireless device may remain in the third state until the wireless device is placed on a patient. The third state may be referred to as a shelf state (mode), in which the wireless device is waiting to be placed on a patient. The wireless device may remain in the third state (shelf state) for a long period of time (e.g., weeks, months, etc.). There may be a tradeoff between the shelf life of the wireless device and how quickly the wireless device detects that it has been placed on a patient. For instance, increasing the time duration between wakeup cycles may increase the shelf life while also potentially increasing the time it takes for the wireless device to detect that it has been placed on a patient. This is because, when the wireless device is placed on a patient while the main device 510 is asleep, the wireless device does not detect the patient until the next wakeup cycle.
- [0094] When the wireless device enters the fourth state, the processor 212 may turn on the transceiver 525 and perform a discovery procedure for discovering nearby devices (e.g.,

mobile device) via the antenna 530. For example, when the wireless device communicates with other devices using a Bluetooth protocol, the processor 212 may preform discovery according to the Bluetooth protocol. Upon discovering a nearby device, the processor 212 may exchange persistent keys and/or other information with the nearby device, and store the keys and/or other information in a memory in the low power device 100 or the main device 510. When the processor 212 is reawakened, the processor 212 may reestablish a wireless link with the nearby device using the stored keys and/or other information without having to perform the discovery procedure again. The fourth state may be referred to as a discovery state (mode).

[0095] After device discovery, the processor the processor 212 may transition the wireless device to a fifth state (mode) by setting the state in the state register to the fifth state. In the fifth state, the low power device 100 may periodically wake up the main device 510 to collect sensor data from one or more of the sensors 511 to 515, as discussed above. More particularly, each time the main device 510 wakes up, the processor 212 may receive sensor readings from one or more of the sensor 511 to 515 and transmit corresponding sensor data to the nearby device via the transceiver 525 and 530. The processor 212 may also program a new wakeup compare value into the compare register 125 for the next wakeup cycle, and send a sleep signal to the low power device 100 to turn off the main device 510. As discussed above, the processor 212 may transmit sensor data to the nearby device every Mth wakeup cycle instead of every wakeup cycle and/or transit sensor data to the nearby device when the sensor data is outside a normal range. The fifth state may be referred to as a mission state (mode).

[0096] In the fifth state (mode), the wakeup times of the main device 510 may be synchronized with the nearby device. In this example, the nearby device may turn on a transceiver to receive sensor data from the wireless device during every wakeup cycle or every Mth wakeup cycle of the main device 510. To maintain time synchronization with the nearby device, the processor 212 may periodically calibrate the first oscillator 101 (e.g., to compensate for frequency drift of the first oscillator 101).

[0097] In one embodiment, the wireless device may remain in the fifth state (mode) for a predetermined period of time. For example, the wireless device may remain in the fifth state over W wakeup cycles, where W is an integer greater than one. In this example, the low power device 100 may include a wakeup register that tracks the number of time that the main device 510 has been woken up in the fifth state (mission state). Each time

the processor 212 wakes up, the processor 212 reads the state in the stage register and determines that the wireless device is in the fifth state. The processor 212 may then check the wakeup register to determine whether the main device 510 has been woken up W times in the fifth state. If not, then the processor 212 may increment the wakeup register and perform one or more of the tasks discussed above.

[0098] If the main device 510 has been woken up W times in the fifth state, then the processor 212 may quickly drain the battery 204 to terminate operation of the wireless device. The processor 212 may do this, for example, by continuously powering on a high-power component (e.g., the transceiver 525) of the wireless device. Before the battery is drained to terminate operation, the processor 212 may transmit a message to the nearby device indicating that the wireless device has reached the end of its useful life and/or perform one or more other tasks.

[0099] In one embodiment, the low power device 100 may include a wakeup register that keeps track of the time duration that the low power device 100 is the third state (e.g., shelf mode). In this embodiment, each time the main device 510 is awoken to determine whether the wireless device has been placed on a patient, the count in the wakeup register may be incremented by the timing circuit 102 or the main device 510. When the main device transitions to the fourth state, the processor 212 may read the count in the wakeup register to determine how long the wireless device has been in the third state (e.g., by multiplying the count by the duration of a sleep cycle in the third state). The main device may then transmit this information to the nearby device (e.g., via a wireless link). The nearby device may display this information to the patient to inform the patient how long the wireless device has been in the third state (e.g., on the shelf). For example, if the wireless device has been on the shelf too long, then the patient may try another wireless device.

[0100] In one aspect, the processor 212 may determine power drain on the battery 204 from the third state (e.g., shelf state) based on the count in the wakeup register. For example, the processor 212 may estimate the power drain by multiplying the count by the power drain for each wakeup cycle in the third state. Based on the estimated power drain from the third state, the processor 212 may estimate the remaining power in the battery 204. The processor 212 may then estimate a time duration that the wireless device may operate in the fifth state (mission state) with the remaining battery power. The processor 212 may do this by dividing the remaining battery power by an estimated

power drain for each wakeup cycle in the fifth state to estimate a number of wakeup cycles in the fifth state, and multiplying the number of wakeup cycles by the duration between adjacent wakeup cycles. After determining the duration that the wireless device may operate in the fifth state with the remaining battery power, the main device 515 may transmit the duration to the nearby device for display to the patient. This may allow the patient to determine how long the wireless device will last. The patient may use this information, for example, to determine whether to order another wireless device before the current device stops functioning.

[0101] As discussed above, the processor 212 may estimate a number of wakeup cycles in the fifth state with the remaining battery power. In this example, the processor 212 may set the number of times *W* that the main device is to be awoken in the fifth state based on the estimated number, and store the number *W* in the state sequencing circuit 104. As discussed above, the number of times that the main device is awoken in the fifth state may be tracked by incrementing a wakeup register each time the main device is awoken in the fifth state. When the main device has been woken up *W* times in the fifth state, the processor 212 may quickly drain the battery 204 to terminate operation of the wireless device.

[0102] The low power device 100 may comprise a plurality of wakeup registers (e.g., one for tracking the number of wakeups in the second state, one for tracking the number of wakeups in the third state, and one for tracking the number of wakeups in the fifth state). In another aspect, the low power device 100 may use the same wakeup register for different states. For example, the low power device 100 may use the same wakeup register for the third and fifth states, in which the wakeup register may be reset to zero when the low power device enters the fifth state. In this example, the wakeup register may be read by the processor 212 before the wakeup register is reset so the processor 212 can determine how long the wireless device has been in the third state.

[0103] In one aspect, the low power device 100 may comprise volatile memory, which may include one or more of the registers discussed above. In this aspect, the volatile memory may remain continuously powered on from the time the low power device is initially powered on (e.g. in a manufacturing facility) to the time that operation of the wireless device is terminated. As a result, the information stored in the memory may be lost when operation of the wireless device is terminated. This may be desirable, for example, when the information includes sensitive patient information (e.g., sensor data

for the patient). The loss of the sensitive information prevents an unauthorized person from later retrieving the information from the wireless device.

[0104] It is to be appreciated that the states discussed above are exemplary only, and that the present disclosure is not limited to these states or any particular order of these states. One or more of the exemplary states discussed above may be omitted. Further, the wireless device may have one or more intermediate states between the exemplary states discussed above.

[0105] It is to be appreciated that, although the low power device 100 is useful for extending the battery life of a medical device (e.g., medical patch), the low power device 100 is not limited to this example. In general, the low power device 100 may be used to improve battery life for any mobile application in which a main device has a low duty of activity (spends most of the time in a sleep state).

[0106] The low device 100 and the main device 510 may be fabricated on the same die. In another example, the low power device 100 and the main device 510 may be fabricated on separate dies and packaged in a same circuit package (e.g., multi-chip package). In yet another example, the low power device 100 and the main device 510 may be fabricated on separate dies and packaged in separate circuit packages.

[0107] In one example, the timing circuit 102, the interface controller 103 and the state sequencing circuit 104 may be implemented on the same die with the oscillator 101 (e.g., crystal oscillator) implemented on a separate die. In still another example, the timing circuit 102, the interface controller 103, the state sequencing circuit 104 and the oscillator (e.g., low power RC oscillator) may be implemented on the same die with the battery pass circuit 105 implemented on a separate die.

[0108] It is to be appreciated that the counter 120 may roll over one or more times during the lifetime of the wireless time depending on the maximum count of the counter 120, the frequency of the first oscillator 101, and the duration of the lifetime. In this case, the processor 212 may have knowledge of the maximum count of the counter 120, and therefore know when the counter rolls over. The processor 212 may use this knowledge to adjust the wakeup compare value accordingly. For example, the processor 212 may roll over a wakeup compare value when the wakeup compare value reaches the maximum count of the counter 120.

[0109] FIG. 6 is a flow diagram of a method 600 operable on an electronic device for extending battery life in mobile applications according to an embodiment of the present disclosure.

- [0110] In step 610, the oscillator signal is received from an oscillator. The oscillator may be a low power oscillator (e.g., oscillator 101) such as a crystal oscillator, an LC oscillator, an RC oscillator, etc.
- [0111] In step 620, a count value is generated based on the oscillator signal. For example, the count value may be generated by driving a counter (e.g., counter 120) with the oscillator signal.
- [0112] In step 630, the counter value is compared with a first compare value. For example, the first compare value (e.g., wakeup compare value) may correspond to a wakeup time of a device (e.g., main device 210 or 510).
- [0113] In step 640, a first expiry event is determined upon the count value matching the first compare value. In step 650, a device is powered on in response to the first expiry event. For example, the device (e.g., main device 210 or 510) may be powered on by turning on a power switch (e.g., battery pass circuit 105) between a battery (e.g., battery 204) and the device.
- [0114] In step 660, a state stored in a state sequencing circuit is communicated to the device while the device is powered on. For example, the device (e.g., main device 210 or 510) may read the state from the state sequencing circuit (e.g., state sequencing circuit 104) via an interface (e.g., interface 103). The device may determine which task(s) to perform based on the read state.
- [0115] Those skilled in the art would appreciate that the circuits described herein may be realized using a variety of transistor types, and are therefore not limited to the particular transistor types shown in the figures. For example, transistor types such as bipolar junction transistors, junction field effect transistor or any other transistor type may be used. Those skilled in the art would also appreciate that the circuits described herein may be fabricated with various IC process technologies such as CMOS, bipolar junction transistor (BJT), bipolar-CMOS (BiCMOS), silicon germanium (SiGe), gallium arsenide (GaAs), etc.
- [0116] The various illustrative logical blocks, modules, and circuits described in connection with the disclosure herein may be implemented or performed with a general-purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but in the alternative, the processor may be any

conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[0117] The steps of a method or algorithm described in connection with the disclosure herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium is coupled to the processor such that the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components in a user terminal.

[0118] The previous description of the disclosure is provided to enable any person skilled in the art to make or use the disclosure. Various modifications to the disclosure will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other variations without departing from the spirit or scope of the disclosure. Thus, the disclosure is not intended to be limited to the examples described herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

CLAIMS

WHAT IS CLAIMED IS:

1. An electronic device comprising:
an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;
a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;
a state sequencing circuit configured to store a state of the main device; and
an interface circuit configured to communicate the stored state to the main device.
2. The electronic device of claim 1, wherein the interface circuit is configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit.
3. The electronic device of claim 2, wherein the interface circuit is configured to receive a sleep signal from the main device and to instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device.
4. The electronic device of claim 3, wherein, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value, and to generate a second wakeup signal in response to the second expiry event, wherein the battery pass circuit powers the main device back on in response to the second wakeup signal.

5. The electronic device of claim 1, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value.

6. The electronic device of claim 1, further comprising a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device.

7. The electronic device of claim 6, wherein the switch is configured to receive the control signal via the interface circuit.

8. The electronic device of claim 1, wherein interface circuit is configured to sequentially receive a plurality of state update signals from the main device, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequence circuit in response to each of the state update signals.

9. The electronic device of claim 8, wherein, in a first one of the plurality of states, the main device is configured to periodically check a contract sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors.

10. The electronic device of claim 9, wherein, in the second one of the plurality of states, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

11. A method for extending battery life in a mobile application, the method comprising:
receiving an oscillator signal from an oscillator;
generating a count value based on the oscillator signal;
comparing the count value with a first compare value;
determining a first expiry event upon the count value matching the first compare value;
powering on a device in response to the first expiry event; and

communicating a state stored in a state sequencing circuit to the device while the device is powered on.

12. The method of claim 11, further comprising receiving a second compare value for a next wakeup cycle from the device.

13. The method of claim 12, further comprising:
receiving a sleep signal from the device; and
powering off the device in the response to the sleep signal.

14. The method of claim 13, further comprising:
after the device is powered off, comparing the count value with the second compare value;
determining a second expiry event upon the count value matching the second compare value; and
powering the device back on in response to the second expiry event.

15. The method of claim 11, further comprising incrementing the count value at a rate based on a frequency of the oscillator.

16. The method of claim 11, further comprising:
receiving a control signal from the device; and
coupling the oscillator signal to the device in response to the control signal.

17. The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and
updating the state stored in the state sequence circuit in response to each of the state update signals.

18. The method of claim 17, wherein, in a first one of the plurality of states, the device periodically checks a contract sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors.

19. The method of claim 18, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

20. An apparatus for extending battery life in a mobile application, the apparatus comprising:

- means for receiving an oscillator signal from an oscillator;
- means for generating a count value based on the oscillator signal;
- means for comparing the count value with a first compare value;
- means for determining a first expiry event upon the count value matching the first compare value;
- means for powering on a device in response to the first expiry event; and
- means for communicating a state stored in a state sequencing circuit to the device while the device is powered on.

21. The apparatus of claim 20, further comprising means for receiving a second compare value for a next wakeup cycle from the device.

22. The apparatus of claim 21, further comprising:

- means for receiving a sleep signal from the device; and
- means for powering off the device in the response to the sleep signal.

23. The apparatus of claim 22, further comprising

- means for comparing the count value with the second compare value after the device is powered off;
- means for determining a second expiry event upon the count value matching the second compare value; and
- means for powering the device back on in response to the second expiry event.

24. The apparatus of claim 20, further comprising means for incrementing the count value at a rate based on a frequency of the oscillator.

25. The apparatus of claim 20, further comprising:

- means for receiving a control signal from the device; and

means for coupling the oscillator signal to the device in response to the control signal.

26. The apparatus of claim 20, further comprising:

means for sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and

means for updating the state stored in the state sequence circuit in response to each of the state update signals.

27. The apparatus of claim 26, wherein, in a first one of the plurality of states, the device periodically checks a contract sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors.

28. The apparatus of claim 27, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS

ABSTRACT

In one embodiment, an electronic device comprises an oscillator configured to generate an oscillator signal, and a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event. The electronic device also comprises a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device. The electronic device further comprises a state sequencing circuit configured to store a state of the main device, and an interface circuit configured to communicate the stored state to the main device.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		
First Named Inventor/Applicant Name:		Robert Bruce Ganton		
Filer:		Eugene R. Worley/Susan Manriquez		
Attorney Docket Number:		32716-00519/143971		
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	8	80	640
Miscellaneous-Filing:				
Late Filing Fee for Oath or Declaration	1051	1	140	140

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2380

Electronic Acknowledgement Receipt

EFS ID:	21193108
Application Number:	14596087
International Application Number:	
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Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	15763
Filer:	Eugene R. Worley/Susan Manriquez
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IPR2025-01015

Qualcomm Inc. v. Collabo Innovations, Inc.

Collabo's Exhibit 2011

Ex. 2011, Page 60

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	143971_Power_of_Attorney_as _filed_Jan_13_2015.pdf	1632341	no	2
			13b7854fb2560738d82bcd8e108eebd8d 717c4e		

Warnings:

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2	Information Disclosure Statement (IDS) Form (SB08)	143971_IDS_as_filed_Jan_13_2 015.pdf	31752	no	4
			617f3ad38e9dcf8d9a241f006527737f7cb eb74		

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3	Application Data Sheet	143971_ADS_as_filed_Jan_13_ 2015.pdf	59560	no	7
			d118f7160d9a34c72a13b6c646998bc7f86 d4c35		

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4	Drawings-only black and white line drawings	143971_Figures_as_filed_Jan_ 13_2015.pdf	51513	no	6
			22bae4299f3ef635bf289541738fc5b2f75d8 0bb		

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5		143971_Application_as_filed_J an_13_2015.pdf	261636	yes	38
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Multipart Description/PDF files in .zip description

	Document Description	Start	End
	Specification	1	32
	Claims	33	37
	Abstract	38	38

Warnings:

Information:

6	Fee Worksheet (SB06)	fee-info.pdf	38984	no	2
			3a33fa1ca2ab1bfe7f8a5da7c640ec9a6566efcb		
Warnings:					
Information:					
Total Files Size (in bytes):				2075786	
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/596,087	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		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))	28	minus 20 = * 8			OR	x 80 =	640
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *				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	2240
* 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	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	x =
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	x =
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	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.							



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/596,087	01/13/2015	2115	2380	32716-00519/143971	28	3

CONFIRMATION NO. 6012

15763

Novak Druce c/o QUALCOMM Incorporated
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1875 Eye Street, N.W.
Suite 1100
Washington, DC 20006

FILING RECEIPT



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Date Mailed: 01/27/2015

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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Applicant(s)

QUALCOMM, Incorporated, San Diego, CA

Power of Attorney: The patent practitioners associated with Customer Number 15763

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/992,039 05/12/2014

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.

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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 14/596,087**

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Early Publication Request: No

Title

ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS

Preliminary Class

713

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

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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).

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/596,087	01/13/2015	Robert Bruce Ganton	32716-00519/143971

CONFIRMATION NO. 6012

15763

Novak Druce c/o QUALCOMM Incorporated
Novak Druce Connolly Bove + Quigg LLP (LA Office)
1875 Eye Street, N.W.
Suite 1100
Washington, DC 20006

NOTICE



Date Mailed: 01/27/2015

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
Robert Bruce Ganton
Robert Scott Ballam

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

Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
---------------------------	--

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐

The attached application, or

☒

United States application or PCT international application number 14/596,087

filed on January 13, 2015

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.

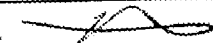
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Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card 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: Robert Bruce Ganton

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.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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

Title of Invention	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
<p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number <u>14/596,087</u> filed on <u>January 13, 2015</u>.</p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>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.</p> <p style="text-align: center;">WARNING:</p> <p>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.</p> <p>LEGAL NAME OF INVENTOR</p> <p>Inventor: <u>Robert Scott Ballam</u> Date (Optional): <u>JAN 27 2015</u></p> <p>Signature: <u></u></p> <p>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.</p>	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	21409244
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	15763
Filer:	Eugene R. Worley/Susan Manriquez
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	32716-00519/143971
Receipt Date:	05-FEB-2015
Filing Date:	13-JAN-2015
Time Stamp:	19:14:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	143971_Declarations_as_filed_Feb_5_2015.pdf	2684910 34dd243f12f9d68a65bd43a910eae12d37aeb01b	no	2

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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.

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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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/596,087	01/13/2015	Robert Bruce Ganton	32716-00519/143971

CONFIRMATION NO. 6012

PUBLICATION NOTICE



OC00000078616660

15763
Novak Druce c/o QUALCOMM Incorporated
Novak Druce Connolly Bove + Quigg LLP (LA Office)
1875 Eye Street, N.W.
Suite 1100
Washington, DC 20006

Title:ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS

Publication No.US-2015-0323984-A1

Publication Date:11/12/2015

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14596087
	Filing Date	2015-01-13
	First Named Inventor	GANTON; Robert Bruce
	Art Unit	2115
	Examiner Name	LEE, THOMAS C
	Attorney Docket Number	32716-00519/143971

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	1	2010056118	WO	A1	2010-05-20	ANAGEAR B V [NL], et al.		

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	14596087
Filing Date	2015-01-13
First Named Inventor	GANTON; Robert Bruce
Art Unit	2115
Examiner Name	LEE, THOMAS C
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	1	INTERNATIONAL SEARCH REPORT AND WRITTEN OPINION – PCT/US2015/021325 – ISA/EPO – 2015-09-01 (143971WO).	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14596087
	Filing Date		2015-01-13
	First Named Inventor	GANTON; Robert Bruce	
	Art Unit	2115	
	Examiner Name	LEE, THOMAS C	
	Attorney Docket Number	32716-00519/143971	

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Benjamin B. Matthew/	Date (YYYY-MM-DD)	2015-12-28
Name/Print	Benjamin B. Matthew	Registration Number	62430

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

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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.



(51) International Patent Classification:
G06F 1/32 (2006.01)

(21) International Application Number:
PCT/NL2009/050682

(22) International Filing Date:
12 November 2009 (12.11.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/113,916 12 November 2008 (12.11.2008) US

(71) Applicant (for all designated States except US): **AN-AGEAR B.V.** [NL/NL]; Sluiskeshoeven 10, NL-5244 GM Rosmalen (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **KAMP, Petrus, Johannes, Maria** [NL/NL]; Sluiskeshoeven 10, NL-5244 GM Rosmalen (NL).

(74) Agents: **ALGEMEEN OCTROOI- EN MERKEN BUREAU BV** et al.; Postbus 645, NL-5600 AP Eindhoven (NL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

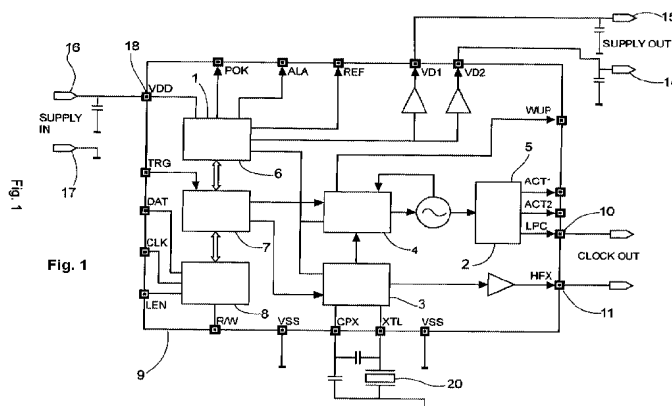
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Published:

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(54) Title: POWER SUPPLY MANAGEMENT CONTROLLER INTEGRATED CIRCUIT, POWER MANAGEMENT CIRCUIT FOR ELECTRICALLY POWERED SYSTEMS, AND METHOD OF MANAGING POWER TO SUCH SYSTEMS



(57) Abstract: The present invention provides a power supply management controller integrated circuit for managing power supply to one or more system units of a system, said integrated circuit comprising power supply means for powering said system units, a power supply control unit for controlling said powering of said system units, a wake-up timer unit, and means for acknowledging an active or passive state of said system, wherein said power supply control unit is arranged for cooperating with said means for acknowledging said state of said system for enabling said power supply control unit to cease powering of said system units for de-activation of said system during said passive state of said system, and for enabling said power supply control unit to maintain powering of said system units during an active state of said system, and wherein said power supply control unit is arranged for cooperating with said wake-up timer unit for periodically powering said system units during said passive state of said system for enabling activation of said system.

Title:

Power supply management controller integrated circuit, power management circuit for electrically powered systems, and method of managing power to such systems

5

Field of the invention

The present invention is directed to a power supply management controller integrated circuit for managing power supply to one or more system units of a system, a power management circuit for electrically powered systems using such an integrated circuit, and to a method of managing power supply to such a system.

10

Background of the invention

With the continuing shrink of silicon device sizes, the processing speed of digital signal processors and micro controllers keeps on growing. However the current consumption is rising too. In many electronic systems high processing speed is only needed during short periods of operation. The rest of the time such systems are in a sleep mode or standby mode at a very low activity level. However the systems cannot be fully shut off as they must be able to resume full operation in a very short period of time. In particular as a result of high leakage currents typical for silicon devices there is still significant supply current being drawn by the systems in sleep mode or standby mode. It will be appreciated that this is not desired from the point of view of energy conservation. Moreover, due to this inefficient use of available energy, many of these type of applications must be powered by mains voltage or a by a durable, large capacity power source that enables operation over a sufficiently long period of time. Battery operation is often not possible, or results in the application being large and bulky, and as therefore difficult to handle or install.

25

Summary of the invention

The present invention is directed to resolving the above mentioned problem, and providing a power management controller which is small, fast, reliable and accurate.

30

To this end, the present invention provides a power supply management controller integrated circuit for managing power supply to one or more system units of a system, said integrated circuit comprising power supply means for

powering said system units, a power supply control unit for controlling said powering of said system units, a wake-up timer unit, and means for acknowledging an active or passive state of said system, wherein said power supply control unit is arranged for cooperating with said means for acknowledging said state of said system for enabling
5 said power supply control unit to cease powering of said system units for de-activation of said system during said passive state of said system, and for enabling said power supply control unit to maintain powering of said system units during an active state of said system, and wherein said power supply control unit is arranged for cooperating with said wake-up timer unit for periodically powering said system
10 units during said passive state of said system for enabling activation of said system.

The integrated circuit of the present invention enables complete shut down of the one or more system units in the system, or the complete system as a whole (dependent on the application).

The integrated circuit takes over all critical system functions when
15 the system is in the de-activated state, and is able to wake-up the full system in a fast and time accurate way. This allows the use of fast signal processors in battery operated equipment or in equipment operated from an unreliable energy source.

In particular, since the integrated circuit of the present invention periodically powers the system units during the de-activated state of the system,
20 power supply management controller integrated circuit of the present invention makes it possible for the system to wake-up as soon as activation of the system is required for processing data or other functions.

The means for acknowledging an active or passive state of the system may be integrated in the power supply control unit of the integrated circuit. In
25 particular, the power supply control unit may be able to detect the active or passive state of the system based on voltage difference, amount of current being drawn, or the temperature of the system units being monitored. Moreover, the means for acknowledging an active or passive state of said system may be connected to a sensor signal input for receiving sensor signals from a sensor unit. Such a sensor
30 unit may for example be at least one element of a group comprising an internal sensor unit of said integrated circuit, a micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor implemented on said integrated circuit, an external sensor unit, a voltage level sensor, a current sensor or a temperature

sensor. It should be appreciated, however, that other types of sensor units may be used as well, e.g. dependent on the application.

The terms 'active', 'passive', 'de-activated' and 'activated' are to be interpreted as follows. The active or passive state of the system refers to the presence or absence of a requirement for the system to perform its functions, i.e. data processing, interaction between system units or performing specific tasks of the system. A passive state thus refers to a state wherein the system is activated, but without performing any required activity (e.g. a wait-state or idle state). De-activation or activation refers to the power supply management controller integrated circuit switching off power to the system units under control, and taking over the system critical functions (e.g. providing a clock signal). In this respect, activation and wake-up both refer to the system being powered on by the integrated circuit of the invention, after a period of de-activation. De-activation turns the system to a de-activated or standby mode by cutting off power to the system units under control, and taking over critical system functions by the integrated circuit.

According to another embodiment of the invention, said integrated circuit further comprises a clock unit for providing a clock signal for said wake-up timer unit. A clock unit enables accurate operation of the wake-up timer, and makes the integrated circuit self-supporting in that it does not have to rely on an external clock circuit. Moreover, the accurate clock unit of this embodiment provides a clock signal that can be used by external units, such as system units that rely on an accurate clock signal even during a de-activated state of the system.

The clock unit may be operatively connected to an oscillator unit. Such an oscillator unit may comprise any of a group comprising a crystal oscillator or a controlled oscillator. In case a controlled oscillator is present in the clock unit, this oscillator comprises tuning means arranged for periodically tuning said controlled oscillator according to a duty cycle, and wherein said tuning means are arranged for adapting said duty cycle dependent on a tuning signal which is indicative of an environmental parameter. Accurate tuning of the oscillator may be achieved by means of a suitable combination of a phase locked loop, a delay locked loop, and/or a frequency locked loop in a manner known to the skilled person.

A special feature of this embodiment is that tuning is performed periodically according to a variable duty cycle. The tuning cycle is made dependent

on parameters that may influence the oscillation frequency. Such parameters include, amongst others, the temperature of the oscillator or the rate of change of this temperature. The present embodiment is designed to perform tuning more intensively (by amending the duty cycle within which tuning is performed) or less intensively dependent on the need for tuning.

As mentioned, the clock unit may comprise a crystal oscillator. In particular, this may be a low power high frequency oscillator with the following characteristics: very low current consumption, fast start-up time, programmable power modes. The high frequency oscillator may provide a clean reference clock to system units, such as radio devices and/or high speed data converters in a system.

The start-up time of a crystal oscillator is generally interpreted as the duration of time required for the oscillator circuit to generate a stable and desired oscillation signal from the time of power-on. In a preferred embodiment, the fast start-up time and programmable power modes are based on precision control of the amplitude of oscillation. In this embodiment, a low-power mode of the crystal oscillator is achieved by reducing the oscillation amplitude to a low level, while in high-power mode the amplitude is increased for providing a strong clock reference signal. Transition from the low-power mode to the high-power mode can be performed relatively fast. This principle is used for providing the short start-up time and fast start-up. In this embodiment, start-up is thus performed by switching the oscillator from a low-power to a high-power mode, instead of switching the oscillator from no power to power-on. Moreover, since the low-power and high-power levels are programmable (the amplitude is programmable), the start-up time can be influenced by selecting/optimizing suitable power levels.

According to another embodiment of the invention, integrated circuit may comprise a transducer interface for enabling said integrated circuit to be operatively connected to an (external) transducer. This enables connection of transducers to monitor specific system parameters which cannot be monitored with the on-chip provided transducers (e.g. gas or pressure). Such parameters may be indicative for a need to 'wake-up' the system from a de-activated state as facilitated by the power supply management controller integrated circuit of the present invention. In relation to this, it is noted that apart from periodic powering of the one or more system units during said de-activated state of said system for enabling

activation of said system, the power supply control unit may be arranged to wake-up the system on detection of a voltage level or temperature within the system which exceeds or drops below a certain preprogrammed threshold. In that case, in order to control such a parameter, the system may require to take action immediately (e.g. by regulating a voltage, switching on a ventilation unit or other cooling means, or the like).

According to another embodiment, said integrated circuit comprises a communication interface for reading or writing data to said integrated circuit. The integrated circuit may be arranged for programming of operation parameters of said circuit, using the communication interface. The communication interface may comprise a serial or parallel digital input or output, for writing or reading said data. Communication may of course also take place in a different suitable way.

The term power supply means, as used herein, should be interpreted to include a power supply input, such as an input voltage connector, which enables the integrated circuit to be connected to an external power source, such as a battery, mains voltage adapter or transformer unit, an alternative suitable AC or DC power source, or an energy harvesting device (i.e. for deriving energy from external sources, such as solar power, thermal energy, wind energy, salinity gradients, and kinetic energy). Integrated circuit according to any of the previous claims, wherein said power supply means comprise an input voltage connector for receiving power from an external power source.

According to a second aspect of the invention, there is provided a power supply management circuit comprising an integrated circuit as described above.

According to a third aspect of the invention, there is provided a method of managing power supply to one or more system units of a system, wherein said system units are powered by power supply means, and wherein said powering of said units is controlled by a power supply control unit, said method comprising a step of: acknowledging an active or passive state of said system; said power supply control unit managing said supply by ceasing powering of said system units for deactivation of said system during said passive state of said system, and maintaining powering of said system units during an active state of said system, and said power supply control unit periodically powering said system units during said passive state

of said system for enabling activation of said system.

Brief description of the drawings

The present invention will be further elucidated through description of an embodiment thereof, with reference to the enclosed drawing, wherein:

fig. 1 is a schematic layout of an integrated circuit according to an embodiment of the present invention.

Detailed description of the drawing

The invention is directed to a largely analog integrated device (also referred to as power supply management controller integrated circuit) that enables complete shut down of other devices in a system (e.g. devices characterized by high leakage current). The integrated circuit takes over all critical system functions in standby or de-activated mode and is able to wake-up the full system in a fast and time accurate way. This will allow the use of fast signal processors in battery operated equipment or in equipment operated from an unreliable energy source.

The key function of the Integrated circuit is to be the system reference for supply (voltage) and time (clock signals) as well as being a monitor of the system's operating conditions. The integrated circuit has ultra low current consumption and therefore never has to be switched off in practice. The integrated circuit has one or more of the functions listed below. How the functions interact is shown in the block diagram.

Figure 1 illustrates the layout of an integrated circuit 9 in accordance with an embodiment of the present invention. In figure 1, the integrated circuit 9 comprises a power supply voltage regulator or power supply control unit 1, a real time clock 2, a high frequency oscillator 3, a controlled oscillator 4, programmable timers 5 (in this embodiment integrated with real time clock 2), temperature and/or voltage monitors 6 (in this embodiment integrated with the power supply control unit 1), a transducer interface 7, and serial digital interface 8.

Power supply control unit 1, comprising one or more voltage regulators, creates the supply voltage for other system parts. This supply voltage is provided through outputs VD1 and VD2 of the integrated circuit, being connected to output terminals 14 and 15 in figure 1. The regulators in the control unit 1 can be

shut-off and their output can be disabled to fully shut down connected system parts. A power-on reset circuit is part of the power management system and produces a logic signal (pok) when the supply voltage has reached a predefined and stable level. Although any suitable power source may be applied, in the present embodiment, the integrated circuit 9 receives its power via supply voltage inputs 16 and 17, through input 18 (VDD) of the integrated circuit 9.

The real time clock 2 can either be based on a crystal oscillator 3 or a Controlled Oscillator (CO) 4, or both. High frequency oscillator 3 comprises a crystal based oscillator with the following special characteristics: very low current consumption, fast start-up, programmable power modes. The high frequency oscillator provides a clean reference clock to, for example radio devices (not shown) and/or high speed data converters (not shown) in the system. This (reference) clock signal is provided to the system units via outputs 10 and 11 (CLOCK out) of the integrated circuit.

The fast start-up time and programmable power modes are based on precision control of the amplitude of oscillation. A low-power mode of the crystal oscillator is achieved by reducing the oscillation amplitude to a low level, while in high-power mode the amplitude is increased for providing a strong clock reference signal. Transition from the low-power mode to the high-power mode can be performed relatively fast. This principle is used for providing the short start-up time and fast start-up. In this embodiment, start-up is thus performed by switching the oscillator 3 from a low-power to a high-power mode.

Controlled oscillator 4 is a low frequency oscillator which is periodically tuned by a low power but high frequency crystal oscillator 3. Under duty cycle control. The tuning is performed using a combination of a Phase Locked Loop (PLL), a Frequency Locked Loop (FLL) and a Delay Locked Loop (DLL). The tuning is performed according to a duty cycle. The controlled oscillator uses adaptive duty cycle control for the timing of the tuning of the oscillator. The duty cycle depends on the rate of change of environmental factors, such as temperature.

Programmable timers 5 are used to wake-up system parts at a pre-programmed time. The timers are controlled based on the clock signal provided by the clock unit 2. A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the

system units, such as to enable the system to be activated if required. If the system is required to activate from a de-activated state, this may either be detected within the power supply control unit 1, or alternatively the system may provide an indication signal to the integrated circuit.

5 One of the timers 5 is a watchdog counter which resets the system if it has detected that the system has unintentionally entered a locked-up mode. The watchdog counter is a digitally implemented pulse counter which is preset and counts down to zero. When the zero count is reached a logic signal is generated which can be used to reset or restart (part of) the system. The counter is periodically preset by
10 the system to prevent that the zero count will be reached during normal operation. If zero count is reached then this means that normal system operation is not possible anymore (e.g. due to a software bug or other system failure) an a reset is necessary.

 The temperature and voltage monitors 6 are monitor circuits that create trigger signals (e.g. wake up signals) to other parts of the system in case
15 certain pre-programmed thresholds have been exceeded.

 The transducer interface 7 allows the connection of transducers to the integrated circuit for monitoring specific system parameters which cannot be monitored with the on-chip provided transducers (e.g. gas or pressure).

 Serial digital interface enables communication with the integrated
20 circuit during normal system operation. It can be used to write settings to or read parameters from the device. It can also be used to provide programming data to the integrated circuit for programming its operational parameters.

CLAIMS

1. Power supply management controller integrated circuit for managing power supply to one or more system units of a system, said integrated circuit comprising power supply means for powering said system units, a power supply control unit for controlling said powering of said system units, a wake-up timer unit, and means for acknowledging an active or passive state of said system,

wherein said power supply control unit is arranged for cooperating with said means for acknowledging said state of said system for enabling said power supply control unit to cease powering of said system units for de-activation of said system during said passive state of said system, and for enabling said power supply control unit to maintain powering of said system units during an active state of said system, and

wherein said power supply control unit is arranged for cooperating with said wake-up timer unit for periodically powering said system units during said passive state of said system for enabling activation of said system.

2. Integrated circuit according to claim 1, wherein said means for acknowledging said state of said system are comprised by or integrated within said power supply control unit.

3. Integrated circuit according to claim 2, wherein for acknowledging said state of said system, said power supply control unit is arranged for detecting current or current variations of a supply current provided to said system units.

4. Integrated circuit according to any of the previous claims, wherein said means for acknowledging an active or passive state of said system are connected to an sensor signal input for receiving sensor signals from a sensor unit.

5. Integrated circuit according to claim 4, wherein said sensor unit comprises at least one element of a group comprising an internal sensor unit of said integrated circuit, a micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor implemented on said integrated circuit, an external sensor unit, a voltage level sensor, a current sensor or a temperature sensor.

6. Integrated circuit according to any of the previous claims, further comprising a clock unit for providing a clock signal for said wake-up timer unit.

7. Integrated circuit according to claim 6, wherein said clock unit is

operatively connected to an oscillator unit, said oscillator unit being at least one of a group comprising a crystal oscillator or a controlled oscillator.

8. Integrated circuit according to claim 7, wherein said oscillator unit is a controlled oscillator, and wherein said oscillator comprises tuning means arranged for periodically tuning said controlled oscillator according to a duty cycle, and wherein said tuning means are arranged for adapting said duty cycle dependent on a tuning signal which is indicative of an environmental parameter.

9. Integrated circuit according to claim 8, said tuning means further comprising means for providing said tuning signal being indicative for at least one of a group comprising temperature, rate of change of temperature.

10. Integrated circuit according to any of the previous claims, further comprising a transducer interface for enabling said integrated circuit to be operatively connected to a transducer.

11. Integrated circuit according to any of the previous claims, further comprising a communication interface for reading or writing data to said integrated circuit.

12. Integrated circuit according to claim 11, said integrated circuit being arranged for programming of operation parameters of said circuit.

13. Integrated circuit according to any of the previous claims, wherein said power supply means comprise an input voltage connector for receiving power from an external power source.

14. Power management circuit for an electrically powered system, said power management circuit comprising a power supply management controller integrated circuit according to any of the previous claims.

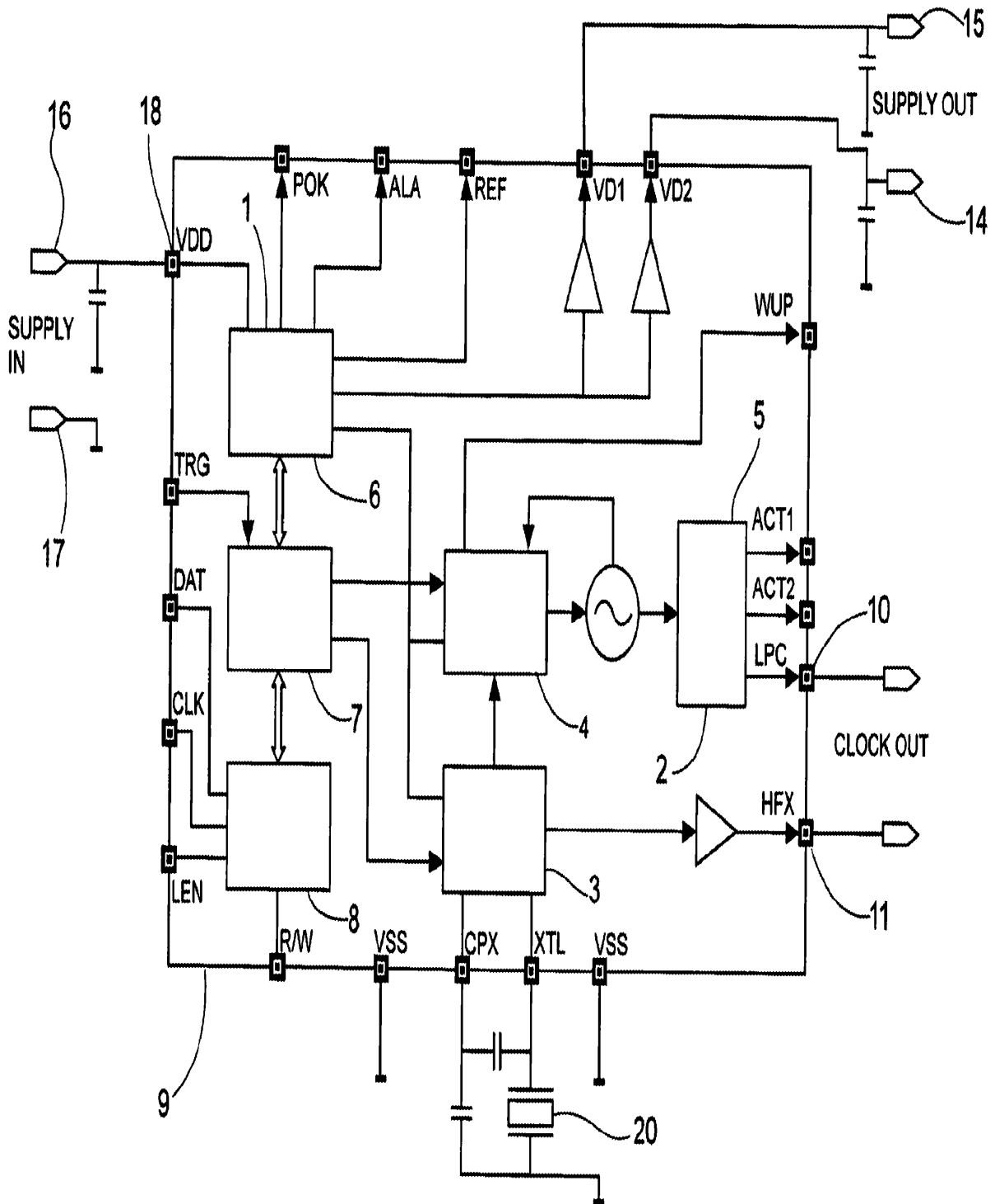
15. Method of managing power supply to one or more system units of a system, wherein said system units are powered by power supply means, and wherein said powering of said units is controlled by a power supply control unit, said method comprising a step of:

acknowledging an active or passive state of said system;

said power supply control unit managing said supply by ceasing powering of said system units for de-activation of said system during said passive state of said system, and maintaining powering of said system units during an active state of said system, and

said power supply control unit periodically powering said system units during said passive state of said system for enabling activation of said system.

Fig. 1



INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2009/050682

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F1/32

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

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/168438 A1 (CASEBOLT MARK W [US] ET AL) 4 August 2005 (2005-08-04) paragraphs [0040], [0041], [0072] - [0094]; figures 1,8	1-15
X	US 4 698 748 A (JUZWIK DAVID L [US] ET AL) 6 October 1987 (1987-10-06) column 1, line 53 - column 3, line 35; column 6, line 15 - column 8, line 36; column 25, line 49 - column 28, line 8; figures 2,3a,3b,13	1-12,14, 15
X	US 5 167 024 A (SMITH R STEVEN [US] ET AL) 24 November 1992 (1992-11-24) the whole document	1-3,6-15
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

8 March 2010

Date of mailing of the international search report

16/03/2010

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

Alonso Nogueiro, M

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2009/050682

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/148533 A1 (NICHOLAS KEN [US]) 29 July 2004 (2004-07-29) the whole document	1-15
X	US 5 990 868 A (FREDERICK JOHN W [US]) 23 November 1999 (1999-11-23) the whole document	1, 11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2009/050682

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2005168438	A1	04-08-2005	NONE	
US 4698748	A	06-10-1987	CA 1229875 A1 DE 3486192 D1 DE 3486192 T2 EP 0140814 A2 ES 8507710 A1 JP 1781504 C JP 4069465 B JP 60143050 A	01-12-1987 09-09-1993 18-11-1993 08-05-1985 16-12-1985 13-08-1993 06-11-1992 29-07-1985
US 5167024	A	24-11-1992	NONE	
US 2004148533	A1	29-07-2004	NONE	
US 5990868	A	23-11-1999	NONE	

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
Matthew, Benjamin B.
NOVAK DRUCE CONNOLLY BOVE + QUIGG LLP
333 S. Grand Ave. 23F
Los Angeles CA 90071
ETATS-UNIS D'AMERIQUE

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year)		1 September 2015 (01-09-2015)
Applicant's or agent's file reference 143971 WO	FOR FURTHER ACTION	See paragraphs 1 and 4 below
International application No. PCT/US2015/021325	International filing date (day/month/year)	18 March 2015 (18-03-2015)
Applicant QUALCOMM INCORPORATED		

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

How? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70

For more detailed instructions, see PCT Applicant's Guide, International Phase, paragraphs 9.004 - 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

The applicant may **submit comments on an informal basis on the written opinion of the International Searching Authority** to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of **18 months from the priority date, the international application will be published** by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for **entry into the national phase** before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Within **19 months from the priority date, the applicant may request that a supplementary international search be carried out** by a different International Searching Authority that offers this service (Rule 45*bis*.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016	Authorized officer NESCIOBELLI, Katarzyna Tel: +49 (0)89 2399-4790
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IPR2025-01015

PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 143971WO	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2015/021325	International filing date (<i>day/month/year</i>) 18 March 2015 (18-03-2015)	(Earliest) Priority Date (<i>day/month/year</i>) 12 May 2014 (12-05-2014)
Applicant QUALCOMM INCORPORATED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 6 sheets.

☐

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

☒

the international application in the language in which it was filed

☐

a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6**bis**(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☒ **Unity of invention is lacking** (see Box No. III)

4. With regard to the **title**,

☒

the text is approved as submitted by the applicant

☐

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒

the text is approved as submitted by the applicant

☐

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒

as suggested by the applicant

☐

as selected by this Authority, because the applicant failed to suggest a figure

☐

as selected by this Authority, because this figure better characterizes the invention

b. ☐ none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/021325

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-8, 11-17, 20-26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/021325

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06F1/32
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/056118 A1 (ANAGEAR B V [NL]; KAMP PETRUS JOHANNES MARIA [NL]) 20 May 2010 (2010-05-20)	1,5-8, 11, 15-17, 20,24-26
Y	abstract figure 1 page 3, line 17 - line 25 page 5, line 7 - line 15 page 6, line 26 - page 8, line 22 claims 1,6,7,11,12	2-4, 12-14, 21-23
Y	----- US 2009/144578 A1 (TATSUMI MASAHIRO [JP]) 4 June 2009 (2009-06-04) paragraph [0024] - paragraph [0027] paragraph [0047] - paragraph [0051] paragraph [0056] - paragraph [0058] ----- -/--	2-4, 12-14, 21-23

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

19 June 2015

Date of mailing of the international search report

01/09/2015

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

Alonso Nogueiro, L

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/021325

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 167 024 A (SMITH R STEVEN [US] ET AL) 24 November 1992 (1992-11-24) abstract column 5, line 15 - line 60 column 6, line 54 - column 7, line 55 figure 1 -----	3,6,7, 13,16, 22,25
A	US 2008/282100 A1 (CHEN WEI-JEN [TW] ET AL) 13 November 2008 (2008-11-13) figure 1 paragraph [0026] - paragraph [0044] -----	3,6,7, 13,16, 22,25
A	US 2008/065920 A1 (SUGINAKA YUKARI [JP] ET AL) 13 March 2008 (2008-03-13) figure 1 abstract paragraph [0005] paragraph [0025] - paragraph [0038] -----	8,17,26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/021325

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2010056118	A1	20-05-2010	EP 2353059 A1	10-08-2011
			US 2011264936 A1	27-10-2011
			WO 2010056118 A1	20-05-2010

US 2009144578	A1	04-06-2009	JP 4800289 B2	26-10-2011
			JP 2009134577 A	18-06-2009
			US 2009144578 A1	04-06-2009

US 5167024	A	24-11-1992	NONE	

US 2008282100	A1	13-11-2008	CN 101303618 A	12-11-2008
			TW 200844727 A	16-11-2008
			US 2008282100 A1	13-11-2008

US 2008065920	A1	13-03-2008	CN 101145077 A	19-03-2008
			JP 4908983 B2	04-04-2012
			JP 2008070934 A	27-03-2008
			KR 20080024097 A	17-03-2008
			US 2008065920 A1	13-03-2008

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8, 11-17, 20-26

An electronic device comprising an oscillator, a timing circuit configured to generate a count value based on the oscillator signal and to generate a first wakeup signal, a battery pass circuit configured to couple a power source to a main device in response to the first wakeup signal, a state sequencing circuit configured to store a state of the main device and an interface circuit configured to communicate the stored state to the main device wherein the interface circuit is configured to receive the value to configure the wakeup timer.

2. claims: 9, 10, 18, 19, 27, 28

An electronic device comprising an oscillator, a timing circuit configured to generate a count value based on the oscillator signal and to generate a first wakeup signal, a battery pass circuit configured to couple a power source to a main device in response to the first wakeup signal, a state sequencing circuit configured to store a state of the main device and an interface circuit configured to communicate the stored state to the main device wherein in a plurality of states the main device is configured to periodically check contact sensors and to collect sensor data.

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2015/021325

International filing date (day/month/year)
18.03.2015

Priority date (day/month/year)
12.05.2014

International Patent Classification (IPC) or both national classification and IPC
INV. G06F1/32

Applicant
QUALCOMM INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0
Fax: +49 89 2399 - 4465

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Alonso Nogueiro, L

Telephone No. +49 89 2399-0



IPR2025-01015

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2015/021325

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2015/021325

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

- ☐ the entire international application
- ☒ claims Nos. 9, 10, 18, 19, 27, 28

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):
- ☒ no international search report has been established for the whole application or for said claims Nos. 9, 10, 18, 19, 27, 28
- ☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:
 - ☐ furnish a sequence listing in the form of an Annex C/ST.25 text file, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.
 - ☐ furnish a sequence listing on paper or in the form of an image file complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.
 - ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13~~ter~~.1(a) or (b).
- ☐ See Supplemental Box for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2015/021325

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:
- ☐ paid additional fees
 - ☐ paid additional fees under protest and, where applicable, the protest fee
 - ☐ paid additional fees under protest but the applicable protest fee was not paid
 - ☒ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-8, 11-17, 20-26

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>2-8, 12-17, 21-26</u>
	No: Claims	<u>1, 11, 20</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-8, 11-17, 20-26</u>
Industrial applicability (IA)	Yes: Claims	<u>1-8, 11-17, 20-26</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item IV

Lack of unity of invention

- 1 This Authority considers that there are 2 inventions covered by the claims indicated as follows:

I: Claims 1-8, 11-17 and 20-26 directed to an electronic device comprising an oscillator, a timing circuit configured to generate a count value based on the oscillator signal and to generate a first wakeup signal, a battery pass circuit configured to couple a power source to a main device in response to the first wakeup signal, a state sequencing circuit configured to store a state of the main device and an interface circuit configured to communicate the stored state to the main device wherein the interface circuit is configured to receive the value to configure the wakeup timer.

II: Claims 9, 10, 18, 19, 27 and 28 directed to an electronic device comprising an oscillator, a timing circuit configured to generate a count value based on the oscillator signal and to generate a first wakeup signal, a battery pass circuit configured to couple a power source to a main device in response to the first wakeup signal, a state sequencing circuit configured to store a state of the main device and an interface circuit configured to communicate the stored state to the main device wherein in a plurality of states the main device is configured to periodically check contact sensors and to collect sensor data.

- 2 The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

- 2.1 The prior art has been identified as document WO 2010/056118 A1 and discloses:

An electronic device: figure 1

comprising

a) an oscillator configured to generate an oscillator signal: figure 1, units 3 and 4; page 6, line 26; claims 8 and 9.

b) a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event: figure 1, programmable timers unit 5; claims 8 and 9; page 7, line 30 to page 8, line 1. The programmable

timers generate a wake-up signal by comparing the value of the timer with a programmed time. The wakeup timer comprises a counter to count-down cycles for temporarily switching on power supply to the external units.

c) a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device: figure 1, voltage regulator unit 6. The voltage regulator is a switch which can be shut-off to shut down system parts. The wakeup timer unit triggers a signal at the end of a count-down cycle for temporarily switching on power supply to the external units.

d) a state sequencing circuit configured to store a state of the main device: figure 1, serial interface 8; page 8, lines 20 to 22; claim 11. The serial interface can be used to read and write data to the power management controller.

e) an interface circuit configured to communicate the stored state to the main device: figure 1, serial interface 8; page 8, lines 20 to 22; claim 11. The serial interface can be used to read and write data to the power management controller.

3 It follows that the following technical features of the claims make a contribution over the prior art and can be considered as special technical features within the meaning of Rule 13.2 PCT:

I: Claims 1-8, 11-17 and 20-26: the interface circuit is configured to receive the value to configure the wakeup timer.

II: Claims 9, 10, 18, 19, 27 and 28: in a plurality of states the main device is configured to periodically check contact sensors and to collect sensor data.

4 The technical effects/problems solved by these special technical features can therefore be construed as:

I: Claims 1-5 and 14-17: modify the circuit of D1 to provide an improved customization of the power parameters to the external main circuit.

II: Claims 6-13: modify the system of D1 to provide a reduction of power consumption for contact-based sensor systems.

- 4.1 The technical effects are neither the same, nor corresponding. Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.
- 5 In conclusion, the groups of claims are not linked by common or corresponding special technical features and define 2 different inventions not linked by a single general inventive concept.
- 5.1 The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

FIRST INVENTION (claims 1-8, 11-17 and 20-26)

- 6 Reference is made to the following documents:
- | | |
|----|--|
| D1 | WO 2010/056118 A1 (ANAGEAR B V [NL]; KAMP PETRUS JOHANNES MARIA [NL]) 20 May 2010 (2010-05-20) |
| D2 | US 2009/144578 A1 (TATSUMI MASAHIRO [JP]) 4 June 2009 (2009-06-04) |
| D3 | US 5 167 024 A (SMITH R STEVEN [US] ET AL) 24 November 1992 (1992-11-24) |
| D4 | US 2008/282100 A1 (CHEN WEI-JEN [TW] ET AL) 13 November 2008 (2008-11-13) |
| D5 | US 2008/065920 A1 (SUGINAKA YUKARI [JP] ET AL) 13 March 2008 (2008-03-13) |
- 7 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claim 1 is not new. Document D1 discloses all features of claim 1 as explained under point 2.1 above.
- 7.1 The same objection applies against the other independent claims 11 and 20, whose subject-matter corresponds in terms of a method and an apparatus to the subject-matter of claim 1.

8 Dependent claims 2 to 8, 12 to 17 and 21 to 26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step.

Claims 2, 12, 21: the feature of receiving the compare value to configure the wakeup timer from the (main) external device provides the technical of an improved customization of the power management controller to the needs of the external device (e.g. enhanced programmability). Confronted with this problem, the skilled person would search in the technical area of power management controllers for enhancements of customization to the external devices (mostly CPUs and microprocessors). Thereby, the skilled person would find document D2, which deals with this problem (see [0056] of D2). As a solution, D2 proposes the use of a data interface for the CPU to specify the value used to configure the wakeup timer. This hint would motivate the skilled person to modify the circuit of D1 to allow for the configuration value of the wakeup timer to be specified by the main device through the serial data interface. Thereby, the skilled person would arrive at the subject-matter of claim 2 without exercising any inventive skills.

Claims 3, 13 and 22: providing a sleep signal at the power management circuit to allow the external device to request a shutdown is a conventional measure in the art, see for example column 7, lines 42 to 54 of D3 and [0028] of D4.

Claims 4, 14 and 23: the implicit use of the wakeup time specified in claims 2, 12 and 21 is to generate a wakeup signal (using the counter of the wakeup timer) to provide power to the main device.

Claim 5, 15 and 24: see page 7, line 33 and claims 6 and 7 of D1. The oscillator signal drives a clock which is used to carry out the count-down of the wakeup timer.

Claims 6, 7, 16 and 25: providing the clock signal (or the oscillator signal, both are equivalent) to the external circuit through a controlled switch is a conventional measure in the art. For example, the clock control unit 27 of figure 1 of D3 is a controlled clock switch (see also figure 2 of D3). The CPU of D3 provides the control signal to control the switch of figure 2.

Claims 8, 17 and 26: in order to improve the wakeup time, document D5 proposes to sequentially store state data of the external device (internal CPU state and settings) shortly before shutdown (which implies updating this data in the power management controller) to then retrieve this data during power up. See [0005], [0023] and [0038] of D5. This sequential storing of data allows the CPU 1 to determine its state before going to sleep in an efficient manner.

Electronic Acknowledgement Receipt

EFS ID:	24461476
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	15763
Filer:	Benjamin Bainbridge Matthew/Isobel Morada
Filer Authorized By:	Benjamin Bainbridge Matthew
Attorney Docket Number:	32716-00519/143971
Receipt Date:	28-DEC-2015
Filing Date:	13-JAN-2015
Time Stamp:	16:51:51
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	Information Disclosure Statement (IDS) Form (SB08)	143971_IDS.PDF	1075522 bb5cbb3036397ccf7fa3acced0154fcd5b69700a	no	4

Warnings:

Information:

2	Foreign Reference	143971_Foreign_Ref_WO2010 056118A1.PDF	682500 31e084cec1318b40bae4401f4f595c80662a 84fe	no	16
Warnings:					
Information:					
3	Non Patent Literature	143971_NPL_2015_09_01_WO _ISR.PDF	1589101 25c84d997a75b7e4962a36883cab1106285 6964d	no	15
Warnings:					
Information:					
Total Files Size (in bytes):			3347123		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

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 TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with the Customer Number:

112246

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name Registration	Number	Name Registration	Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:



The address associated with Customer Number:

112246

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address:

QUALCOMM Incorporated
 5775 Morehouse Drive
 San Diego, California 92121-1714

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	7 May 2013
Name	Raymond B. Horn	Telephone	858-587-1121
Title	VP, Patent Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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.

Electronic Acknowledgement Receipt

EFS ID:	25413001
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	15763
Filer:	Eugene R. Worley/Michalene Winkelspecht
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	32716-00519/143971
Receipt Date:	06-APR-2016
Filing Date:	13-JAN-2015
Time Stamp:	13:25:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	143971_3_73_Statement.pdf	118083 336521e74f2e843aa0df4d2c794674a44a1db81e	no	3

Warnings:

Information:

2	Power of Attorney	143971_POA.pdf	300182 aa707238b8d005b54beb3fd07d236256e2 b66548	no	1
Warnings:					
Information:					
Total Files Size (in bytes):				418265	
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

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.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: Robert Bruce Ganton et al.Application No./Patent No.: 14/596,087 Filed/Issue Date: January 13, 2015Titled: ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONSQUALCOMM Incorporated, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 034901, Frame 0093, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:
1. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). 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 1.11 and 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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
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5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
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6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Eugene Worley/

Signature

Eugene Worley

Printed or Typed Name

April 6, 2016

Date

47186

Title or Registration 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/596,087	01/13/2015	Robert Bruce Ganton	32716-00519/143971

112246
Loza & Loza, LLP/Qualcomm
305 N. Second Ave., #127
Upland, CA 91786

CONFIRMATION NO. 6012
POA ACCEPTANCE LETTER



Date Mailed: 04/18/2016

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/06/2016.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mnguyen/



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/596,087	01/13/2015	Robert Bruce Ganton	32716-00519/143971

CONFIRMATION NO. 6012

POWER OF ATTORNEY NOTICE



OC000000082237680

15763
Novak Druce c/o QUALCOMM Incorporated
Novak Druce Connolly Bove + Quigg LLP (LA Office)
1875 Eye Street, N.W.
Suite 1100
Washington, DC 20006

Date Mailed: 04/18/2016

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/06/2016.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mnguyen/



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/596,087	01/13/2015	Robert Bruce Ganton	QCOM-3146US (143971)	6012
112246	7590	08/12/2016	EXAMINER	
Loza & Loza, LLP/Qualcomm			SAMPATH, GAYATHRI	
305 N. Second Ave., #127			ART UNIT	PAPER NUMBER
Upland, CA 91786			2118	
			NOTIFICATION DATE	DELIVERY MODE
			08/12/2016	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):

ocpat_uspto@qualcomm.com
qualcomm-pto@lozaip.com

Office Action Summary	Application No. 14/596,087	Applicant(s) GANTON ET AL.	
	Examiner GAYATHRI SAMPATH	Art Unit 2118	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 01/13/2015.
☐ 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) 1-28 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) 1-28 is/are rejected.
- 8) ☐ Claim(s) _____ 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 01/13/2015 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)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date 12/28/2015, 01/13/2015
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 4) ☐ Other: _____

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

Claims 1-28 are presented for examination.

DETAILED ACTION

Claims 9, 18 and 27 objected to because of the following informalities:

Regarding claims 9, 18 and 27, line 2 a contract sensor should be ----“a contact sensor”----.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **1-9, 11-18 and 20-27** are rejected under 35 U.S.C. 103 as being unpatentable over Kamp (U.S Patent Application Publication 2011/0264936; *Reference cited by applicant*) in view of Cooper et al. (U.S Patent Application Publication 2003/0120960).

Regarding claim 1, **Kamp** discloses, an electronic device comprising:

an oscillator configured to generate an oscillator signal [0026; Fig.1 Units 3 and 4; claims 7 and 8];

a timing circuit [Fig.1 Unit 5] configured to generate a count value based on the oscillator signal [0011, 0012], to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value and to generate a first wakeup signal in response to the first expiry event

[“Programmable timers 5 are used to wake-up system parts at a pre-programmed time.

The timers are controlled based on the clock signal provided by the clock unit 2. A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the system units, such as to enable the system to be activated if required. ...”, 0029; (*i.e. the programmable timer compares the value of the timer with a programmed time and at the end of count down cycle a trigger signal is generated to power the system units*)];

a battery pass circuit [“power supply voltage regulator or power supply control unit 1”, Fig.1;0024, 0025]configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the

Art Unit: 2118

main device [“A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the system units, such as to enable the system to be activated if required.” 0029];

an interface circuit configured to communicate the stored state to the main device [“Serial digital interface...” 0033].

However Kamp does not expressly disclose a state sequencing circuit configured to store a state of the main device and communicate the stored state to the main device.

In the same field of endeavor (e.g. controlling the power state of a processor with respect to a time loaded with a value based on the processor state), Cooper teaches,

a state sequencing circuit configured to store a state of the main device [“...the throttling state 220 implements a data structure similar to the description table (e.g., the FADT) and the associated registers which the ACPI OS 230 would have accessed in a normal power management scheme. This data structure may include throttling parameters such as the duty cycle of the processor state, and the processor state to be transitioned to...” 0029; Fig.2; *(i.e. the power state of the host processor or device is stored and based on which the timer is reloaded)*] and

communicate the stored state to the main device[“...The throttling emulator 145, when executed, causes the processor 110 to perform a number of tasks or operations ...”, 0022; 0029; 0038; *(i.e. . the throttling state of the throttling emulator communicates the stored state to transition the processor to low power or operational state)*].

It would have been obvious to one of ordinary skill in the art at the time of filing to combine the teachings of Kamp with Cooper. Cooper's teaching of controlling the timer based on the power state of the processor will substantially improve Kamp's system to set the programmable timer and control the power control unit accordingly.

Regarding claim 2, Kamp discloses the interface circuit [0033]

Cooper teaches, configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit[0013,0032; (i.e. the timer values corresponding to the power state (low power or operational state is loaded)].

Regarding claim 3, Kamp discloses the interface circuit is configured receive a sleep signal from the main device [...indication signal..." 0029, "... means for acknowledging an active or passive state of the system may be integrated in the power supply control unit of the integrated circuit. In particular, the power supply control unit may be able to detect the active or passive state of the system based on voltage difference, amount of current being drawn, or the temperature of the system units being monitored", 0008-0009, 0033], instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device [0025, 0029].

Regarding claim 4 , Kamp discloses, after the main device is powered off [0022, 0025] to generate a second wakeup signal in response to the second expiry event, wherein the battery pass circuit powers the main device back on in response to the second wakeup signal[0011, 0015,"... periodically powering...", 0019]

Cooper teaches, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value[“...a first value and a second value ..”, 0013; 0031; 0043]

Regarding claim 5, Kamp discloses, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value [0029-0030].

Regarding claim 6, Kamp discloses the oscillator [0026; Fig.1 Units 3 and 4; claims 7 and 8]

Cooper teaches a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device [“Enable selector 245”, Fig.2 “... the SMI handler 210 interfaces to the SMI timer 240 to enable/disable the SMI timer 240 to enable/disable the throttling emulation. If the throttling emulation is enabled, the SMI handler 210 initializes the SMI timer 240 by loading the initial value to the SMI timer 240”, 0028; 0031, 0038].

Regarding claim 7, Kamp discloses the interface circuit [0033].

Cooper teaches the switch is configured to receive the control signal [0031, 0038]

Regarding claim 8, Kamp discloses interface circuit is configured to sequentially receive a plurality of state update signals from the main device [0008-0009, 0029]

Cooper teaches, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequence circuit in response to each of the state update signals [0041].

Regarding claim 9, Kamp discloses, in a first one of the plurality of states, the main device is configured to periodically check a contract sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors [0008]

It is apparent that a person skilled in the art to employ a sensor to detect the presence of a patient as Kamp discloses other type of sensor units may be used depending on the type of application [0008].

Regarding claims 11-18, Kamp and Cooper together teaches an electronic device as outlined in claims 1-9. Therefore they together teach the method steps implemented in the device.

Regarding claims 20-27, Kamp and Cooper together teaches an electronic device as outlined in claims 1-6 and 8-9. Therefore they together teach an apparatus implementing the electronic device.

Claims **10, 19 and 28** are rejected under 35 U.S.C. 103 as being unpatentable over Kamp (U.S Patent Application Publication 2011/0264936; *Reference cited by applicant*) in view of Cooper et al. (U.S Patent Application Publication 2003/0120960) as

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applied to claims 9, 18 and 27 further in view of Ginggen et al. (U.S Patent Application Publication 2006/0271797; hereinafter “Ginggen”)

Regarding claims 10, 19 and 28 Kamp discloses, the sensor data [0008].

However Kamp does not expressly disclose in the second one of the plurality of states, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

In the same field of endeavor (e.g. managing the power state of an high power processor and maintaining a power off state until it receives a power enabling signal from a low power processor), Ginggen teaches,

in the second one of the plurality of states [0023], the main device is configured to periodically transmit the sensor data wirelessly to an external device [0022].

It would have been obvious to one of ordinary skill in the art at the time of filing to combine the teachings of Kamp with Ginggen. Ginggen’s teaching of employing multiple processors at least one of which is always powered on while one or more other processors remain powered down only to be energized in response to a request to perform a particular operation, task or function will substantially improve Kamp’s system to conserve power.

Conclusion

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

Art Unit: 2118

- Kato et al., U.S Patent Application Publication 2011/0183727, teaches a mobile communication terminal with a first control unit, second control unit, a timer unit for generating an interrupt signal. The first control unit sets a timer value in the timer unit based on the information received from the second control unit and wakes up the second control unit when the interrupt signal is generated by the timer unit.
- Bibikar et al., U.S Patent Application Publication 2008/0072087, teaches an indication that a power supply is ramped up to a threshold level is received

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GAYATHRI SAMPATH whose telephone number is (571)272-5489. The examiner can normally be reached on Monday- Friday 7:30AM-4:00PMEST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jaweed Abbaszadeh can be reached on 571-270-1640. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2118

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.

/GAYATHRI SAMPATH/

Examiner, Art Unit 2118

/MOHAMMED REHMAN/

Primary Examiner, Art Unit 2118

Notice of References Cited	Application/Control No. 14/596,087		Applicant(s)/Patent Under Reexamination GANTON ET AL.	
	Examiner GAYATHRI SAMPATH		Art Unit 2118	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2003/0120960 A1	06-2003	Cooper, Barnes	G06F1/3203	713/320
*	B	US-2006/0271797 A1	11-2006	Ginggen; Alec	G06F1/3203	713/300
*	C	US-2008/0072087 A1	03-2008	Bibikar; Vasudev J.	G06F1/26	713/323
*	D	US-2011/0183727 A1	07-2011	KATO; Masataka	H04W52/0293	455/574
*	E	US-2011/0264936 A1	10-2011	Kamp; Petrus Johannes Maria	G06F1/3203	713/323
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*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.

Doc code: IDS

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2016. OMB 0651-0031

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	14596087
Filing Date	2015-01-13
First Named Inventor	GANTON; Robert Bruce
Art Unit	2115
Examiner Name	LEE, THOMAS C
Attorney Docket Number	32716-00519/143971

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	5167024		1992-11-24	SMITH; R. Steven et al.	
If you wish to add additional U.S. Patent citation information please click the Add button.						Add

U.S.PATENT APPLICATION PUBLICATIONS						Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20080065920		2008-03-13	SUGINAKA; Yukari et al.	
	2	20080282100		2008-11-13	CHEN; Wei-Jen et al.	
	3	20090144578		2009-06-04	TATSUMI; Masahiro	
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FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	2010056118	WO	A1	2010-05-20	ANAGEAR B V [NL], et al.		

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Attorney Docket Number	32716-00519/143971

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	INTERNATIONAL SEARCH REPORT AND WRITTEN OPINION – PCT/US2015/021325 – ISA/EPO – 2015-09-01 (143971WO).	

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Examiner Signature	/GAYATHRI SAMPATH/	Date Considered	08/02/2016
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	14596087
Filing Date	2015-01-13
First Named Inventor	GANTON; Robert Bruce
Art Unit	2115
Examiner Name	LEE, THOMAS C
Attorney Docket Number	32716-00519/143971

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Benjamin B. Matthew/	Date (YYYY-MM-DD)	2015-12-28
Name/Print	Benjamin B. Matthew	Registration Number	62430

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

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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.



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 P.O. Box 1450
 Alexandria, Virginia 22313-1450
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BIB DATA SHEET

CONFIRMATION NO. 6012

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/596,087	01/13/2015	713	2118	QCOM-3146US (143971)		
APPLICANTS QUALCOMM, Incorporated, San Diego, CA; INVENTORS Robert Bruce Ganton, San Diego, CA; Robert Scott Ballam, Eatons Hill, AUSTRALIA; ** CONTINUING DATA ***** This appln claims benefit of 61/992,039 05/12/2014 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/26/2015						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /GAYATHRI SAMPATH/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 6	TOTAL CLAIMS 28	INDEPENDENT CLAIMS 3
ADDRESS Loza & Loza, LLP/Qualcomm 305 N. Second Ave., #127 Upland, CA 91786 UNITED STATES						
TITLE ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS						
FILING FEE RECEIVED 2380	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		

<i>Index of Claims</i> 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

✓	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	08/03/2016							
	1	✓							
	2	✓							
	3	✓							
	4	✓							
	5	✓							
	6	✓							
	7	✓							
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	23	✓							
	24	✓							
	25	✓							
	26	✓							
	27	✓							
	28	✓							

Doc code: IDS

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. OMB 0651-0031

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2015-01-13
	First Named Inventor	GANTON, Robert Bruce	
	Art Unit	N/A	
	Examiner Name	N/A	
	Attorney Docket Number	32716-00519/143971	

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6996732		2006-02-07	KOTLOW; Daniel B. et al.	
	2	7844265		2010-11-30	KUCHIBHOTLA; Ravi et al.	
	3	8311594		2012-11-13	ISLAM; Khaledul M. et al.	
	4	8779729		2014-07-15	SHIRAISHI; Takeyuki	

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U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040180702		2004-09-16	HUGHES; Brent	

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Filing Date		2015-01-13	
First Named Inventor	GANTON, Robert Bruce		
Art Unit	N/A		
Examiner Name	N/A		
Attorney Docket Number	32716-00519/143971		

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	1		☐

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Examiner Signature	/GAYATHRI SAMPATH/	Date Considered	08/02/2016
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number			
Filing Date		2015-01-13	
First Named Inventor	GANTON, Robert Bruce		
Art Unit	N/A		
Examiner Name	N/A		
Attorney Docket Number	32716-00519/143971		

CERTIFICATION STATEMENT

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

Signature	/Eugene R. Worley/	Date (YYYY-MM-DD)	2015-01-13
Name/Print	Eugene R. Worley	Registration Number	47,186

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("20110183727").PN.	US-PGPUB; USPAT	OR	OFF	2016/08/03 11:22
S1	38	Robert near Ganton.in.	US-PGPUB; USPAT	OR	ON	2016/07/27 11:59
S2	9	Robert near ballam.in.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:00
S3	2184	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:53
S4	1952	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:53
S5	2840	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:53
S6	387	(connect\$3 or disconnect\$3) near5 power near3 (processor or cpu) with (timer or count\$3)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:00
S7	2	(connect\$3 or disconnect\$3) near5 power near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:02
S8	2	(connect\$3 or disconnect\$3) near5 (power or battery) near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:04
S9	36	(wak\$3 or wakeup or 'wake-up') near3 (processor or cpu) same (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:05
S10	159	(wak\$3 or wakeup or 'wake-up') near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:08
S11	24	("7844265" "8311594" "20080065920" "20080282100" "5167024" "6996732" "8779729" "20090144578" "20040180702").PN.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:21
S12	15	("20070019770" "20090168943" "20090296531" "6728234" "6885254" "20050270108" "20090322400").PN.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:23
S15	3	wo-2010015611-\$.did.	US-PGPUB;	OR	OFF	2016/07/27

			USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			15:32
S16	3	wo-2010056118-\$.did.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:33
S17	1	("20110264936").PN.	US-PGPUB; USPAT	OR	OFF	2016/07/27 15:34
S18	1	(14/596087).APP.	US-PGPUB; USPAT	OR	OFF	2016/07/27 15:45
S19	2	(activat\$3 or enabl\$3 or connect\$3) near5 (power or battery) near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:57
S20	9	(activat\$3 or enabl\$3 or connect\$3) near5 (power or battery) near3 (processor or cpu) same (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:58
S21	24	(activat\$3 or enabl\$3 or connect\$3) near5 (power or battery) near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:59
S22	60	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near5 (power or battery) near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:02
S23	334	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:12
S24	2184	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 16:12
S25	7	S23 and S24	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:12
S26	1952	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 16:14
S28	2840	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 16:14
S29	4	S23 and S28	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:14
S30	499	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near5 (power or battery) with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:17

S31	6	S30 and S24	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:20
S32	3	S30 and S26	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:22
S33	2	S30 and S28	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:22
S34	6	("2009/0144578").URPN.	USPAT	OR	ON	2016/07/28 16:25
S35	1	("20060075267").PN.	US-PGPUB; USPAT	OR	OFF	2016/07/28 17:05
S36	787	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:52
S37	334	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:52
S38	0	S37 same (updat\$3 or chang\$3) near5 (count\$3 or timer) near5 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:54
S39	16	(updat\$3 or chang\$3) near5 (count\$3 or timer) near5 expir\$5 with state near5 (processor or cpu)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:55
S40	18890	(stor\$3 or sav\$3) near5 (processor or cpu) near3 (state or status)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:03
S41	8	S40 with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:03
S42	1086	(determ\$5 or set\$4) near5 (timer or counter) with power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:06
S43	20	S36 and S42	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:07

S44	2	"14596087"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 14:35
S45	3	"20030120960"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 14:35
S46	3	"20110264936"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 14:36
S48	3	"20060271797"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 17:03

8/ 3/ 2016 11:45:37 AM
C:\ Users\ gsampath\ Documents\ EAST\ Workspaces\ 14596087.wsp

Search Notes 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

CPC- SEARCHED		
Symbol	Date	Examiner
G06F1/3206, G06F1/28,G06F1/3296	07/27/2016	Gayathri Sampath

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
G06F1/3206, G06F1/28,G06F1/3296 (See search history)	07/27/2016	Gayathri Sampath
Searched in EAST and search history attached with office action	07/27/2016	Gayathri Sampath

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

/GAYATHRI SAMPATH/ Examiner.Art Unit 2118	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	14596087
				Filing Date	01-13-2015
				First Named Inventor	GANTON; Robert Bruce
				Art Unit	2118
				Examiner Name	SAMPATH, GAYATHRI
Sheet	1	of	3	Attorney Docket Number	QCOM-3146US (143971)

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
	001	US-6442407	08-27-2002	BAUER; Harald et al.	
	002	US-20130179707	07-11-2013	OSUGA; Yoshiharu et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
		None				

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		None	

Examiner Signature		Date Considered	
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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND**
TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	14596087
				Filing Date	01-13-2015
				First Named Inventor	GANTON; Robert Bruce
				Art Unit	2118
				Examiner Name	SAMPATH, GAYATHRI
Sheet	2	of	3	Attorney Docket Number	QCOM-3146US (143971)

CERTIFICATION STATEMENT

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

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

OR

- ☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).
- ☐ See attached certification statement.
- ☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☐ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Eugene Worley/	Date (YYYY-MM-DD)	2016-09-08
Name/Print	Eugene Worley	Registration Number	47186

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

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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.
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Electronic Acknowledgement Receipt

EFS ID:	26869578
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	112246
Filer:	Eugene R. Worley/Michalene Winkelspecht
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	QCOM-3146US (143971)
Receipt Date:	08-SEP-2016
Filing Date:	13-JAN-2015
Time Stamp:	15:29:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	143971_IDS_07_Sep_2016_17_53_42.pdf	54194 52a2d84872ece181b69f3ae60ac1639ac0b130e4	no	3

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/596,087 Confirmation No. 6012
Applicants : Robert Bruce Ganton
Filed : January 13, 2015
Art Unit : 2118
Examiner : Gayathri Sampath
Docket No. : 143971

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION

Sir or Madam:

In response to the final Office Action dated August 12, 2016, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An electronic device comprising:
an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;
a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;
a state sequencing circuit configured to store a state of the main device; ~~and~~
an interface circuit configured to communicate the stored state to the main device; and
a register configured to track a number of times that the main device has been woken up in the stored state.
2. (Original) The electronic device of claim 1, wherein the interface circuit is configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit.
3. (Original) The electronic device of claim 2, wherein the interface circuit is configured to receive a sleep signal from the main device and to instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device.
4. (Original) The electronic device of claim 3, wherein, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value, and to generate a second wakeup signal in response to the second expiry event,

wherein the battery pass circuit powers the main device back on in response to the second wakeup signal.

5. (Original) The electronic device of claim 1, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value.

6. (Original) The electronic device of claim 1, further comprising a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device.

7. (Original) The electronic device of claim 6, wherein the switch is configured to receive the control signal via the interface circuit.

8. (Currently Amended) The electronic device of claim 1, wherein interface circuit is configured to sequentially receive a plurality of state update signals from the main device, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state ~~sequence~~ sequencing circuit in response to each of the state update signals.

9. (Currently Amended) ~~The electronic device of claim 8;~~ An electronic device comprising:

an oscillator configured to generate an oscillator signal;

a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;

a state sequencing circuit configured to store a state of the main device; and

an interface circuit configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main device, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequencing circuit in response to each of the state update signals;

wherein, in a first one of the plurality of states, the main device is configured to periodically check a ~~contact~~ contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors.

10. (Original) The electronic device of claim 9, wherein, in the second one of the plurality of states, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

11. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:
receiving an oscillator signal from an oscillator;
generating a count value based on the oscillator signal;
comparing the count value with a first compare value;
determining a first expiry event upon the count value matching the first compare value;
powering on a device in response to the first expiry event; ~~and~~
communicating a state stored in a state sequencing circuit to the device while the device is powered on; and
tracking a number of times that the main device has been woken up in the stored state.

12. (Original) The method of claim 11, further comprising receiving a second compare value for a next wakeup cycle from the device.

13. (Original) The method of claim 12, further comprising:
receiving a sleep signal from the device; and
powering off the device in the response to the sleep signal.

14. (Original) The method of claim 13, further comprising:
after the device is powered off, comparing the count value with the second compare value;
determining a second expiry event upon the count value matching the second compare value; and
powering the device back on in response to the second expiry event.

15. (Original) The method of claim 11, further comprising incrementing the count value at a rate based on a frequency of the oscillator.

16. (Original) The method of claim 11, further comprising:
receiving a control signal from the device; and
coupling the oscillator signal to the device in response to the control signal.

17. (Currently Amended) The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and
updating the state stored in the state ~~sequence~~ sequencing circuit in response to each of the state update signals.

18. (Currently Amended) ~~The method of claim 17,~~ A method for extending battery life in a mobile application, the method comprising:
receiving an oscillator signal from an oscillator;
generating a count value based on the oscillator signal;
comparing the count value with a first compare value;
determining a first expiry event upon the count value matching the first compare value;
powering on a device in response to the first expiry event;
communicating a state stored in a state sequencing circuit to the device while the device is powered on;
sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and

updating the state stored in the state sequencing circuit in response to each of the state update signals;

wherein, in a first one of the plurality of states, the device periodically checks a ~~contact~~ contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors.

19. (Original) The method of claim 18, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

20. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:

means for receiving an oscillator signal from an oscillator;
means for generating a count value based on the oscillator signal;
means for comparing the count value with a first compare value;
means for determining a first expiry event upon the count value matching the first compare value;
means for powering on a device in response to the first expiry event; ~~and~~
means for communicating a state stored in a state sequencing circuit to the device while the device is powered on; and
means for tracking a number of times that the main device has been woken up in the stored state.

21. (Original) The apparatus of claim 20, further comprising means for receiving a second compare value for a next wakeup cycle from the device.

22. (Original) The apparatus of claim 21, further comprising:
means for receiving a sleep signal from the device; and
means for powering off the device in the response to the sleep signal.

23. (Original) The apparatus of claim 22, further comprising

means for comparing the count value with the second compare value after the device is powered off;

means for determining a second expiry event upon the count value matching the second compare value; and

means for powering the device back on in response to the second expiry event.

24. (Original) The apparatus of claim 20, further comprising means for incrementing the count value at a rate based on a frequency of the oscillator.

25. (Original) The apparatus of claim 20, further comprising:

means for receiving a control signal from the device; and

means for coupling the oscillator signal to the device in response to the control signal.

26. (Currently Amended) The apparatus of claim 20, further comprising:

means for sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and

means for updating the state stored in the state ~~sequence~~ sequencing circuit in response to each of the state update signals.

27. (Currently Amended) ~~The apparatus of claim 26,~~ An apparatus for extending battery life in a mobile application, the apparatus comprising:

means for receiving an oscillator signal from an oscillator;

means for generating a count value based on the oscillator signal;

means for comparing the count value with a first compare value;

means for determining a first expiry event upon the count value matching the first compare value;

means for powering on a device in response to the first expiry event;

means for communicating a state stored in a state sequencing circuit to the device while the device is powered on;

means for sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and

means for updating the state stored in the state sequencing circuit in response to each of the state update signals;

wherein, in a first one of the plurality of states, the device periodically checks a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors.

28. (Original) The apparatus of claim 27, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

29. (New) The electronic device of claim 1, wherein the state sequencing circuit is configured to change the stored state of the main device when the number of times that the main device has been woken up in the stored state reaches a predetermined number.

30. (New) The electronic device of claim 1, further comprising a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state.

31. (New) The electronic device of claim 9, wherein the one or more sensors comprises at least one of a pulse oximeter, a blood pressure sensor, or a blood sugar sensor.

32. (New) The electronic device of claim 9, wherein the one or more sensors comprises a temperature sensor configured to measure a temperature of the patient.

REMARKS/ARGUMENTS

Claims 1, 8, 9, 11, 17, 18, 20, 26 and 27 have been amended herein, and new claims 29-32 have been added herein. Claims 1-32 are pending in the application, with claims 1, 9, 11, 18, 20 and 27 being the independent claims. Applicants believe that the present application is in condition for allowance, for which prompt and favorable action is respectfully requested.

Support for the claim amendments can be found throughout the originally-filed application, including, for example, in paragraphs [0075], [0087]-[0089] and [0097]-[0103]. No new matter has been added.

Claim Objections

Claims 9, 18 and 27 were objected to because of informalities.

Claims 9, 18 and 27 have been amended to adopt the correction indicated in the Office Action. Accordingly, Applicants respectfully request that the objections to the claims be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1-9, 11-18 and 20-27 are rejected under 35 U.S.C. § 103 as being unpatentable over U.S. 2011/0264936 (“Kamp”) in view of U.S. 2003/0120960 (“Cooper”). Claims 10, 19 and 28 are rejected under 35 U.S.C. § 103 as being unpatentable over Kamp in view of Cooper, and in further view of U.S. 2006/0271797 (“Ginggen”). Reconsideration and withdrawal of these rejections are respectfully requested.

Independent Claims 1, 11 and 20

While not conceding the correctness of the rejection, and in an effort to expedite prosecution of the present application, claim 1 has been amended to further distinguish claim 1 from the cited references. Claim 1, as amended, recites *inter alia*:

an oscillator configured to generate an oscillator signal;

a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;

a state sequencing circuit configured to store a state of the main device;

an interface circuit configured to communicate the stored state to the main device; and

a register configured to track a number of times that the main device has been woken up in the stored state.

Applicants submit that claim 1 is allowable over the cited references because none of references, taken individually or in combination, teaches or suggests at least the above highlighted features of claim 1.

Kamp discloses a power supply management controller 9 including a clock unit 2, and programmable timers 5. *See* paragraph [0024], and Figure 1 of Kamp. The programmable timers 5 “are controlled based on the clock signal provided by the clock unit 2” and “are used to wake-up system parts at a pre-determined programmed time.” *See* paragraph [0029] of Kamp.

However, Kamp fails to teach or suggest at least the features of “*a register configured to track a number of times that the main device has been woken up in the stored state,*” as recited in claim 1.

The Office Action appears to contend that the system parts of Kamp correspond to the main device recited in claim 1. However, even assuming, *arguendo*, this were correct, Kamp would still fail to teach or suggest that above features of claim 1. This is because Kamp does not teach or suggest a register configured to track a number of times that the system parts of Kamp have been woken up in a stored state.

Applicants submit that Kamp and Ginggen also fail to teach or suggest the above features of claim 1, and therefore fail to remedy the deficiencies of Kamp.

For at least the reasons given above, Applicants respectfully submit that claim 1 is allowable, and respectfully request that the rejection of claim 1 be withdrawn.

Each of independent claims 11 and 20 recites features similar to the above features of claim 1, and is therefore allowable for at least the reasons given above for claim 1.

Independent Claims 9, 18 and 27

Claim 9 recites *inter alia*:

an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;
a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;
a state sequencing circuit configured to store a state of the main device;
an interface circuit configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main device, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequencing circuit in response to each of the state update signals;
wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors.

Applicants submit that independent claim 9 is allowable over the cited references because none of references, taken individually or in combination, teaches or suggests at least the above highlighted features of claim 9.

Kamp discloses a power management supply controller for managing power of a system. *See* paragraph [0004] of Kamp. The power management supply controller includes a control unit and a means for acknowledging an active state or a passive state of the system. *Id.* The control unit ceases powering system units of the system when the means for acknowledging detects the passive state of the system, and maintains power to the system units when the means for acknowledging detects the active state of the system. *Id.* Kamp also discloses detecting the active or passive state of the system using sensors such as a voltage level sensor, a current sensor or a temperature sensor. *See* paragraph [0008] of Kamp.

However, Kamp fails to teach or suggest at least the features “*wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to*

detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors,” as recited in claim 9.

The Office Action contends that Kamp discloses the above features in paragraph [0008] of Kamp. *See* page 7 of the Office Action. Applicants respectfully disagree. Nowhere in paragraph [0008] or anywhere else does Kamp teach or suggest a contact sensor for detecting the presence of a patient, let alone teach or suggest the above features of claim 9.

The Office Action also contends “[i]t is apparent that a person skilled in the art to employ a sensor to detect the presence of a patient as Kamp discloses other types of sensor units may be used depending on the type of application [0008].” Applicants respectfully disagree. Paragraph [0008] of Kamp relates to types of sensors used for detecting whether the system of Kamp is in the active state or the passive state. This is unrelated to detecting the presence of a patient. As such, it would not have occurred to one skilled in the art to employ a contact sensor for detecting the presence of a patient in the system of Kamp, let alone in a manner resulting in the above features of claim 9.

Applicants submit that Cooper and Ginggen also fail to teach or suggest the above features of claim 9, and therefore fail to remedy the deficiencies of Kamp.

For at least the reasons given above, Applicants respectfully submit that independent claim 9 is allowable, and respectfully request that the rejection of claim 9 be withdrawn.

Each of independent claims 18 and 27 recites features similar to the above features of claim 9, and is therefore allowable for at least the reasons given above for claim 9.

Remaining Rejected Claims

Each of the remaining rejected claims depends from one of the independent claims discussed above and is therefore deemed to be allowable for at least the same reasons given for the respective independent claim.

New Claim

Each of new claims 29 and 30 depends from claim 1, and is therefore allowable for at least the reasons given above for claim 1.

Each of new claims 31 and 32 depends from claim 9, and is therefore allowable for at least the reasons given above for claim 9.

Disclaimer

Applicants may not have presented all possible arguments or have refuted the characterizations of either the claims or the prior art as found in the Office Action. However, the lack of such arguments or refutations is not intended to act as a waiver of such arguments or as concurrence with such characterizations.

CONCLUSION

Applicants submit that the application is in condition for allowance, for which early action is requested. In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 50-5240.

Respectfully submitted,

Dated: October 26, 2016

By: /Eugene R. Worley/
Eugene R. Worley
Reg. No. 47,186

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Electronic Patent Application Fee Transmittal

Application Number:	14596087			
Filing Date:	13-Jan-2015			
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS			
First Named Inventor/Applicant Name:	Robert Bruce Ganton			
Filer:	Eugene R. Worley/Michalene Winkelspecht			
Attorney Docket Number:	QCOM-3146US (143971)			
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:				
CLAIMS IN EXCESS OF 20	1202	4	80	320
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	3	420	1260
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1580

Electronic Acknowledgement Receipt

EFS ID:	27330627
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	112246
Filer:	Eugene R. Worley/Michalene Winkelspecht
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	QCOM-3146US (143971)
Receipt Date:	26-OCT-2016
Filing Date:	13-JAN-2015
Time Stamp:	16:02:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1580
RAM confirmation Number	102716INTEFSW16030900
Deposit Account	
Authorized User	

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

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	143971_Response_to_Office_Action.pdf	73558	no	13
			b0cfae2b2f43e35d6d508e646f17eac9d0f328be		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32670	no	2
			6f924981512fba641f27bbf1fe251c1c8e5d98a		
Warnings:					
Information:					
Total Files Size (in bytes):			106228		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/596,087	Filing Date 01/13/2015	☐ To be Mailed
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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), (i), 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	10/26/2016	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 32	Minus	** 28	= 4	X \$80 =	320
	Independent (37 CFR 1.16(h))	* 3	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	320

(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.

LIE
JAMES TUNSTALL

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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/596,087	01/13/2015	Robert Bruce Ganton	QCOM-3146US (143971)	6012
112246	7590	02/08/2017	EXAMINER	
Loza & Loza, LLP/Qualcomm			SAMPATH, GAYATHRI	
305 N. Second Ave., #127			ART UNIT	PAPER NUMBER
Upland, CA 91786			2118	
			NOTIFICATION DATE	DELIVERY MODE
			02/08/2017	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):

ocpat_uspto@qualcomm.com
qualcomm-pto@lozaip.com

Office Action Summary	Application No. 14/596,087	Applicant(s) GANTON ET AL.	
	Examiner GAYATHRI SAMPATH	Art Unit 2118	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 10/26/2016.
☐ 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) 1-32 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) 1-32 is/are rejected.
- 8) ☐ Claim(s) ____ 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 ____ 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)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date 09/08/2016
- 3) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date 20170202
- 4) ☐ Other: ____.

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

Claims 1-32 are presented for examination.

DETAILED ACTION

Claim 27 objected to because of the following informalities:

Regarding claim 27, line 2 a contract sensor should be ----“a contact sensor”----.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **9, 18, 27, 31 -32** are rejected under 35 U.S.C. 103 as being unpatentable over Kamp (U.S Patent Application Publication 2011/0264936; *Reference cited in*

Art Unit: 2118

previous office action) in view of Cooper et al. (U.S Patent Application Publication 2003/0120960; *Reference cited in previous office action*)

Regarding claims **9, 18 and 27**, an electronic device comprising:

an oscillator configured to generate an oscillator signal [0026; Fig.1 Units 3 and 4; claims 7 and 8];

a timing circuit [Fig.1 Unit 5] configured to generate a count value based on the oscillator signal [0011, 0012], to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value and to generate a first wakeup signal in response to the first expiry event

[“Programmable timers 5 are used to wake-up system parts at a pre-programmed time. The timers are controlled based on the clock signal provided by the clock unit 2. A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the system units, such as to enable the system to be activated if required. ...”, 0029; *(i.e. the programmable timer compares the value of the timer with a programmed time and at the end of count down cycle a trigger signal is generated to power the system units)*];

a battery pass circuit [“power supply voltage regulator or power supply control unit 1”, Fig.1;0024, 0025]configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device [“A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the system units, such as to enable the system to be activated if required.” 0029];

an interface circuit configured to communicate the stored state to the main device [“Serial digital interface...” 0033], to sequentially receive a plurality of state update signals from the main device [0008-0009, 0029],

wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors [0008]

It is obvious to a person skilled in the art to implement a contact sensor to detect the presence of a patient for a different application, as Kamp discloses other type of sensor units may be used depending on the type of application. Further Kamp discloses implementing micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor for acknowledging an active or passive system state [0008]. MEMS based sensors are well known in the art and used in variety of applications including patient monitoring i.e. detecting the presence of a patient upon touch or contact of the patient to measure blood pressure, temperature, blood glucose etc.

However Kamp does not expressly disclose a state sequencing circuit configured to store a state of the main device and communicate the stored state to the main device, and each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequence circuit in response to each of the state update signals.

In the same field of endeavor (e.g. controlling the power state of a processor with respect to a time loaded with a value based on the processor state), **Cooper** teaches,

a state sequencing circuit configured to store a state of the main device [“...the throttling state 220 implements a data structure similar to the description table (e.g., the FADT) and the associated registers which the ACPI OS 230 would have accessed in a normal power management scheme. This data structure may include throttling parameters such as the duty cycle of the processor state, and the processor state to be transitioned to...” 0029; Fig.2; *(i.e. the power state of the host processor or device is stored and based on which the timer is reloaded)*] and

communicate the stored state to the main device[“...The throttling emulator 145, when executed, causes the processor 110 to perform a number of tasks or operations ...”, 0022; 0029; 0038; *(i.e. . the throttling state of the throttling emulator communicates the stored state to transition the processor to low power or operational state)*].

each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequence circuit in response to each of the state update signals [0041].

It would have been obvious to one of ordinary skill in the art at the time of filing to combine the teachings of Kamp with Cooper. Cooper's teaching of controlling the timer based on the power state of the processor will substantially improve Kamp's system to set the programmable timer and control the power control unit accordingly.

Regarding claim 31, Kamp discloses, wherein the one or more sensors comprises at least one of a pulse oximeter, a blood pressure sensor, or a blood sugar sensor [0008].

It is obvious to a person skilled in the art to implement a contact sensor to detect the presence of a patient for a different application, as Kamp discloses other type of sensor units may be used depending on the type of application. Further Kamp discloses implementing micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor for acknowledging an active or passive system state [0008]. MEMS based sensors are well known in the art and used in variety of applications including patient monitoring i.e. detecting the presence of a patient upon touch or contact of the patient to measure blood pressure, temperature, blood glucose etc.

Regarding claim 32, Kamp discloses, wherein the one or more sensors comprises a temperature sensor configured to measure a temperature of the patient [0008].

It is obvious to a person skilled in the art to implement a contact sensor to detect the presence of a patient for a different application, as Kamp discloses other type of sensor units may be used depending on the type of application. Further Kamp discloses implementing micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor for acknowledging an active or passive system state [0008]. MEMS based sensors are well known in the art and used in variety of applications including patient monitoring i.e. detecting the presence of a patient upon touch or contact of the patient to measure blood pressure, temperature, blood glucose etc.

Claims **10, 19 and 28** are rejected under 35 U.S.C. 103 as being unpatentable over Kamp (U.S Patent Application Publication 2011/0264936; *Reference cited by applicant*) in view of Cooper et al. (U.S Patent Application Publication 2003/0120960) as applied to claims 9, 18 and 27 further in view of Ginggen et al. (U.S Patent Application Publication 2006/0271797; hereinafter “Ginggen”)

Regarding claims 10, 19 and 28 **Kamp** discloses, the sensor data [0008].

However Kamp and Cooper does not expressly disclose in the second one of the plurality of states, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

In the same field of endeavor (e.g. managing the power state of an high power processor and maintaining a power off state until it receives a power enabling signal from a low power processor), **Ginggen** teaches,

in the second one of the plurality of states [0023], the main device is configured to periodically transmit the sensor data wirelessly to an external device [0022].

It would have been obvious to one of ordinary skill in the art at the time of filing to combine the teachings of Kamp in view of Cooper with Ginggen. Ginggen’s teaching of employing multiple processors at least one of which is always powered on while one or more other processors remain powered down only to be energized in response to a request to perform a particular operation, task or function will substantially improve Kamp in view of Cooper’s system to conserve power.

Claims **1-8, 11-17, 20-26, 29 and 30** are rejected under 35 U.S.C. 103 as being unpatentable over Kamp (U.S Patent Application Publication 2011/0264936; *Reference cited in previous office action*) in view of Cooper et al. (U.S Patent Application Publication 2003/0120960; *Reference cited in previous office action*) further in view of Gauthier et al. (U.S Patent Application Publication 2011/0158303; hereinafter “Gauthier”).

Regarding claim 1, **Kamp** discloses, an electronic device comprising:

an oscillator configured to generate an oscillator signal [0026; Fig.1 Units 3 and 4; claims 7 and 8];

a timing circuit [Fig.1 Unit 5] configured to generate a count value based on the oscillator signal [0011, 0012], to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value and to generate a first wakeup signal in response to the first expiry event

[“Programmable timers 5 are used to wake-up system parts at a pre-programmed time. The timers are controlled based on the clock signal provided by the clock unit 2. A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the system units, such as to enable the system to be activated if required. ...”, 0029; (*i.e. the programmable timer compares the value of the timer with a programmed time and at the end of count down cycle a trigger signal is generated to power the system units*)];

a battery pass circuit [“power supply voltage regulator or power supply control unit 1”, Fig.1;0024, 0025]configured to receive the first wakeup signal, and to couple a

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power source to a main device in response to the first wakeup signal to power on the main device [“A wake-up timer unit causes providing a trigger signal to the power supply control unit at the end of a count-down cycle for temporarily powering the system units, such as to enable the system to be activated if required.” 0029];

an interface circuit configured to communicate the stored state to the main device [“Serial digital interface...” 0033].

However Kamp does not expressly disclose a state sequencing circuit configured to store a state of the main device and communicate the stored state to the main device, a register configured to track a number of times that the main device has been woken up in the stored state.

In the same field of endeavor (e.g. controlling the power state of a processor with respect to a time loaded with a value based on the processor state), **Cooper** teaches,

a state sequencing circuit configured to store a state of the main device [“...the throttling state 220 implements a data structure similar to the description table (e.g., the FADT) and the associated registers which the ACPI OS 230 would have accessed in a normal power management scheme. This data structure may include throttling parameters such as the duty cycle of the processor state, and the processor state to be transitioned to...” 0029; Fig.2; *(i.e. the power state of the host processor or device is stored and based on which the timer is reloaded)*] and

communicate the stored state to the main device[“...The throttling emulator 145, when executed, causes the processor 110 to perform a number of tasks or operations

...”, 0022; 0029; 0038; (*i.e. . the throttling state of the throttling emulator communicates the stored state to transition the processor to low power or operational state*)).

Stored state [0022; 0029; 0038]

It would have been obvious to one of ordinary skill in the art at the time of filing to combine the teachings of Kamp with Cooper. Cooper’s teaching of controlling the timer based on the power state of the processor will substantially improve Kamp’s system to set the programmable timer and control the power control unit accordingly.

However Cooper does not expressly teach a register configured to track a number of times that the main device has been woken up in the stored state.

In the same field of endeavor (e.g. reducing power consumption by indicating false wake-up signals), **Gauthier** teaches,

a register configured to track a number of times that the main device has been woken up in the stored state [0003; “...status register containing status entries for some or all of the counters corresponding to the different wake-up indications counted...”, 0032; “...If the number of wake-ups counted does not equal a verification threshold MAX, the wake-up sequence may end and the system may be switched back to OFF mode...”, 0053; 0021];

It would have been obvious to one of ordinary skill in the art at the time of filing to combine the teachings of Kamp in view of Cooper with Gauthier. Gauthier’s teaching of monitoring the false wake-up parameter will substantially improve Kamp in view of Cooper’s system to program the timer values for a valid wakeup condition.

Regarding claim 2, Kamp discloses the interface circuit [0033]

Cooper teaches, configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit[0013,0032; (i.e. the timer values corresponding to the power state (low power or operational state is loaded)].

Regarding claim 3, Kamp discloses the interface circuit is configured receive a sleep signal from the main device [...indication signal..." 0029, "... means for acknowledging an active or passive state of the system may be integrated in the power supply control unit of the integrated circuit. In particular, the power supply control unit may be able to detect the active or passive state of the system based on voltage difference, amount of current being drawn, or the temperature of the system units being monitored", 0008-0009, 0033], instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device [0025, 0029].

Regarding claim 4 , Kamp discloses, after the main device is powered off [0022, 0025] to generate a second wakeup signal in response to the second expiry event, wherein the battery pass circuit powers the main device back on in response to the second wakeup signal [0011, 0015,"... periodically powering...", 0019]

Cooper teaches, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value["...a first value and a second value ..", 0013; 0031; 0043]

Regarding claim 5, Kamp discloses, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value [0029-0030].

Regarding claim 6, Kamp discloses the oscillator [0026; Fig.1 Units 3 and 4; claims 7 and 8]

Cooper teaches a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device ["Enable selector 245", Fig.2 "... the SMI handler 210 interfaces to the SMI timer 240 to enable/disable the SMI timer 240 to enable/disable the throttling emulation. If the throttling emulation is enabled, the SMI handler 210 initializes the SMI timer 240 by loading the initial value to the SMI timer 240", 0028; 0031, 0038].

Regarding claim 7, Kamp discloses the interface circuit [0033].

Cooper teaches the switch is configured to receive the control signal [0031, 0038]

Regarding claim 8, Kamp discloses interface circuit is configured to sequentially receive a plurality of state update signals from the main device [0008-0009, 0029]

Cooper teaches, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequence circuit in response to each of the state update signals [0041].

Regarding claim 29, Cooper teaches, wherein the state sequencing circuit is configured to change the stored state of the main device [0029, 0031]

Gauthier teaches, when the number of times that the main device has been woken up in the stored state reaches a predetermined number [0003, 0029, and 0039 0053].

Regarding claim 30, Gauthier teaches a processor configured to read the number of times that the main device has been woken up in the stored state from the register [0032], and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state [0003, 0028, 0031].

Regarding claims 11-17, Kamp, Cooper, Gauthier together teaches an electronic device as outlined in claims 1-8. Therefore they together teach the method steps implemented in the device.

Regarding claims 20-26, Kamp, Cooper, Gauthier together teaches an electronic device as outlined in claims 1-6 and 8. Therefore they together teach an apparatus implementing the electronic device.

Response to Arguments

Applicant's arguments with respect to claims 1, 11, and 20 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Applicant's arguments filed on 10/26/2016 have been fully considered, but they are not persuasive to the extent that is applicable to the current pending claims.

Applicant argues in substances that:

A. Regarding claims 9, 18 and 27 cited reference (Kamp) does not teach or suggest a contact sensor for detecting the presence of a patient, let alone teach or suggest the features of claim 9.

[Applicant's remarks Page 12]

The examiner respectfully traverses applicant's arguments for the following reasons:

As to Point A:

Regarding claims 9, 18 and 27 Kamp does not expressly disclose a contact sensor to detect the presence of a patient. Kamp discloses power supply management controller for managing power supply to one or more system units of a system and acknowledging active or passive state of the system based on the sensor signals received from the sensor unit i.e. upon detecting difference in voltage, current, temperature, pressure difference through the respective sensors[0008] .

It is obvious to a person skilled in the art to implement a contact sensor to detect the presence of a patient for a different application, as Kamp discloses other type of sensor units may be used depending on the type of application. Further Kamp discloses implementing micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor for acknowledging an active or passive system state [0008]. MEMS based sensors are well known in the art and used in variety of applications including patient monitoring i.e. detecting the presence of a patient upon touch or contact of the patient to measure blood pressure, temperature, blood glucose etc.

In light of these teachings, the examiner submits Kamp discloses” a contact sensor for detecting the presence of a patient”.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GAYATHRI SAMPATH whose telephone number is (571)272-5489. The examiner can normally be reached on Monday- Friday 7:30AM-4:00PMEST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jaweed Abbaszadeh can be reached on 571-270-1640. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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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.

/GAYATHRI SAMPATH/

Examiner, Art Unit 2118

/MOHAMMED REHMAN/

Primary Examiner, Art Unit 2118

<i>Examiner-Initiated Interview Summary</i>	Application No. 14/596,087	Applicant(s) GANTON ET AL.		
	Examiner GAYATHRI SAMPATH	Art Unit 2118	AIA (First Inventor to File) Status Yes	Page 1 of 2

All participants (applicant, applicant's representative, PTO personnel):

1. GAYATHRI SAMPATH (Examiner); Telephonic
2. Eugene R. Worley (Attorney of Record); Telephonic

Date of Interview: 01 February 2017

Claim(s) discussed: Claims 1 and 29

Amendment Proposed: Examiner proposed amending claim 1 with the limitations of claim 29 in light of the subject matter in the specification document [paragraph 100].

Brief Description of main topic of discussion: Examiner proposed amending claim 1 with the limitations of claim 29, in light of the subject matter in the specification document [paragraph 100].

No agreement was reached. Applicants representative requested for an office action with respect to the response filed on 10/26/2016.

Issues Discussed:

Proposed Amendments:

No agreement was reached regarding the proposed amendment. Applicants representative requested for an office action.

	/GAYATHRI SAMPATH/ Examiner, Art Unit 2118
<p>Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of the interview.</p> <p>Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.</p> <p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicant's responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see:</p> <p>MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

U.S. Patent and Trademark Office
PTOL-413/413b (Rev. 01/01/2015)

Interview Summary

Paper No. 20170202

Notice of References Cited	Application/Control No. 14/596,087		Applicant(s)/Patent Under Reexamination GANTON ET AL.	
	Examiner GAYATHRI SAMPATH		Art Unit 2118	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2011/0158303 A1	06-2011	Gauthier; Laurent	H04W52/0283	375/224
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*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
L1	1	("20110158303").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/02 17:23
S1	38	Robert near Ganton.in.	US-PGPUB; USPAT	OR	ON	2016/07/27 11:59
S2	9	Robert near ballam.in.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:00
S3	2184	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:53
S4	1952	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:53
S5	2840	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 12:53
S6	387	(connect\$3 or disconnect\$3) near5 power near3 (processor or cpu) with (timer or count\$3)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:00
S7	2	(connect\$3 or disconnect\$3) near5 power near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:02
S8	2	(connect\$3 or disconnect\$3) near5 (power or battery) near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:04
S9	36	(wak\$3 or wakeup or 'wake-up') near3 (processor or cpu) same (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:05
S10	159	(wak\$3 or wakeup or 'wake-up') near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:08
S11	24	("7844265" "8311594" "20080065920" "20080282100" "5167024" "6996732" "8779729" "20090144578" "20040180702").PN.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:21
S12	15	("20070019770" "20090168943" "20090296531" "6728234" "6885254" "20050270108" "20090322400").PN.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 13:23
S15	3	wo-2010015611-\$.did.	US-PGPUB;	OR	OFF	2016/07/27

			USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			15:32
S16	3	wo-2010056118-\$.did.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:33
S17	1	("20110264936").PN.	US-PGPUB; USPAT	OR	OFF	2016/07/27 15:34
S18	1	(14/596087).APP.	US-PGPUB; USPAT	OR	OFF	2016/07/27 15:45
S19	2	(activat\$3 or enabl\$3 or connect\$3) near5 (power or battery) near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:57
S20	9	(activat\$3 or enabl\$3 or connect\$3) near5 (power or battery) near3 (processor or cpu) same (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:58
S21	24	(activat\$3 or enabl\$3 or connect\$3) near5 (power or battery) near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 15:59
S22	60	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near5 (power or battery) near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:02
S23	334	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:12
S24	2184	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 16:12
S25	7	S23 and S24	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:12
S26	1952	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 16:14
S28	2840	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2016/07/27 16:14
S29	4	S23 and S28	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:14
S30	499	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near5 (power or battery) with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:17

S31	6	S30 and S24	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:20
S32	3	S30 and S26	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:22
S33	2	S30 and S28	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/27 16:22
S34	6	("2009/0144578").URPN.	USPAT	OR	ON	2016/07/28 16:25
S35	1	("20060075267").PN.	US-PGPUB; USPAT	OR	OFF	2016/07/28 17:05
S36	787	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:52
S37	334	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:52
S38	0	S37 same (updat\$3 or chang\$3) near5 (count\$3 or timer) near5 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:54
S39	16	(updat\$3 or chang\$3) near5 (count\$3 or timer) near5 expir\$5 with state near5 (processor or cpu)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 17:55
S40	18890	(stor\$3 or sav\$3) near5 (processor or cpu) near3 (state or status)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:03
S41	8	S40 with (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:03
S42	1086	(determ\$5 or set\$4) near5 (timer or counter) with power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:06
S43	20	S36 and S42	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/07/28 18:07

S44	2	"14596087"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 14:35
S45	3	"20030120960"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 14:35
S46	3	"20110264936"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 14:36
S48	3	"20060271797"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/02 17:03
S49	1	("20110183727").PN.	US-PGPUB; USPAT	OR	OFF	2016/08/03 11:22
S50	1	("20110264936").PN.	US-PGPUB; USPAT	OR	OFF	2017/01/30 11:35
S51	1	("20030120960").PN.	US-PGPUB; USPAT	OR	OFF	2017/01/30 11:35
S52	1	("6442407").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/01 09:44
S53	1	("20130179707").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/01 09:44
S54	1	(14/596087).APP.	US-PGPUB; USPAT	OR	OFF	2017/02/01 10:02
S55	122	(contact near2 sensor) near5 patient and battery near2 life	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 11:50
S56	1	estimat\$3 near5 battery same (count\$3 or track\$3) near5 ('wake- up' or wak\$3 or wakeup)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 11:55
S57	235	battery same (count\$3 or track\$3) near5 ('wake-up' or wak\$3 or wakeup)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 11:55
S58	0	(count\$3 or track\$3) near5 ('wake- up' or wak\$3 or wakeup) with reamin\$3 near3 battery	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 11:56
S59	0	(count\$3 or track\$3) near5 ('wake- up' or wak\$3 or wakeup) with remain\$3 near3 battery	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 11:56
S60	2	(count\$3 or track\$3) near5 ('wake-	US-PGPUB;	OR	OFF	2017/02/01

		up' or wak\$3 or wakeup) same remain\$3 near3 battery	USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			11:56
S61	4	(count\$3 or track\$3) near5 ('wake-up' or wak\$3 or wakeup\$1) same replac\$3 near3 battery	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 11:59
S62	3	(count\$3 or track\$3) near5 ('wake-up' or wak\$3 or wakeup\$1) with (replac\$3 or recharg\$3) near3 battery	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:01
S63	0	determin\$3 near5 (replac\$3 or recharg\$3) near3 battery with ('wake-up' or wak\$3 or wakeup\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:03
S64	4	determin\$3 near5 (replac\$3 or recharg\$3) near3 battery same ('wake-up' or wak\$3 or wakeup\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:03
S65	574	(determin\$3 or set\$4) near5 (wak\$3 or 'wake-up\$1' or wakeup) with power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:42
S66	334	(determin\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup) with power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:42
S67	2673	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2017/02/01 12:43
S68	17	S66 and S67	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:43
S69	33	(track\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup) with power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:45
S70	888	(track\$3 or monitor\$3 or detect\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup) with power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 12:45
S71	106	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup) near5 during near3 ((low adj power) or sleep\$3 or idle)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:00
S72	110	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup) near5 threshold	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/02/01 13:17

			IBM_TDB			
S73	919	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) near3 (threshold or limit)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:34
S74	1	S73 with (power adj2 state)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:35
S75	3	S73 same (contact or proximity) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:40
S76	11	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (contact or proximity) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:41
S77	29	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) same (contact or proximity) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:42
S78	1455	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) and (contact or proximity) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:44
S79	32	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit)and (contact or proximity) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:45
S80	14	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit)and (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:49
S81	791	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) and (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:50
S82	21	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with battery and (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:51
S83	791	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) and (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:52
S84	3	S83 and S67	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/02/01 13:52

			IBM_TDB			
S85	2198	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2017/02/01 13:52
S86	1	S83 and S85	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:52
S87	3250	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2017/02/01 13:53
S88	3	S83 and S87	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:53
S89	14	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) same (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:54
S90	195	(wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:55
S91	39	S90 same (track\$1 or monitor\$3 or count\$3)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:55
S92	453	(wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit) and (contact) near2 sensor	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:58
S93	1	S92 and S85	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:59
S94	1	S92 and S87	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 13:59
S95	1	S92 and S87	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 14:00
S96	1864	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 14:26
S97	31	S96 same (transition\$3 or chang\$3) near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/02/01 14:27

			IBM_TDB			
S98	193	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit)with register\$1	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 14:38
S99	140	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit) near4 register\$1	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/02/01 14:39
S100	1	("20100332868").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/02 13:19
S101	1	("20110066874").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/02 13:40
S103	1	("20120115552").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/02 14:09
S104	0	(85/564419).APP.	US-PGPUB; USPAT	OR	OFF	2017/02/02 14:10

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Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	14596087
				Filing Date	01-13-2015
				First Named Inventor	GANTON; Robert Bruce
				Art Unit	2118
				Examiner Name	SAMPATH, GAYATHRI
Sheet	1	of	3	Attorney Docket Number	QCOM-3146US (143971)

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
	001	US-6442407	08-27-2002	BAUER; Harald et al.	
	002	US-20130179707	07-11-2013	OSUGA; Yoshiharu et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
		None				

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		None	

Examiner Signature	/GAYATHRI SAMPATH/	Date Considered	02/02/2017
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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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IPR2025-01015

Qualcomm Inc. v. Collabo Innovations, Inc.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.S/

Collabo's Exhibit 2011

Ex. 2011, Page 196

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Complete if Known

Application Number	14596087
Filing Date	01-13-2015
First Named Inventor	GANTON; Robert Bruce
Art Unit	2118
Examiner Name	SAMPATH, GAYATHRI
Attorney Docket Number	QCOM-3146US (143971)

Sheet 2 of 3

CERTIFICATION STATEMENT

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

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

OR

- ☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).
- ☐ See attached certification statement.
- ☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☐ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Eugene Worley/	Date (YYYY-MM-DD)	2016-09-08
Name/Print	Eugene Worley	Registration Number	47186

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

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

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

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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.

<i>Index of Claims</i> 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

✓	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	08/03/2016	02/02/2017						
	1	✓	✓						
	2	✓	✓						
	3	✓	✓						
	4	✓	✓						
	5	✓	✓						
	6	✓	✓						
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	27	✓	✓						
	28	✓	✓						
	29		✓						
	30		✓						
	31		✓						
	32		✓						

Search Notes 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

CPC- SEARCHED		
Symbol	Date	Examiner
G06F1/3206, G06F1/28,G06F1/3296	07/27/2016	Gayathri Sampath
G06F1/3206,G06F1/28,G06F1/3296	02/01/2017	Gayathri Sampath

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
G06F1/3206, G06F1/28,G06F1/3296 (See search history)	07/27/2016	Gayathri Sampath
Searched in EAST and search history attached with office action	07/27/2016	Gayathri Sampath
G06F1/3206,G06F1/28,G06F1/3296(see search report)	02/01/2017	Gayathri Sampath
Searched in EAST and search results attached with office action	02/01/2017	Gayathri Sampath

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

/GAYATHRI SAMPATH/
Examiner.Art Unit 2118

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/596,087 Confirmation No. 6012

Applicants : Robert Bruce Ganton

Filed : January 13, 2015

Art Unit : 2118

Examiner : Gayathri Sampath

Docket No. : 143971

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO FINAL OFFICE ACTION

Dear Commissioner:

In response to the Final Office Action dated February 8, 2017, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 10 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) ~~An electronic device~~ A system comprising:
an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;
a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;
a state sequencing circuit configured to store a state of the main device;
an interface circuit configured to communicate the stored state to the main device; ~~and~~
a register configured to track a number of times that the main device has been woken up in the stored state; and
a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.
2. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the interface circuit is configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit.
3. (Currently Amended) The ~~electronic device~~ system of claim 2, wherein the interface circuit is configured to receive a sleep signal from the main device and to instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device.

4. (Currently Amended) The ~~electronic device~~ system of claim 3, wherein, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value, and to generate a second wakeup signal in response to the second expiry event, wherein the battery pass circuit powers the main device back on in response to the second wakeup signal.

5. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value.

6. (Currently Amended) The ~~electronic device~~ system of claim 1, further comprising a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device.

7. (Currently Amended) The ~~electronic device~~ system of claim 6, wherein the switch is configured to receive the control signal via the interface circuit.

8. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the interface circuit is configured to sequentially receive a plurality of state update signals from the main device, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequencing circuit in response to each of the state update signals.

9. (Currently Amended) ~~An electronic device~~ A system comprising:
an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;

a state sequencing circuit configured to store a state of the main device; [[and]]

an interface circuit configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main device, ~~each of the state update signal corresponding to a different state of the main device~~, and to update the state stored in the state sequencing circuit in response to each of the state update signals[[:]], wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors; and

a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor.

10. (Currently Amended) The ~~electronic device~~ system of claim 9, wherein, in the second one of the plurality of states, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

11. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:

receiving an oscillator signal from an oscillator;

generating a count value based on the oscillator signal;

comparing the count value with a first compare value;

determining a first expiry event upon the count value matching the first compare value;

powering on a device in response to the first expiry event;

communicating a state stored in a state sequencing circuit to the device while the device is powered on; ~~and~~

tracking a number of times that the main device has been woken up in the stored state; and

determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the device.

12. (Original) The method of claim 11, further comprising receiving a second compare value for a next wakeup cycle from the device.

13. (Original) The method of claim 12, further comprising:
receiving a sleep signal from the device; and
powering off the device in the response to the sleep signal.

14. (Original) The method of claim 13, further comprising:
after the device is powered off, comparing the count value with the second compare value;
determining a second expiry event upon the count value matching the second compare value; and
powering the device back on in response to the second expiry event.

15. (Original) The method of claim 11, further comprising incrementing the count value at a rate based on a frequency of the oscillator.

16. (Original) The method of claim 11, further comprising:
receiving a control signal from the device; and
coupling the oscillator signal to the device in response to the control signal.

17. (Previously Presented) The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and
updating the state stored in the state sequencing circuit in response to each of the state update signals.

18. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:
receiving an oscillator signal from an oscillator;

generating a count value based on the oscillator signal;
comparing the count value with a first compare value;
determining a first expiry event upon the count value matching the first compare value;
powering on a device in response to the first expiry event;
communicating a state stored in a state sequencing circuit to the device while the device is powered on;
sequentially receiving a plurality of state update signals from the device, ~~each of the state update signal corresponding to a different state of the device~~; and
updating the state stored in the state sequencing circuit in response to each of the state update signals;
wherein, in a first one of the plurality of states, the device periodically checks a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors, and sequentially receiving the plurality of state update signals from the device comprises receiving one of the state update signals from the device when the presence of the patient is detected by the contact sensor.

19. (Original) The method of claim 18, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

20. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:

means for receiving an oscillator signal from an oscillator;
means for generating a count value based on the oscillator signal;
means for comparing the count value with a first compare value;
means for determining a first expiry event upon the count value matching the first compare value;
means for powering on a device in response to the first expiry event;
means for communicating a state stored in a state sequencing circuit to the device while the device is powered on;
means for tracking a number of times that the main device has been woken up in the stored state; and

means for determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

21. (Original) The apparatus of claim 20, further comprising means for receiving a second compare value for a next wakeup cycle from the device.

22. (Original) The apparatus of claim 21, further comprising:
means for receiving a sleep signal from the device; and
means for powering off the device in the response to the sleep signal.

23. (Original) The apparatus of claim 22, further comprising
means for comparing the count value with the second compare value after the device is powered off;
means for determining a second expiry event upon the count value matching the second compare value; and
means for powering the device back on in response to the second expiry event.

24. (Original) The apparatus of claim 20, further comprising means for incrementing the count value at a rate based on a frequency of the oscillator.

25. (Original) The apparatus of claim 20, further comprising:
means for receiving a control signal from the device; and
means for coupling the oscillator signal to the device in response to the control signal.

26. (Previously Presented) The apparatus of claim 20, further comprising:
means for sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and
means for updating the state stored in the state sequencing circuit in response to each of the state update signals.

27. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:

- means for receiving an oscillator signal from an oscillator;
- means for generating a count value based on the oscillator signal;
- means for comparing the count value with a first compare value;
- means for determining a first expiry event upon the count value matching the first compare value;
- means for powering on a device in response to the first expiry event;
- means for communicating a state stored in a state sequencing circuit to the device while the device is powered on;
- means for sequentially receiving a plurality of state update signals from the device, ~~each of the state update signal corresponding to a different state of the device;~~ and
- means for updating the state stored in the state sequencing circuit in response to each of the state update signals;

wherein, in a first one of the plurality of states, the device periodically checks a ~~[[contract]]~~ contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors, and the means for sequentially receiving the plurality of state update signals receives one of the state update signals from the device when the presence of the patient is detected by the contact sensor.

28. (Original) The apparatus of claim 27, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

29. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the state sequencing circuit is configured to change the stored state of the main device when the number of times that the main device has been woken up in the stored state reaches a predetermined number.

30. (Canceled)

31. (Currently Amended) The ~~electronic device~~ system of claim 9, wherein the one or more sensors comprises at least one of a pulse oximeter, a blood pressure sensor, or a blood sugar sensor.

32. (Currently Amended) The ~~electronic device~~ system of claim 9, wherein the one or more sensors comprises a temperature sensor configured to measure a temperature of the patient.

33. (New) The system of claim 1, wherein the processor is in the main device.

34. (New) The system of claim 1, wherein the system further comprises a transceiver, and the processor is configured to transmit the duration that the main device has been in the stored state to an external device via the transceiver.

35. (New) The system of claim 9, wherein the system further comprises:
a register configured to track a number of times that the main device has been woken up in the second one of the plurality of states; and
a transceiver;

wherein the processor is further configured to transmit at least portion of the sensor data collected by the main device to an external device via the transceiver when the number of times that the main device has been woken up in the second one of the plurality of states reaches a predetermined number.

36. (New) The system of claim 9, wherein the system further comprises a transceiver, and wherein, in a third one of the plurality of states, the processor is configured to perform a discovery procedure using the transceiver to discover an external device, and, in the second one of the plurality of states, the processor is further configured to transmit at least portion of the sensor data collected by the main device to the external device via the transceiver.

REMARKS/ARGUMENTS

Claims 1-11, 18, 20, 27, 29, 31 and 32 have been amended herein, claim 30 has been canceled herein without prejudice or disclaimer, and new claims 33-36 have been added herein. Claims 1-29 and 31-36 are pending in the application, with claims 1, 9, 11, 18, 20 and 27 being the independent claims. Applicants believe that the present application is in condition for allowance, for which prompt and favorable action is respectfully requested.

Support for the claim amendments and new claims 33-36 can be found throughout the originally-filed application, including, for example, in paragraphs [0080]-[0082], [0094] and [0099]. No new matter has been added.

Claim Objections

Claim 27 is objected to because of informalities.

Claim 27 has been amended to adopt the correction indicated in the Office Action. Accordingly, Applicants respectfully request that the objections to the claims be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1-8, 11-17, 20-26, 29 and 30 are rejected under 35 U.S.C. § 103 as being unpatentable over U.S. 2011/0264936 (“Kamp”) in view of U.S. 2003/0120960 (“Cooper”), and further in view of U.S. 2011/0158303 (“Gauthier”). Claims 9, 18, 27, 31 and 32 are rejected under 35 U.S.C. § 103 as being unpatentable over Kamp in view of Cooper. Claims 10, 19 and 28 are rejected under 35 U.S.C. § 103 as being unpatentable over Kamp in view of Cooper, and in further view of U.S. 2006/0271797 (“Ginggen”). Reconsideration and withdrawal of these rejections are respectfully requested.

Independent Claims 1, 11 and 20

While not conceding the correctness of the rejection, and in an effort to expedite prosecution of the present application, claim 1 has been amended to further distinguish claim 1 from the cited references. Claim 1, as amended, recites *inter alia*:

an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to

determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;

a state sequencing circuit configured to store a state of the main device;

an interface circuit configured to communicate the stored state to the main device;

a register configured to track a number of times that the main device has been woken up in the stored state; and

a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

Applicants submit that claim 1 is allowable over the cited references because none of the cited references, taken individually or in combination, teaches or suggests at least the above highlighted features of claim 1.

Kamp discloses a power supply management controller 9 including a clock unit 2, and programmable timers 5. *See* paragraph [0024], and Figure 1 of Kamp. The programmable timers 5 “are controlled based on the clock signal provided by the clock unit 2” and “are used to wake-up system parts at a pre-determined programmed time.” *See* paragraph [0029] of Kamp.

However, Kamp fails to teach or suggest at least the features of “*a register configured to track a number of times that the main device has been woken up in the stored state,*” and “*a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device,*” as recited in claim 1.

The Office Action appears to contend that the system parts of Kamp correspond to the main device recited in claim 1. However, even assuming, *arguendo*, this were correct, Kamp would still fail to teach or suggest that above features of claim 1. This is because Kamp does not teach or suggest a register configured to track a number of times that the system parts of Kamp have been woken up in a stored state, let alone teach or suggest the processor recited in claim 1.

Applicants submit that Gauthier fails to remedy the above deficiencies of Kamp for at least the reasons given below.

Gauthier discloses a receiver that wakes up from a standby mode by performing “a power up sequence with several steps to detect an incoming signal and activate functions when needed.” *See* paragraph [0003] of Gauthier. During the power up sequence (also referred to as a wake-up sequence in Gauthier), a plurality of different signal analyzer units in the receiver analyze the incoming signal to determine whether the incoming signal is a valid signal or an invalid signal. *See* paragraphs [0003] and [0017] of Gauthier. If the incoming signal is determined to be invalid, then the analyzer units output one or more false wake-up indications, in which case the power up sequence is terminated before completion. *See* paragraphs [0017] of Gauthier. If the incoming signal is determined to be valid, then the analyzer units output a wake-up indication, in which case the power up sequence is completed. *See* paragraphs [0017] and [0021] of Gauthier. Gauthier also discloses an evaluation unit in the receiver that tracks the number of false wake-up indications and wake-up indications, and determines a false wake-up rate based on the number of false wake-up indications and wake-up indications. *See* paragraphs [0027] and [0028] of Gauthier. If the false wake-up rate exceeds a threshold, then a controller in the receiver adjusts parameters of the signal analyzer units to reduce the false wake-up rate. *See* paragraphs [0030] - [0033] of Gauthier.

However, Gauthier fails to teach or suggest at least the features of “a processor configured to *read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device,*” as recited in claim 1.

The Office Action appears to contend that the number of false wake-up indications and/or number of wake-up indications of Gauthier correspond to the “number of times that the main device has been woken up” recited in claim 1. However, even assuming, *arguendo*, this were correct, Gauthier would still fail to teach or suggest that above features of claim 1. This is because Gauthier does not teach or suggest determining a duration that a main device has been in a stored state based on the number of false wake-up indications and/or number of wake-up indications and a duration between adjacent wake ups of the main device. Rather, Gauthier teaches determining a false wake-up rate based on the number of false wake-up indications and

number of wake-up indications, in which the false wake-up rate is used to determine whether to adjust the parameters of the signal analyzer units of Gauthier.

Applicants submit that Cooper and Ginggen also fail to teach or suggest the above features of claim 1, and therefore fail to remedy the deficiencies of Kamp and Gauthier.

For at least the reasons given above, Applicants respectfully submit that claim 1 is allowable, and respectfully request that the rejection of claim 1 be withdrawn.

Each of independent claims 11 and 20 recites features similar to the above features of claim 1, and is therefore allowable for at least the reasons given above for claim 1.

Independent Claims 9, 18 and 27

Claim 9 recites *inter alia*:

an oscillator configured to generate an oscillator signal;

a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to power on the main device;

a state sequencing circuit configured to store a state of the main device;

an interface circuit configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main device, and to update the state stored in the state sequencing circuit in response to each of the state update signals, *wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors; and*

a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor.

Applicants submit that independent claim 9 is allowable over the cited references because none of the cited references, taken individually or in combination, teaches or suggests at least the above highlighted features of claim 9.

Kamp discloses a power management supply controller for managing power of a system. *See* paragraph [0004] of Kamp. The power management supply controller includes a control unit and a means for acknowledging an active state or a passive state of the system. *Id.* The control unit ceases powering system units of the system when the means for acknowledging detects the passive state of the system, and maintains power to the system units when the means for acknowledging detects the active state of the system. *Id.* Kamp also discloses detecting the active or passive state of the system using sensors such as a voltage level sensor, a current sensor or a temperature sensor. *See* paragraph [0008] of Kamp.

However, Kamp fails to teach or suggest at least the features “*wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors,*” and “*a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor,*” as recited in claim 9.

The Office Action appears to acknowledge that Kamp does not disclose a contact sensor configured to detect the presence of a patient. *See* page 4 of the Office Action. Nevertheless, the Office Action contends:

It is obvious to a person skilled in the art to implement a contact sensor to detect the presence of a patient for a different application, as Kamp discloses other types of sensor units may be used depending on the type of application. Further Kamp discloses implementing micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor for acknowledging an active or passive system state [0008]. MEMS based sensors are well known in the art and used in variety of application including patient monitoring i.e., detecting the presence of a patient upon touch or contact of the patient to measure blood pressure, temperature, blood glucose etc.

Applicants respectfully disagree. Paragraph [0008] of Kamp relates to types of sensors used for detecting whether the system of Kamp is in the active state or the passive state. This is unrelated to detecting the presence of a patient. As such, it would not have occurred to one skilled in the art to employ a contact sensor for detecting the presence of a patient in the system of Kamp, let alone in a manner resulting in the above features of claim 9.

Regarding the Examiner’s reliance on the statement “that other types of sensor units may be used as well, e.g., dependent on the application” in paragraph [0008] of Kamp, Applicants submit that this statement of Kamp, when read in light of the rest of paragraph [0008] of Kamp,

is meant to convey that other types of sensor may be used to detect whether the system of Kamp is in the active state or the passive state besides the sensors explicitly disclosed in paragraph [0008]. This statement does not reasonably suggest to one skilled in the art to employ a contact sensor configured to detect the presence of a patient in the system of Kamp.

Applicants submit that Cooper also fails to teach or suggest the above features of claim 9, and therefore fails to remedy the deficiencies of Kamp.

Cooper discloses a throttling emulator including a system management interrupt (SMI) handler and a SMI timer. *See* paragraph [0027] of Cooper. In a throttling state, the SMI handler transitions a processor from a normal operation state to a low power state or from the low power state to the normal operation state when the SMI timer reaches a terminal count. *See* paragraphs [0031] and [0032] of Cooper. The terminal count is used to control the period of time that the processor spends in the normal operation state or the low power state. *Id.*

However, Cooper fails to teach or suggest at least the features “*wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors,*” and “*a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor,*” as recited in claim 9, and therefore fails to remedy the deficiencies of Kamp.

For instance, Cooper teaches transitioning a processor between a normal operation state and a low power state in response to a timer reaching a terminal count. There is no teaching or suggestion in Cooper and Kamp, whether taken individually or in combination, of updating a stored state of a device in response to detection of the presence of a patient by a contact sensor, much less “*a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor,*” as recited in claim 9.

Applicants submit that Gauthier and Ginggen also fail to teach or suggest the above features of claim 9, and therefore fail to remedy the deficiencies of Kamp and Cooper.

For at least the reasons given above, Applicants respectfully submit that independent claim 9 is allowable, and respectfully request that the rejection of claim 9 be withdrawn.

Each of independent claims 18 and 27 recites features similar to the above features of claim 9, and is therefore allowable for at least the reasons given above for claim 9.

Remaining Rejected Claims

Each of the remaining rejected claims depends from one of the independent claims discussed above and is therefore deemed to be allowable for at least the same reasons given for the respective independent claim.

New Claim

Each of new claims 33-36 depends from independent claim 1 or 9, and is therefore allowable for at least the reasons given for the respective independent claim.

Disclaimer

Applicants may not have presented all possible arguments or have refuted the characterizations of either the claims or the prior art as found in the Office Action. However, the lack of such arguments or refutations is not intended to act as a waiver of such arguments or as concurrence with such characterizations.

CONCLUSION

Applicants submit that the application is in condition for allowance, for which early action is requested. In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 50-5240.

Respectfully submitted,

Dated: April 3, 2017

By: /Eugene R. Worley/
Eugene R. Worley
Reg. No. 47,186

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Electronic Patent Application Fee Transmittal

Application Number:	14596087			
Filing Date:	13-Jan-2015			
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS			
First Named Inventor/Applicant Name:	Robert Bruce Ganton			
Filer:	Eugene R. Worley/Michalene Winkelspecht			
Attorney Docket Number:	QCOM-3146US (143971)			
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:				
CLAIMS IN EXCESS OF 20	1202	4	80	320
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				320

Electronic Acknowledgement Receipt

EFS ID:	28820312
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	112246
Filer:	Eugene R. Worley/Michalene Winkelspecht
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	QCOM-3146US (143971)
Receipt Date:	03-APR-2017
Filing Date:	13-JAN-2015
Time Stamp:	18:36:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 320
RAM confirmation Number	040417INTEFSW18365300
Deposit Account	505240
Authorized User	Loza and Loza - Accounting

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

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

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)
37 CFR 1.20 (Post Issuance fees)
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	Response After Final Action	143971_Response_to_Final_Office_Action.pdf	93791	no	17
			c8bedc28a9038b7cda54156aa994c221dcd11d3		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	31114	no	2
			bb9daf664cbefe64d54162f12918627f59615ba6		

Warnings:

Information:

Total Files Size (in bytes):			124905
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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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/596,087	Filing Date 01/13/2015	☐ To be Mailed
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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), (i), 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)

	04/03/2017	CLAIMS REMAINING AFTER AMENDMENT	Minus	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	Total (37 CFR 1.16(i))	* 35	Minus	** 35	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 6	Minus	*** 3	= 3	X \$420 =	1260
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE							1260

(Column 1)

(Column 2)

(Column 3)

		CLAIMS REMAINING AFTER AMENDMENT	Minus	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	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.

LIE
TAMMY D. MCBETH BROWN

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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/596,087	01/13/2015	Robert Bruce Ganton	QCOM-3146US (143971)	6012
112246	7590	04/24/2017	EXAMINER	
Loza & Loza, LLP/Qualcomm			SAMPATH, GAYATHRI	
305 N. Second Ave., #127			ART UNIT	PAPER NUMBER
Upland, CA 91786			2118	
			NOTIFICATION DATE	DELIVERY MODE
			04/24/2017	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):

ocpat_uspto@qualcomm.com
qualcomm-pto@lozaip.com

Examiner-Initiated Interview Summary	Application No. 14/596,087	Applicant(s) GANTON ET AL.		
	Examiner GAYATHRI SAMPATH	Art Unit 2118	AIA (First Inventor to File) Status Yes	Page 1 of 1

All participants (applicant, applicant's representative, PTO personnel):

1. GAYATHRI SAMPATH (Examiner); Telephonic
2. Eugene R.Worley (Attorney of Record); Telephonic(Reg.No.47,186)

Date of Interview: 18 April 2017

Claim(s) discussed: Claim 1

Brief Description of main topic of discussion: Examiner discussed amending claim 1 regarding the limitation "determine a duration that the main device has been in the stored state based on the number of the times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device" with respect to the limitation " a timing circuit configured to generate a count value... and to generate a first wakeup signal in response to the first expiry event", to clarify the relationship between these limitations.

Issues Discussed:

Other:

No agreement was reached. However amendment and arguments will be considered upon receiving official response.

/MOHAMMED REHMAN/ Primary Examiner, Art Unit 2118	/GAYATHRI SAMPATH/ Examiner, Art Unit 2118
<p>Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of the interview.</p> <p>Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.</p> <p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicant's responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see:</p> <p>MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

Advisory Action Before the Filing of an Appeal Brief	Application No. 14/596,087	Applicant(s) GANTON ET AL.	
	Examiner GAYATHRI SAMPATH	Art Unit 2118	AIA (First Inventor to File) Status Yes

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

THE REPLY FILED 03 April 2017 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:

a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.

b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires _____ months from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because

a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);

b) ☐ They raise the issue of new matter (see NOTE below);

c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: See Continuation Sheet. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).

5. ☐ Applicant's reply has overcome the following rejection(s): _____.

6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☒ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).

10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.

13. ☐ Note the attached Information *Disclosure Statement(s)*. (PTO/SB/08) Paper No(s). _____

14. ☒ Other: Interview summary paper number 20170418.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____.

Claim(s) objected to: _____.

Claim(s) rejected: 1-32.

Claim(s) withdrawn from consideration: _____.

/GAYATHRI SAMPATH/ Examiner, Art Unit 2118	/MOHAMMED REHMAN/ Primary Examiner, Art Unit 2118
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Continuation of 3. NOTE: The newly added limitations to claims 1(similar limitations to claims 11 and 20), "a duration between adjacent wake ups of the main device" changes the scope of the claim and requires additional search and/or consideration. The newly added limitations to claim 9(similar limitations to claims 18 and 27), " a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor" changes the scope of the claim and requires additional search and/or consideration.

Examiner-Initiated Interview Summary	Application No. 14/596,087	Applicant(s) GANTON ET AL.		
	Examiner GAYATHRI SAMPATH	Art Unit 2118	AIA (First Inventor to File) Status Yes	Page 1 of 1

All participants (applicant, applicant's representative, PTO personnel):

1. GAYATHRI SAMPATH (Examiner); Telephonic
2. Eugene R.Worley (Attorney of Record); Telephonic(Reg.No.47,186)

Date of Interview: 18 April 2017

Claim(s) discussed: Claim 1

Brief Description of main topic of discussion: Examiner discussed amending claim 1 regarding the limitation "determine a duration that the main device has been in the stored state based on the number of the times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device" with respect to the limitation " a timing circuit configured to generate a count value... and to generate a first wakeup signal in response to the first expiry event", to clarify the relationship between these limitations.

Issues Discussed:

Other:

No agreement was reached. However amendment and arguments will be considered upon receiving official response.

/MOHAMMED REHMAN/ Primary Examiner, Art Unit 2118	/GAYATHRI SAMPATH/ Examiner, Art Unit 2118
<p>Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of the interview.</p> <p>Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.</p> <p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicant's responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see:</p> <p>MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/596,087 Confirmation No. 6012
Applicants : Robert Bruce Ganton
Filed : January 13, 2015
Art Unit : 2118
Examiner : Gayathri Sampath
Docket No. : 143971

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO FINAL OFFICE ACTION

Dear Commissioner:

In response to the Final Office Action dated February 8, 2017, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 10 of this paper.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

Application Number	14/596,087	Filing Date	2015-01-13	Docket Number (if applicable)	QCOM-3146US (143971)	Art Unit	2118
First Named Inventor	Robert Bruce Ganton			Examiner Name	Gayathri Sampath		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.

Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, to any international application that does not comply with the requirements of 35 U.S.C. 371, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV.

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____.
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☐ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to
Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	Eugene R. Worley/	Date (YYYY-MM-DD)	2015-05-03
Name	Eugene R. Worley	Registration Number	47186

This collection of information is required by 37 CFR 1.114. 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 1.11 and 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.

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

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 Patent Application Fee Transmittal				
Application Number:		14596087		
Filing Date:		13-Jan-2015		
Title of Invention:		ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		
First Named Inventor/Applicant Name:		Robert Bruce Ganton		
Filer:		Eugene R. Worley/Michalene Winkelspecht		
Attorney Docket Number:		QCOM-3146US (143971)		
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:				
CLAIMS IN EXCESS OF 20	1202	4	80	320
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
RCE- 1st Request	1801	1	1200	1200
Total in USD (\$)				1520

Electronic Acknowledgement Receipt

EFS ID:	29106791
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	112246
Filer:	Eugene R. Worley/Michalene Winkelspecht
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	QCOM-3146US (143971)
Receipt Date:	03-MAY-2017
Filing Date:	13-JAN-2015
Time Stamp:	15:53:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1520
RAM confirmation Number	050417INTEFSW15543500
Deposit Account	505240
Authorized User	Loza and Loza - Accounting

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

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

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)
37 CFR 1.20 (Post Issuance fees)
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	Response After Final Action	143971_Response_to_Final_Office_Action_and_Advisory_Action.pdf	99683	no	18
			5ba630c1ccfa944e323b11d78d09f4a9f44e5389		

Warnings:

Information:

2	Request for Continued Examination (RCE)	143971_RCE.pdf	1349527	no	3
			8fa7cbae7d5996aac8e86ac04112463c11044e0a		

Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	32811	no	2
			10428afb371ccc44328bef348520662fc8a41562		

Warnings:

Information:

Total Files Size (in bytes):			1482021
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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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/596,087 Confirmation No. 6012
Applicants : Robert Bruce Ganton
Filed : January 13, 2015
Art Unit : 2118
Examiner : Gayathri Sampath
Docket No. : QCOM-3146US (143971)

Mail Stop: RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO FINAL OFFICE ACTION

Dear Commissioner:

In response to the Final Office Action dated February 8, 2017 and the Advisory Action dated April 24, 2017, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 11 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) ~~An electronic device~~ A system comprising:
 - an oscillator configured to generate an oscillator signal;
 - a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;
 - a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to ~~power on~~ wake up the main device;
 - a state sequencing circuit configured to store a state of the main device;
 - an interface circuit configured to communicate the stored state to the main device; ~~and~~
 - a register configured to track a number of times that the main device has been woken up in the stored state; and
 - a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.
2. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the interface circuit is configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit.
3. (Currently Amended) The ~~electronic device~~ system of claim 2, wherein the interface circuit is configured to receive a sleep signal from the main device and to instruct the

timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device.

4. (Currently Amended) The ~~electronic device~~ system of claim 3, wherein, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value, and to generate a second wakeup signal in response to the second expiry event, wherein the battery pass circuit ~~powers~~ wakes up the main device ~~back on~~ in response to the second wakeup signal.

5. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value.

6. (Currently Amended) The ~~electronic device~~ system of claim 1, further comprising a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device.

7. (Currently Amended) The ~~electronic device~~ system of claim 6, wherein the switch is configured to receive the control signal via the interface circuit.

8. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the interface circuit is configured to sequentially receive a plurality of state update signals from the main device, each of the state update signal corresponding to a different state of the main device, and to update the state stored in the state sequencing circuit in response to each of the state update signals.

9. (Currently Amended) ~~An electronic device~~ A system comprising:
an oscillator configured to generate an oscillator signal;
a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the

count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to ~~power on~~ wake up the main device;

a state sequencing circuit configured to store a state of the main device; [[and]]

an interface circuit configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main device, ~~each of the state update signal corresponding to a different state of the main device~~, and to update the state stored in the state sequencing circuit in response to each of the state update signals[[]]; wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors; and

a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor.

10. (Currently Amended) The ~~electronic device~~ system of claim 9, wherein, in the second one of the plurality of states, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

11. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:

receiving an oscillator signal from an oscillator;

generating a count value based on the oscillator signal;

comparing the count value with a first compare value;

determining a first expiry event upon the count value matching the first compare value;

~~powering on~~ waking up a device in response to the first expiry event;

communicating a state stored in a state sequencing circuit to the device while the device is powered on; ~~and~~

tracking a number of times that the main device has been woken up in the stored state;

and

determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the device.

12. (Original) The method of claim 11, further comprising receiving a second compare value for a next wakeup cycle from the device.

13. (Original) The method of claim 12, further comprising:
receiving a sleep signal from the device; and
powering off the device in the response to the sleep signal.

14. (Currently Amended) The method of claim 13, further comprising:
after the device is powered off, comparing the count value with the second compare value;
determining a second expiry event upon the count value matching the second compare value; and
~~powering~~ waking up the device ~~back on~~ in response to the second expiry event.

15. (Original) The method of claim 11, further comprising incrementing the count value at a rate based on a frequency of the oscillator.

16. (Original) The method of claim 11, further comprising:
receiving a control signal from the device; and
coupling the oscillator signal to the device in response to the control signal.

17. (Previously Presented) The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and
updating the state stored in the state sequencing circuit in response to each of the state update signals.

18. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:

- receiving an oscillator signal from an oscillator;
- generating a count value based on the oscillator signal;
- comparing the count value with a first compare value;
- determining a first expiry event upon the count value matching the first compare value;
- ~~powering on~~ waking up a device in response to the first expiry event;
- communicating a state stored in a state sequencing circuit to the device while the device is powered on;
- sequentially receiving a plurality of state update signals from the device, ~~each of the state update signal corresponding to a different state of the device;~~ and
- updating the state stored in the state sequencing circuit in response to each of the state update signals;

wherein, in a first one of the plurality of states, the device periodically checks a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors, and sequentially receiving the plurality of state update signals from the device comprises receiving one of the state update signals from the device when the presence of the patient is detected by the contact sensor.

19. (Original) The method of claim 18, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

20. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:

- means for receiving an oscillator signal from an oscillator;
- means for generating a count value based on the oscillator signal;
- means for comparing the count value with a first compare value;
- means for determining a first expiry event upon the count value matching the first compare value;
- means for ~~powering on~~ waking up a device in response to the first expiry event;

means for communicating a state stored in a state sequencing circuit to the device while the device is powered on;

means for tracking a number of times that the main device has been woken up in the stored state; and

means for determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

21. (Original) The apparatus of claim 20, further comprising means for receiving a second compare value for a next wakeup cycle from the device.

22. (Original) The apparatus of claim 21, further comprising:
means for receiving a sleep signal from the device; and
means for powering off the device in the response to the sleep signal.

23. (Currently Amended) The apparatus of claim 22, further comprising
means for comparing the count value with the second compare value after the device is powered off;
means for determining a second expiry event upon the count value matching the second compare value; and
means for ~~powering~~ waking up the device ~~back on~~ in response to the second expiry event.

24. (Original) The apparatus of claim 20, further comprising means for incrementing the count value at a rate based on a frequency of the oscillator.

25. (Original) The apparatus of claim 20, further comprising:
means for receiving a control signal from the device; and
means for coupling the oscillator signal to the device in response to the control signal.

26. (Previously Presented) The apparatus of claim 20, further comprising:

means for sequentially receiving a plurality of state update signals from the device, each of the state update signal corresponding to a different state of the device; and

means for updating the state stored in the state sequencing circuit in response to each of the state update signals.

27. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:

means for receiving an oscillator signal from an oscillator;

means for generating a count value based on the oscillator signal;

means for comparing the count value with a first compare value;

means for determining a first expiry event upon the count value matching the first compare value;

means for ~~powering on~~ waking up a device in response to the first expiry event;

means for communicating a state stored in a state sequencing circuit to the device while the device is powered on;

means for sequentially receiving a plurality of state update signals from the device, ~~each of the state update signal corresponding to a different state of the device;~~ and

means for updating the state stored in the state sequencing circuit in response to each of the state update signals;

wherein, in a first one of the plurality of states, the device periodically checks a ~~[[contract]]~~ contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the device periodically collects sensor data from one or more sensors, and the means for sequentially receiving the plurality of state update signals receives one of the state update signals from the device when the presence of the patient is detected by the contact sensor.

28. (Original) The apparatus of claim 27, wherein, in the second one of the plurality of states, the device periodically transmits the sensor data wirelessly to an external device.

29. (Currently Amended) The ~~electronic device~~ system of claim 1, wherein the state sequencing circuit is configured to change the stored state of the main device when the number

of times that the main device has been woken up in the stored state reaches a predetermined number.

30. (Canceled)

31. (Currently Amended) The ~~electronic device~~ system of claim 9, wherein the one or more sensors comprises at least one of a pulse oximeter, a blood pressure sensor, or a blood sugar sensor.

32. (Currently Amended) The ~~electronic device~~ system of claim 9, wherein the one or more sensors comprises a temperature sensor configured to measure a temperature of the patient.

33. (New) The system of claim 1, wherein the processor is in the main device.

34. (New) The system of claim 1, wherein the system further comprises a transceiver, and the processor is configured to transmit the duration that the main device has been in the stored state to an external device via the transceiver.

35. (New) The system of claim 9, wherein the system further comprises:
a register configured to track a number of times that the main device has been woken up in the second one of the plurality of states; and
a transceiver;
wherein the processor is further configured to transmit at least portion of the sensor data collected by the main device to an external device via the transceiver when the number of times that the main device has been woken up in the second one of the plurality of states reaches a predetermined number.

36. (New) The system of claim 9, wherein the system further comprises a transceiver, and wherein, in a third one of the plurality of states, the processor is configured to perform a discovery procedure using the transceiver to discover an external device, and, in the

second one of the plurality of states, the processor is further configured to transmit at least portion of the sensor data collected by the main device to the external device via the transceiver.

REMARKS/ARGUMENTS

Claims 1-11, 14, 18, 20, 23, 27, 29, 31 and 32 have been amended herein, claim 30 has been canceled herein without prejudice or disclaimer, and new claims 33-36 have been added herein. Claims 1-29 and 31-36 are pending in the application, with claims 1, 9, 11, 18, 20 and 27 being the independent claims. Applicants believe that the present application is in condition for allowance, for which prompt and favorable action is respectfully requested.

Support for the claim amendments and new claims 33-36 can be found throughout the originally-filed application, including, for example, in paragraphs [0019], [0024], [0072], [0078], [0080]-[0082], [0094] and [0099]. No new matter has been added.

Examiner-Initiated Interview

The Examiner called Applicants' representative, Eugene Worley (Reg. No. 47,186), on April 18, 2017. During the call, the Examiner suggested amending claim 1 to clarify the relationship between the limitation "determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device" and the limitation "a timing circuit configured to generate a count value... and to generate a first wakeup signal in response to the first expiry event." No agreement was reached during the call.

In this paper, Applicants have amended claim 1 to recite that the battery pass circuit wakes up the main device in response to the first wakeup signal from the timing circuit. This amendment clarifies the relationship between wake up of the main device and the timing circuit.

Claim Objections

Claim 27 is objected to because of informalities.

Claim 27 has been amended to adopt the correction indicated in the Office Action. Accordingly, Applicants respectfully request that the objections to the claims be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1-8, 11-17, 20-26, 29 and 30 are rejected under 35 U.S.C. § 103 as being unpatentable over U.S. 2011/0264936 ("Kamp") in view of U.S. 2003/0120960 ("Cooper"), and further in view of U.S. 2011/0158303 ("Gauthier"). Claims 9, 18, 27, 31 and 32 are rejected

under 35 U.S.C. § 103 as being unpatentable over Kamp in view of Cooper. Claims 10, 19 and 28 are rejected under 35 U.S.C. § 103 as being unpatentable over Kamp in view of Cooper, and in further view of U.S. 2006/0271797 (“Ginggen”). Reconsideration and withdrawal of these rejections are respectfully requested.

Independent Claims 1, 11 and 20

While not conceding the correctness of the rejection, and in an effort to expedite prosecution of the present application, claim 1 has been amended to further distinguish claim 1 from the cited references. Claim 1, as amended, recites *inter alia*:

an oscillator configured to generate an oscillator signal;

a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to wake up the main device;

a state sequencing circuit configured to store a state of the main device;

an interface circuit configured to communicate the stored state to the main device;

a register configured to track a number of times that the main device has been woken up in the stored state; and

a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

Applicants submit that claim 1 is allowable over the cited references because none of the cited references, taken individually or in combination, teaches or suggests at least the above highlighted features of claim 1.

Kamp discloses a power supply management controller 9 including a clock unit 2, and programmable timers 5. *See* paragraph [0024], and Figure 1 of Kamp. The programmable timers 5 “are controlled based on the clock signal provided by the clock unit 2” and “are used to wake-up system parts at a pre-determined programmed time.” *See* paragraph [0029] of Kamp.

However, Kamp fails to teach or suggest at least the features of “*a register configured to track a number of times that the main device has been woken up in the stored state,*” and “*a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device,*” as recited in claim 1.

The Office Action appears to contend that the system parts of Kamp correspond to the main device recited in claim 1. However, even assuming, *arguendo*, this were correct, Kamp would still fail to teach or suggest that above features of claim 1. This is because Kamp does not teach or suggest a register configured to track a number of times that the system parts of Kamp have been woken up in a stored state, let alone teach or suggest the processor recited in claim 1.

Applicants submit that Gauthier fails to remedy the above deficiencies of Kamp for at least the reasons given below.

Gauthier discloses a receiver that wakes up from a standby mode by performing “a power up sequence with several steps to detect an incoming signal and activate functions when needed.” *See* paragraph [0003] of Gauthier. During the power up sequence (also referred to as a wake-up sequence in Gauthier), a plurality of different signal analyzer units in the receiver analyze the incoming signal to determine whether the incoming signal is a valid signal or an invalid signal. *See* paragraphs [0003] and [0017] of Gauthier. If the incoming signal is determined to be invalid, then the analyzer units output one or more false wake-up indications, in which case the power up sequence is terminated before completion. *See* paragraphs [0017] of Gauthier. If the incoming signal is determined to be valid, then the analyzer units output a wake-up indication, in which case the power up sequence is completed. *See* paragraphs [0017] and [0021] of Gauthier. Gauthier also discloses an evaluation unit in the receiver that tracks the number of false wake-up indications and wake-up indications, and determines a false wake-up rate based on the number of false wake-up indications and wake-up indications. *See* paragraphs [0027] and [0028] of Gauthier. If the false wake-up rate exceeds a threshold, then a controller in the receiver adjusts parameters of the signal analyzer units to reduce the false wake-up rate. *See* paragraphs [0030] - [0033] of Gauthier.

However, Gauthier fails to teach or suggest at least the features of “a processor configured to *read the number of times that the main device has been woken up in the stored*

state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device,” as recited in claim 1.

The Office Action appears to contend that the number of false wake-up indications and/or number of wake-up indications of Gauthier correspond to the “number of times that the main device has been woken up” recited in claim 1. However, even assuming, *arguendo*, this were correct, Gauthier would still fail to teach or suggest that above features of claim 1. This is because Gauthier does not teach or suggest determining a duration that a main device has been in a stored state based on the number of false wake-up indications and/or number of wake-up indications and a duration between adjacent wake ups of the main device. Rather, Gauthier teaches determining a false wake-up rate based on the number of false wake-up indications and number of wake-up indications, in which the false wake-up rate is used to determine whether to adjust the parameters of the signal analyzer units of Gauthier.

Applicants submit that Cooper and Ginggen also fail to teach or suggest the above features of claim 1, and therefore fail to remedy the deficiencies of Kamp and Gauthier.

For at least the reasons given above, Applicants respectfully submit that claim 1 is allowable, and respectfully request that the rejection of claim 1 be withdrawn.

Each of independent claims 11 and 20 recites features similar to the above features of claim 1, and is therefore allowable for at least the reasons given above for claim 1.

Independent Claims 9, 18 and 27

Claim 9 recites *inter alia*:

an oscillator configured to generate an oscillator signal;

a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to wake up the main device;

a state sequencing circuit configured to store a state of the main device;

an interface circuit configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main

device, and to update the state stored in the state sequencing circuit in response to each of the state update signals, *wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors; and*

a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor.

Applicants submit that independent claim 9 is allowable over the cited references because none of the cited references, taken individually or in combination, teaches or suggests at least the above highlighted features of claim 9.

Kamp discloses a power management supply controller for managing power of a system. *See* paragraph [0004] of Kamp. The power management supply controller includes a control unit and a means for acknowledging an active state or a passive state of the system. *Id.* The control unit ceases powering system units of the system when the means for acknowledging detects the passive state of the system, and maintains power to the system units when the means for acknowledging detects the active state of the system. *Id.* Kamp also discloses detecting the active or passive state of the system using sensors such as a voltage level sensor, a current sensor or a temperature sensor. *See* paragraph [0008] of Kamp.

However, Kamp fails to teach or suggest at least the features “*wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors,*” and “*a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor,*” as recited in claim 9.

The Office Action appears to acknowledge that Kamp does not disclose a contact sensor configured to detect the presence of a patient. *See* page 4 of the Office Action. Nevertheless, the Office Action contends:

It is obvious to a person skilled in the art to implement a contact sensor to detect the presence of a patient for a different application, as Kamp discloses other types of sensor units may be used depending on the type of application. Further Kamp discloses implementing micro-electro-mechanical systems (MEMS) based sensor such as a pressure sensor for acknowledging an active or

passive system state [0008]. MEMS based sensors are well known in the art and used in variety of application including patient monitoring i.e., detecting the presence of a patient upon touch or contact of the patient to measure blood pressure, temperature, blood glucose etc.

Applicants respectfully disagree. Paragraph [0008] of Kamp relates to types of sensors used for detecting whether the system of Kamp is in the active state or the passive state. This is unrelated to detecting the presence of a patient. As such, it would not have occurred to one skilled in the art to employ a contact sensor for detecting the presence of a patient in the system of Kamp, let alone in a manner resulting in the above features of claim 9.

Regarding the Examiner's reliance on the statement "that other types of sensor units may be used as well, e.g., dependent on the application" in paragraph [0008] of Kamp, Applicants submit that this statement of Kamp, when read in light of the rest of paragraph [0008] of Kamp, is meant to convey that other types of sensors may be used to detect whether the system of Kamp is in the active state or the passive state besides the sensors explicitly disclosed in paragraph [0008]. This statement does not reasonably suggest to one skilled in the art to employ a contact sensor configured to detect the presence of a patient in the system of Kamp.

Applicants submit that Cooper also fails to teach or suggest the above features of claim 9, and therefore fails to remedy the deficiencies of Kamp.

Cooper discloses a throttling emulator including a system management interrupt (SMI) handler and a SMI timer. *See* paragraph [0027] of Cooper. In a throttling state, the SMI handler transitions a processor from a normal operation state to a low power state or from the low power state to the normal operation state when the SMI timer reaches a terminal count. *See* paragraphs [0031] and [0032] of Cooper. The terminal count is used to control the period of time that the processor spends in the normal operation state or the low power state. *Id.*

However, Cooper fails to teach or suggest at least the features "*wherein, in a first one of the plurality of states, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states, the main device is configured to periodically collect sensor data from one or more sensors,*" and "*a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor,*" as recited in claim 9, and therefore fails to remedy the deficiencies of Kamp.

For instance, Cooper teaches transitioning a processor between a normal operation state and a low power state in response to a timer reaching a terminal count. There is no teaching or suggestion in Cooper and Kamp, whether taken individually or in combination, of updating a stored state of a device in response to detection of the presence of a patient by a contact sensor, much less “*a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor,*” as recited in claim 9.

Applicants submit that Gauthier and Ginggen also fail to teach or suggest the above features of claim 9, and therefore fail to remedy the deficiencies of Kamp and Cooper.

For at least the reasons given above, Applicants respectfully submit that independent claim 9 is allowable, and respectfully request that the rejection of claim 9 be withdrawn.

Each of independent claims 18 and 27 recites features similar to the above features of claim 9, and is therefore allowable for at least the reasons given above for claim 9.

Remaining Rejected Claims

Each of the remaining rejected claims depends from one of the independent claims discussed above and is therefore deemed to be allowable for at least the same reasons given for the respective independent claim.

New Claim

Each of new claims 33-36 depends from independent claim 1 or 9, and is therefore allowable for at least the reasons given for the respective independent claim.

Disclaimer

Applicants may not have presented all possible arguments or have refuted the characterizations of either the claims or the prior art as found in the Office Action. However, the lack of such arguments or refutations is not intended to act as a waiver of such arguments or as concurrence with such characterizations.

CONCLUSION

Applicants submit that the application is in condition for allowance, for which early action is requested. In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 50-5240.

Respectfully submitted,

Dated: May 3, 2017

By: /Eugene R. Worley/
Eugene R. Worley
Reg. No. 47,186

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 14/596,087		Filing Date 01/13/2015		☐ 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 \$80 =						
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$420 =						
☐ 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	05/03/2017	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 35	Minus	** 31	= 4			x \$80 =		320		
	Independent (37 CFR 1.16(h))	* 5	Minus	*** 5	= 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		320				
AMENDMENT			(Column 1)		(Column 2)		(Column 3)					
			CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))		*		Minus		**		=		x \$0 =	
	Independent (37 CFR 1.16(h))		*		Minus		***		=		x \$0 =	
	☐ 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.						LIE						
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						Ross W Brown						
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EXAMINER

SAMPATH, GAYATHRI

ART UNIT

PAPER NUMBER

2118

DATE MAILED: 07/10/2017

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/596,087

01/13/2015

Robert Bruce Ganton

QCOM-3146US (143971)

6012

TITLE OF INVENTION: ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	10/10/2017

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/596,087	01/13/2015	Robert Bruce Ganton	QCOM-3146US (143971)	6012

TITLE OF INVENTION: ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	10/10/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAMPATH, GAYATHRI	2118	713-323000

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- 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
- ☐ 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 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 _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/596,087	01/13/2015	Robert Bruce Ganton	QCOM-3146US (143971)	6012

112246	7590	07/10/2017
Loza & Loza, LLP/Qualcomm		
305 N. Second Ave., #127		
Upland, CA 91786		

EXAMINER	
SAMPATH, GAYATHRI	

ART UNIT	PAPER NUMBER
2118	

DATE MAILED: 07/10/2017

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.

Notice of Allowability	Application No. 14/596,087	Applicant(s) GANTON ET AL.	
	Examiner GAYATHRI SAMPATH	Art Unit 2118	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 communication filed on 05/03/2017.
☐ 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 1-29 and 31-36 (renumbered as 1-35). 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 <u>20170630</u> .	5. ☒ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☒ Other <u>Proposed amendments</u> .
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/MOHAMMED REHMAN/ Primary Examiner, Art Unit 2118	/GAYATHRI SAMPATH/ Examiner, Art Unit 2118
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EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Eugene Worley (Reg. No. 47,186) on June 30th, 2017.

The application has been amended as follows:

Please replace all the claims:

-- 1. (Previously Presented) A system comprising:

an oscillator configured to generate an oscillator signal;

a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;

a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to wake up the main device;

a state sequencing circuit configured to store a state of the main device;

an interface circuit configured to communicate the stored state to the main device;

a register configured to track a number of times that the main device has been woken up in the stored state; and

a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

2. (Previously Presented) The system of claim 1, wherein the interface circuit is configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit.
3. (Previously Presented) The system of claim 2, wherein the interface circuit is configured to receive a sleep signal from the main device and to instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device.
4. (Previously Presented) The system of claim 3, wherein, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value, and to generate a second wakeup

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signal in response to the second expiry event, wherein the battery pass circuit wakes up the main device in response to the second wakeup signal.

5. (Previously Presented) The system of claim 1, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value.
6. (Previously Presented) The system of claim 1, further comprising a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device.
7. (Previously Presented) The system of claim 6, wherein the switch is configured to receive the control signal via the interface circuit.
8. (Currently Amended) The system of claim 1, wherein the interface circuit is configured to sequentially receive a plurality of state update signals from the main device, each of the plurality of state update ~~signal-signals~~ corresponding to a different state of the main device, and to update the state stored in the state sequencing circuit in response to each of the plurality of state update signals.

9. (Currently Amended)

The system of claim 1, wherein [[an]] the interface circuit is further configured to sequentially receive a plurality of state update signals from the main device, and to update the state stored in the state sequencing circuit in response to each of the plurality of state update signals, wherein each of the plurality of state update signals corresponds to a different one of a plurality of states of the main device, in a first one of the plurality of states of the main device, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states of the main device, the main device is configured to periodically collect sensor data from one or more sensors.

10. (Currently Amended) The system of claim 9, wherein, in the second one of the plurality of states of the main device, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

11. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:

receiving an oscillator signal from an oscillator;
generating a count value based on the oscillator signal;
comparing the count value with a first compare value;

determining a first expiry event upon the count value matching the first compare value;

waking up a main device in response to the first expiry event;

communicating a state stored in a state sequencing circuit to the main device while the main device is powered on;

tracking a number of times that the main device has been woken up in the stored state; and

determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

12. (Currently Amended) The method of claim 11, further comprising receiving a second compare value for a next wakeup cycle from the main device.

13. (Currently Amended) The method of claim 12, further comprising:
receiving a sleep signal from the main device; and
powering off the main device in the response to the sleep signal.

14. (Currently Amended) The method of claim 13, further comprising:
after the main device is powered off, comparing the count value with the second compare value;

determining a second expiry event upon the count value matching the second compare value; and

waking up the main device in response to the second expiry event.

15. (Original) The method of claim 11, further comprising incrementing the count value at a rate based on a frequency of the oscillator.

16. (Currently Amended) The method of claim 11, further comprising:
receiving a control signal from the main device; and
coupling the oscillator signal to the main device in response to the control signal.

17. (Currently Amended) The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the main device,
each of the plurality of state update signals corresponding to a different state of the main device; and
updating the state stored in the state sequencing circuit in response to each of the plurality of state update signals.

18. (Currently Amended)
The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the main device;
and

updating the state stored in the state sequencing circuit in response to each of the plurality of state update signals;

wherein each of the plurality of state update signals corresponds to a different one of a plurality of states of the main device, in a first one of the plurality of states of the main device, the device periodically checks a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states of the main device, the device periodically collects sensor data from one or more sensors.

19. (Currently Amended) The method of claim 18, wherein, in the second one of the plurality of states of the main device, the main device periodically transmits the sensor data wirelessly to an external device.

20. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:

- means for receiving an oscillator signal from an oscillator;
- means for generating a count value based on the oscillator signal;
- means for comparing the count value with a first compare value;
- means for determining a first expiry event upon the count value matching the first compare value;
- means for waking up a main device in response to the first expiry event;
- means for communicating a state stored in a state sequencing circuit to the main device while the main device is powered on;

means for tracking a number of times that the main device has been woken up in the stored state; and

means for determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

21. (Currently Amended) The apparatus of claim 20, further comprising means for receiving a second compare value for a next wakeup cycle from the main device.

22. (Currently Amended) The apparatus of claim 21, further comprising:
means for receiving a sleep signal from the main device; and
means for powering off the main device in the response to the sleep signal.

23. (Currently Amended) The apparatus of claim 22, further comprising
means for comparing the count value with the second compare value after the main device is powered off;
means for determining a second expiry event upon the count value matching the second compare value; and
means for waking up the main device in response to the second expiry event.

24. (Original) The apparatus of claim 20, further comprising means for incrementing the count value at a rate based on a frequency of the oscillator.

25. (Currently Amended) The apparatus of claim 20, further comprising:
means for receiving a control signal from the main device; and
means for coupling the oscillator signal to the main device in response to the control signal.

26. (Currently Amended) The apparatus of claim 20, further comprising:
means for sequentially receiving a plurality of state update signals from the main device, each of the plurality of state update ~~signal~~ signals corresponding to a different state of the main device; and
means for updating the state stored in the state sequencing circuit in response to each of the plurality of state update signals.

27. (Currently Amended) The apparatus of claim 20, further comprising:
means for sequentially receiving a plurality of state update signals from the main device; and
means for updating the state stored in the state sequencing circuit in response to each of the plurality of state update signals;
wherein each of the plurality of state update signals corresponds to a different one of a plurality of states of the main device, in a first one of the plurality of states of

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the main device, the device periodically checks a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states of the main device, the device periodically collects sensor data from one or more sensors.

28. (Currently Amended) The apparatus of claim 27, wherein, in the second one of the plurality of states of the main device, the main device periodically transmits the sensor data wirelessly to an external device.

29. (Previously Presented) The system of claim 1, wherein the state sequencing circuit is configured to change the stored state of the main device when the number of times that the main device has been woken up in the stored state reaches a predetermined number.

30. (Canceled)

31. (Previously Presented) The system of claim 9, wherein the one or more sensors comprises at least one of a pulse oximeter, a blood pressure sensor, or a blood sugar sensor.

32. (Previously Presented) The system of claim 9, wherein the one or more sensors comprises a temperature sensor configured to measure a temperature of the patient.

33. (Previously Presented) The system of claim 1, wherein the processor is in the main device.

34. (Previously Presented) The system of claim 1, wherein the system further comprises a transceiver, and the processor is configured to transmit the duration that the main device has been in the stored state to an external device via the transceiver.

35. (Currently Amended) The system of claim 9, wherein the system further comprises[[:]]

a transceiver[[:]],

~~wherein~~ and the processor is further configured to transmit at least portion of the sensor data collected by the main device to an external device via the transceiver when the number of times that the main device has been woken up in the second one of the plurality of states of the main device reaches a predetermined number.

36. (Currently Amended) The system of claim 9, wherein the system further comprises a transceiver, and wherein, in a third one of the plurality of states of the main device, the processor is configured to perform a discovery procedure using the transceiver to discover an external device, and, in the second one of the plurality of states of the main device, the processor is further configured to transmit at least portion

of the sensor data collected by the main device to the external device via the transceiver.--

Allowable Subject matter

Claims 1-29 and 31-36 are allowed.

Reasons for Allowance

“Means for” interpretation of 112 sixth paragraph acknowledgment:

The examiner is hereby acknowledging the applicant, the interpretation of 112th 6th paragraph, means for function.

Regarding claim 20, the examiner is interpreting the means for receiving a oscillator signal as timing circuit 102 configured to receive an oscillator signal on page 4 para [0021] of the specification. The examiner is interpreting the means for generating a count value as the counter 120 to generate a count value on page 4 para [0021] of the specification. The examiner is interpreting the means for comparing the count value with a first compare value as the compare register 125 to compare the count value from the counter with a wakeup compare value on page 4 para [0021] and page 5 para [0025]. The examiner is interpreting the means for determining a first expiry event as the timing circuit 102 activating the battery pass circuit when the number of ticks reaches the wakeup compare value on page 5 para [0025] of the specification.

The examiner is interpreting the means for waking up a device as the battery pass circuit 105 on page 5 para [0025] of the specification. The examiner is interpreting

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the means for communicating a state stored in a state sequencing circuit to the device as the interface controller 103 on page 7 para [0030] and page 8 para [0033] of the specification. The examiner is interpreting the means for tracking number of times that the main device has been woken up as the wakeup register on page 24 para [0087] of the specification. The examiner is interpreting the means for determining a duration that the main device has been in the stored state as the processor on page 25 para [0088] and page 28 para [0099] of the specification.

Regarding claim 21 the examiner is interpreting the means for receiving a second compare value as the interface controller 103 configured to receive an oscillator signal on page 6 para [0025] of the specification.

Regarding claim 22 the examiner is interpreting the means for receiving a sleep signal as the interface controller 103 on page 6 para [0026] of the specification. The examiner is interpreting the means for powering off the device as the timing circuit 102 on page 6 para [0026] of the specification.

Regarding claim 24 the examiner is interpreting the means for incrementing the count value at a rate based on the frequency of the oscillator as the oscillator 101 on page 5 para [0023] of the specification.

Regarding claim 25, the examiner is interpreting the means for receiving a control signal from the device on page 13 para [0051] of the specification. The examiner is interpreting the means for coupling the oscillator signal to the device as the switch 315 on page 13 para [0051] of the specification.

Regarding claim 26, the examiner is interpreting the means for sequentially receiving a plurality of state update signals from the device as the interface controller 103 in on page 8 para [0034] and pages 22 and 23 para [0083] of the specification. The examiner is interpreting the means for updating the state stored in the state sequencing circuit as the interface controller 103 in on page 8 para [0034] and pages 22 and 23 para [0083] of the specification.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GAYATHRI SAMPATH whose telephone number is (571)272-5489. The examiner can normally be reached on Monday- Friday 7:30AM-4:00PMEST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jaweed Abbaszadeh can be reached on 571-270-1640. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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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.

/GAYATHRI SAMPATH/

Examiner, Art Unit 2118

/MOHAMMED REHMAN/

Primary Examiner, Art Unit 2118

Examiner-Initiated Interview Summary	Application No. 14/596,087	Applicant(s) GANTON ET AL.		
	Examiner GAYATHRI SAMPATH	Art Unit 2118	AIA (First Inventor to File) Status Yes	Page 1 of 1

All participants (applicant, applicant's representative, PTO personnel):

1. GAYATHRI SAMPATH (Examiner); Telephonic
2. Eugene Worley (Attorney of Record); Telephonic (Reg. No. 47,186)

Date of Interview: 28 May 2017

Claim(s) discussed: Claims 1 , 9 , 18 and 27

Amendment Proposed: Applicant amended claims 9, 18 and 27 into dependent from to incorporate the features " a processor configured to read the number of times... and a duration between adjacent wakeups of the device.

Brief Description of main topic of discussion: Examiner discussed with the applicant the following :

- 1) Regarding claim 1 with respect to the limitation " a processor configured to read the number of times that the main device ... and a duration between adjacent wake ups of the main device" and incorporating these features to the independent claims 9, 18 and 27.
- 2) Regarding claims 9 and 18 " the state update signals " and "plurality of state update signals" for language consistency
- 3) Regarding claims 11, 20 and 27 " a device" and "main device" for language consistency

Issues Discussed:

Proposed Amendments:

Applicant amended claims 9, 18, 27 to dependent and agreed to the changes as set forth in the examiner's amendment(authorized on 06/30).

Attachment(s): Proposed Amendments

/MOHAMMED REHMAN/ Primary Examiner, Art Unit 2118	/GAYATHRI SAMPATH/ Examiner, Art Unit 2118
<p>Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of the interview.</p> <p>Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.</p> <p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicant's responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see:</p> <p>MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

Notice of References Cited	Application/Control No. 14/596,087		Applicant(s)/Patent Under Reexamination GANTON ET AL.	
	Examiner GAYATHRI SAMPATH		Art Unit 2118	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2009/0235105 A1	09-2009	Branover; Alexander	G06F1/3203	713/330
*	B	US-2012/0173904 A1	07-2012	Jahagirdhar; Sanjeev S.	G06F1/3206	713/320
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
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	I	US-				
	J	US-				
	K	US-				
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
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EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S167	2981	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 09:38
S168	2370	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 09:38
S169	3574	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 09:38
S170	177	(wak\$3 or wakeup or 'wake-up') near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:39
S171	35	(duration or period) with adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:39
S172	488	(duration or period) with (adjacent or subsequent or successive) near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:40
S173	754	(duration or period or interval or cycle) with (adjacent or subsequent or successive) near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:40
S174	1	S173 and S170	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:40
S175	629	determin\$3 near5 (duration or period) with (power adj2 state)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:45
S176	29	(duration or period) near5 adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:46
S177	303	(duration or period) near5 (adjacent or successive or subsequent) near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:46
S178	19	determin\$3 near3 power near3 state same (track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:46
S180	11031	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) with (timer or count\$3 or timeout)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:47
S181	70	S180 same (sav\$3 or stor\$3) near3 state	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:48
S182	1	S181 and S167	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:48

S183	0	S181 and S168	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:48
S184	1	S181 and S169	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:48
S185	41993	(duration or interval or period or cycle) near7 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:50
S186	7591	(duration or period) with (power adj2 state)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:57
S187	156	S180 and S186	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:57
S188	9	S187 and S167	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:57
S189	2	S187 and S168	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:58
S190	4	S187 and S169	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:58
S191	17	S181.ab,clm.	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:59
S192	82	(sav\$3 or stor\$3) near3 power near3 state same (track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 10:00
S193	17	S192.ab,clm.	US-PGPUB; USPAT	OR	OFF	2017/07/03 10:01
S194	41	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) same (duration or period) with power adj2 state	US-PGPUB; USPAT	OR	OFF	2017/07/03 10:02
S195	10	S194.ab,clm.	US-PGPUB; USPAT	OR	OFF	2017/07/03 10:03
S196	6	S194 same S175	US-PGPUB; USPAT	OR	OFF	2017/07/03 10:06

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Simulating the power consumption of large-scale sensor network applications

V Shnayder, M Hempstead, B Chen, GW Allen... - Proceedings of the 2nd ..., 2004 - dl.acm.org

... CPU **Wakeup** ... of instrumentation of the TinyOS codebase to track hardware **power state** transitions, an accu- rate CPU cycle **counting** mechanism based ... ba- sic block execution counters that are processed offline in the manner described above to obtain CPU cycle **count** totals. ...

Cited by 1257 Related articles All 31 versions Cite Save

Method and apparatus of automatic power management control for Serial ATA interface

V Ayyavu, B Day, G Viswanathan - US Patent 7,028,199, 2006 - Google Patents

... Serial ATA is in an idle condition, idle time of Serial ATA interface is **counted** using a ... present invention, wherein the Timer **Count** Reg, the Partial **Count** Reg, the Slumber **Count** Reg, and ... second OR gate 404, an inverter 406, **power** down counter logic 408 (for **counting** idle time ...

Cited by 24 Related articles All 4 versions Cite Save

PEAS: A robust energy conserving protocol for long-lived sensor networks

F Ye, G Zhong, J Cheng, S Lu... - ... computing systems, 2003 ..., 2003 - ieeexplore.ieee.org

... lustrated in Figure 4). Therefore, PEAS chooses to distribute node **wake- ups** over time ... theory [8], the exponentially distributed intervals be- tween successive **wakeups** observe a ... Average Total **Wakeup Count** for Deployment Numbers The failure percentage is the percentage of ...

Cited by 1277 Related articles All 19 versions Cite Save

An ultra low power, high performance medical implant communication system (MICS) transceiver for implantable devices

PD Bradley - ... Circuits and Systems Conference, 2006. BioCAS ..., 2006 - ieeexplore.ieee.org

... Minimum external component **count** and minimum ... B. Ultra Low **Power Wakeup** System Most implant applications will use the MICS RF link infrequently due to the overriding ... In very low **power** applications, the transceiver will spend most of the time asleep in a very low current ...

Cited by 144 Related articles All 5 versions Cite Save

Multi-mode energy management for multi-tier server clusters

T Horvath, K Skadron - Parallel Architectures and Compilation ..., 2008 - ieeexplore.ieee.org

... This ac- counts for both that **wakeups** will only be initiated, and that the cluster will only ... between the number of nodes currently in each **state** and that **state's** timeout **count**, we get ... well as an Ethernet interface that supports the Wake-On-LAN protocol for remote **wakeup** capability. ...

Cited by 110 Related articles All 14 versions Cite Save

Energy-efficient low power listening for wireless sensor networks in noisy environments

M Sha, G Hackmann, C Lu - ... of the 12th international conference on ..., 2013 - dl.acm.org

... AEDP sets Tmin to be the noise floor to avoid sustained **wakeups**, and sets Tmax to be the minimum ... Second, we augment the radio core to **count wakeup** events. ... Doing so would have had only a small impact on network reliability, in exchange for never incurring a false **wakeup**. ...

Cited by 46 Related articles All 15 versions Cite Save

Method and apparatus for controlling the wakeup logic of a radio receiver in sleep mode

M Chapman, DE Starbuck - US Patent 5,845,204, 1998 - Google Patents

... This translates into minimum component **count** and advanced shutdown features. ... for specifying the phases of the signals, ie rising edges or falling edges, to be **counted** by the ... In stop mode, the ring oscillator 310 provides the **counting** signal to the counter 320, through the ...

Cited by 52 Related articles All 2 versions Cite Save

Method and apparatus of automatic power management control for serial ATA device directly attached to SAS/SATA host controller

PR Bashford, BA Day, V Ayyavu... - US Patent ..., 2007 - Google Patents

... present invention, wherein the Timer **Count** Reg, the Partial **Count** Reg, the Slumber **Count** Reg, and ... first AND gate 405, an inverter 406, **power** down counter logic 408 (for **counting** idle time ... Bit, and an COMWAKE or COMREST OOB signal and may output a **WakeUp** signal to ...

Cited by 23 Related articles All 4 versions Cite Save

A MAC protocol to reduce sensor network energy consumption using a wakeup radio

MJ Miller, NH Vaidya - IEEE Transactions on mobile Computing, 2005 - ieeexplore.ieee.org

... packets are assumed to be transmitted instantaneously in time, though the energy cost is **counted**. During these instantaneous transmissions, we only **count** the energy for the sender and receiver ...

This shows the need to schedule triggered **wakeups** even if the full **wakeup** cost is ...

Cited by 343 Related articles All 13 versions Cite Save

Adaptive adjustment of sleep duration to increase standby time in wireless mobile stations

JF Hunzinger - US Patent 6,829,493, 2004 - Google Patents

... The adjustment of sleep durations and **wakeup** intervals are based on a number of key-presses or ... The processor adjusts sleep durations and **wakeups** based on a number of key-presses or other ... The counter is configured to **count** a number of clock cycles from a last **wakeup**. ...

Cited by 74 Related articles All 2 versions Cite Save

Radio-triggered wake-ups with addressing capabilities for extremely low power sensor network applications

J Ansari, D Pankin, P Mahonen - Personal, Indoor and Mobile ..., 2008 - [ieeexplore.ieee.org](#)

... For the CC2420 raw data rate of 250kbps, we **calculate**: 45 bytes Tpacket = 250 kbps = 1.44 ms (7 ... avoid idle listening to the medium but also to suppress the energy wastage in the undesired **wake-ups** by having ... [5] L. Gu and J. Stankovic, "Radio-Triggered **Wake-Up** for Wireless ...

Cited by 177 Related articles All 14 versions Cite Save

Asynchronous wakeup for ad hoc networks

R Zheng, JC Hou, L Sha - Proceedings of the 4th ACM international ..., 2003 - [dl.acm.org](#)

... slots (as I goes from 0 to T - 1) is at least $m \cdot T$. By **counting** argument, m ... cation schedule over the **wakeup** schedule to decide when a node should go to sleep and **wake up**. ... choices of **power** management that can be laid on top of the proposed asynchronous **wakeup** protocol. ...

Cited by 500 Related articles All 12 versions Cite Save

AWS: Asynchronous wakeup schedule to minimize latency in wireless sensor networks

NA Vasanthi, S Annadurai - Sensor Networks, Ubiquitous, and ..., 2006 - [ieeexplore.ieee.org](#)

... S-MAC [6] follows a scheduling scheme that allows nodes to sleep for long periods and to synchronize **wakeups**. ... from a node that belongs to N1 (color A) to any other neighboring node that belongs to N2 (color C) that is in the **wake-up state**. ... 'N1' can **calculate** the clock drift and ...

Cited by 34 Related articles All 5 versions Cite Save

Multi-stage transponder wake-up, method and structure

CA Sharpe, DS Hurta, MA Hamlett... - US Patent ..., 1995 - Google Patents

... from the interrogator 12, determine in which lane the transponder 14 is located, and **calculate** the incoming ... The number of bytes may be **counted** by incrementing the byte counter 114 with every ... 110 preferably resets the CRC generator 106 and resets the byte **count** register 114 ...

Cited by 85 Related articles All 2 versions Cite Save

Sleep and wakeup strategies in solar-powered wireless sensor/mesh networks: Performance analysis and optimization

D Niyato, E Hossain, A Fallahi - IEEE Transactions on Mobile ..., 2007 - [ieeexplore.ieee.org](#)

... To **calculate** the packet error rate (PER) when the channel **state** is n, we use the approximation ... channel is in **state** 0), a node switches to sleep mode and it will **wake up** with a ... This matrix is composed of the transition probability for sleep and **wakeup** modes and solar radiation ...

Cited by 195 Related articles All 7 versions Cite Save

Multi-stage transponder wake-up, method and structure

CA Sharpe, DS Hurta, MA Hamlett - US Patent 5,621,412, 1997 - Google Patents

... from the interrogator 12, determine in which lane the transponder 14 is located, and **calculate** the incoming ... The number of bytes may be **counted** by incrementing the byte counter 114 with every ... 110 preferably resets the CRC generator 106 and resets the byte **count** register 114 ...

Cited by 411 Related articles All 2 versions Cite Save

TAP: token-based adaptive power gating

AB Kahng, S Kang, T Rosing, R Strong - ... symposium on Low power ..., 2012 - [dl.acm.org](#)

... **wake-up** latencies; this enables greater leakage savings when lower-latency **wake-ups** are feasible. ... Core transistor **count**, capacitance, and Vdd_core are determined from the 2009-2010 International ... We model the entire **power** down and **wake-up** sequence as in [9]. Figure 6 ...

Cited by 10 Related articles All 29 versions Cite Save

Exploiting ZigBee in reducing WiFi power consumption for mobile devices

Y Zhang, Q Li - IEEE Transactions on Mobile Computing, 2014 - [ieeexplore.ieee.org](#)

... counter) records the time since the last message packet in terms of energy sample **count**. ... In the WAITING_PKT **state**, the ZigBee radio keeps **counting** the message packet interval as they ... all the sizes are from the same sub-alphabet, the ZigBee radio can **calculate** the message ...

Cited by 9 Related articles All 5 versions Cite Save

Many-core token-based adaptive power gating

AB Kahng, S Kang, TS Rosing... - IEEE Transactions on ..., 2013 - [ieeexplore.ieee.org](#)

... Increasing STREAM's thread **count** causes more queuing of memory requests, longer delay per request ... Fig. 6. Improvement in energy savings with staggered **wake ups** in an 16 EV6 core CMP ... 7. Comparison of **power-gated** time using staggered **wake up** with a centralized WUC ...

Cited by 7 Related articles All 18 versions Cite Save

Optimal block design for asynchronous **wake-up** schedules and its applications in multihop wireless networks

R Zheng, JC Hou, L Sha - IEEE Transactions on Mobile ..., 2006 - ieeexplore.ieee.org

... slots (as ' goes from 0 to $T \setminus 1$) is at least $m \lfloor T \rfloor$. By **counting** argument, $m \lfloor T \rfloor \geq 4$

IMPLEMENTATION OF ASYNCHRONOUS **WAKEUP** SCHEDULES IN UNSLOTTED SYSTEMS ...

When a node is awake (either mandated by its own **wake-up** schedule or other higher-level **power** ...

Cited by 51 Related articles All 6 versions Cite Save

Issue Classification 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

CPC						
Symbol					Type	Version
G06F		1		3206	F	2013-01-01
G06F		1		3296	I	2013-01-01
G06F		1		28	I	2013-01-01
						
						
						
						
						
						
						
						
						
						
						
						

CPC Combination Sets					
Symbol		Type	Set	Ranking	Version
					
					

/GAYATHRI SAMPATH/ Examiner.Art Unit 2118	07/03/2017	Total Claims Allowed: 35	
(Assistant Examiner)	(Date)		
/MOHAMMED REHMAN/ Primary Examiner.Art Unit 2118	07/05/2017	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	Fig.2

Issue Classification 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

☐ Claims renumbered in the same order as presented by applicant															
☐ CPA															
☐ T.D.															
☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17	32	33										
2	2	18	18	33	34										
3	3	19	19	34	35										
4	4	20	20	35	36										
5	5	21	21												
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10	10	26	26												
11	11	27	27												
12	12	28	28												
13	13	29	29												
14	14	-	30												
15	15	30	31												
16	16	31	32												

/GAYATHRI SAMPATH/ Examiner.Art Unit 2118 (Assistant Examiner)	07/03/2017 (Date)	Total Claims Allowed: 35	
/MOHAMMED REHMAN/ Primary Examiner.Art Unit 2118 (Primary Examiner)	07/05/2017 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig.2

Search Notes 	Application/Control No. 14596087	Applicant(s)/Patent Under Reexamination GANTON ET AL.
	Examiner GAYATHRI SAMPATH	Art Unit 2118

CPC- SEARCHED		
Symbol	Date	Examiner
G06F1/3206, G06F1/28,G06F1/3296	07/27/2016	Gayathri Sampath
G06F1/3206,G06F1/28,G06F1/3296	02/01/2017	Gayathri Sampath
G06F1/3206, G06F1/28, G06F1/3296	07/03/2017	Gayathri Sampath

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
G06F1/3206, G06F1/28,G06F1/3296 (See search history)	07/27/2016	Gayathri Sampath
Searched in EAST and search history attached with office action	07/27/2016	Gayathri Sampath
G06F1/3206,G06F1/28,G06F1/3296(see search report)	02/01/2017	Gayathri Sampath
Searched in EAST and search results attached with office action	02/01/2017	Gayathri Sampath
G06F1/3206, G06F1/28, G06F1/3296(see search report)	07/03/2017	Gayathri Sampath
Searched in EAST and search history attached with office action	07/03/2017	Gayathri Sampath
Google scholar search report attached	07/03/2017	Gayathri Sampath

/GAYATHRI SAMPATH/ Examiner.Art Unit 2118	
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SEARCH NOTES

Search Notes	Date	Examiner
Consulted with Mohammed Rehman	06/29/2017	Gayathri Sampath

INTERFERENCE SEARCH

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
G06F1	3206	07/03/2017	Gayathri Sampath
G06F1	28	07/03/2017	Gayathri Sampath
G06F1	3296	07/03/2017	Gayathri Sampath

/GAYATHRI SAMPATH/
Examiner.Art Unit 2118

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/596,087 Confirmation No. 6012
Applicants : Robert Bruce Ganton
Filed : January 13, 2015
Art Unit : 2118
Examiner : Gayathri Sampath
Docket No. : 143971

Via Email: gayathri.sampath@uspto.gov

Dear Examiner Sampath:

Applicant appreciates the Examiner-initiated telephone interview conducted on June 28, 2017. During the interview, the Examiner suggested amending independent claim 9 to incorporate the following features of claim 1:

a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device

To expedite prosecution of the present application, and not for reasons of patentability, Applicant has amended claim 9 into dependent form to depend from claim 1 in the attached Set of Amended Claims. Claim 9, as amended, incorporates the above features of claim 1 by virtue of its dependency from claim 1, and therefore adopts the Examiner's suggestion. Independent claims 18 and 26 have been similarly amended in the attached Set of Amended Claims.

Applicant reserves the right to pursue the subject matter of claims 9, 18 and 26 in a continuation application.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A system comprising:
 - an oscillator configured to generate an oscillator signal;
 - a timing circuit configured to generate a count value based on the oscillator signal, to compare the count value with a first compare value, to determine a first expiry event upon the count value matching the first compare value, and to generate a first wakeup signal in response to the first expiry event;
 - a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to wake up the main device;
 - a state sequencing circuit configured to store a state of the main device;
 - an interface circuit configured to communicate the stored state to the main device;
 - a register configured to track a number of times that the main device has been woken up in the stored state; and
 - a processor configured to read the number of times that the main device has been woken up in the stored state from the register, and to determine a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.
2. (Previously Presented) The system of claim 1, wherein the interface circuit is configured to receive a second compare value for a next wakeup cycle from the main device, and to program the second compare value into the timing circuit.
3. (Previously Presented) The system of claim 2, wherein the interface circuit is configured to receive a sleep signal from the main device and to instruct the timing circuit to turn off the battery pass circuit in response to the sleep signal to power off the main device.

4. (Previously Presented) The system of claim 3, wherein, after the main device is powered off, the timing circuit is configured to compare the count value with the second compare value, to determine a second expiry event upon the count value matching the second compare value, and to generate a second wakeup signal in response to the second expiry event, wherein the battery pass circuit wakes up the main device in response to the second wakeup signal.

5. (Previously Presented) The system of claim 1, wherein the timing circuit comprises a counter driven by the oscillator signal, and the counter is configured to generate the count value.

6. (Previously Presented) The system of claim 1, further comprising a switch between the oscillator and the main device, wherein the switch is configured to couple the oscillator to the main device in response to a control signal from the main device.

7. (Previously Presented) The system of claim 6, wherein the switch is configured to receive the control signal via the interface circuit.

8. (Currently Amended) The system of claim 1, wherein the interface circuit is configured to sequentially receive a plurality of state update signals from the main device, each of the plurality of state update signal-signals corresponding to a different state of the main device, and to update the state stored in the state sequencing circuit in response to each of the plurality of state update signals.

9. (Currently Amended) ~~A system comprising:~~
~~an oscillator configured to generate an oscillator signal;~~
~~a timing circuit configured to generate a count value based on the oscillator signal, to~~
~~compare the count value with a first compare value, to determine a first expiry event upon the~~
~~count value matching the first compare value, and to generate a first wakeup signal in response~~
~~to the first expiry event;~~

~~a battery pass circuit configured to receive the first wakeup signal, and to couple a power source to a main device in response to the first wakeup signal to wake up the main device;~~

~~a state sequencing circuit configured to store a state of the main device;~~ The system of claim 1, wherein ~~[[an]] the interface circuit is further configured to communicate the stored state to the main device, to sequentially receive a plurality of state update signals from the main device, and to update the state stored in the state sequencing circuit in response to each of the plurality of state update signals, wherein each of the plurality of state update signals corresponds to a different one of a plurality of states of the main device, in a first one of the plurality of states of the main device, the main device is configured to periodically check a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states of the main device, the main device is configured to periodically collect sensor data from one or more sensors;~~ ~~and~~

~~a processor configured to send one of the state update signals to the interface circuit in response to detection of the presence of the patient by the contact sensor.~~

10. (Currently Amended) The system of claim 9, wherein, in the second one of the plurality of states of the main device, the main device is configured to periodically transmit the sensor data wirelessly to an external device.

11. (Currently Amended) A method for extending battery life in a mobile application, the method comprising:

receiving an oscillator signal from an oscillator;

generating a count value based on the oscillator signal;

comparing the count value with a first compare value;

determining a first expiry event upon the count value matching the first compare value;

waking up a main device in response to the first expiry event;

communicating a state stored in a state sequencing circuit to the main device while the main device is powered on;

tracking a number of times that the main device has been woken up in the stored state;

and

determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

12. (Currently Amended) The method of claim 11, further comprising receiving a second compare value for a next wakeup cycle from the main device.

13. (Currently Amended) The method of claim 12, further comprising:
receiving a sleep signal from the main device; and
powering off the main device in the response to the sleep signal.

14. (Currently Amended) The method of claim 13, further comprising:
after the main device is powered off, comparing the count value with the second compare value;
determining a second expiry event upon the count value matching the second compare value; and
waking up the main device in response to the second expiry event.

15. (Original) The method of claim 11, further comprising incrementing the count value at a rate based on a frequency of the oscillator.

16. (Currently Amended) The method of claim 11, further comprising:
receiving a control signal from the main device; and
coupling the oscillator signal to the main device in response to the control signal.

17. (Currently Amended) The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the main device, each of the plurality of state update ~~signal~~ signals corresponding to a different state of the main device; and
updating the state stored in the state sequencing circuit in response to each of the plurality of state update signals.

18. (Currently Amended) ~~A method for extending battery life in a mobile application, the method comprising:~~
~~receiving an oscillator signal from an oscillator;~~
~~generating a count value based on the oscillator signal;~~
~~comparing the count value with a first compare value;~~
~~determining a first expiry event upon the count value matching the first compare value;~~
~~waking up a device in response to the first expiry event;~~
~~communicating a state stored in a state sequencing circuit to the device while the device is powered on;~~ The method of claim 11, further comprising:
sequentially receiving a plurality of state update signals from the main device; and
updating the state stored in the state sequencing circuit in response to each of the plurality of state update signals;
wherein each of the plurality of state update signals corresponds to a different one of a plurality of states of the main device, in a first one of the plurality of states of the main device, the device periodically checks a contact sensor to detect the presence of a patient, and, in a second one of the plurality of states of the main device, the device periodically collects sensor data from one or more sensors, ~~and sequentially receiving the plurality of state update signals from the device comprises receiving one of the state update signals from the device when the presence of the patient is detected by the contact sensor.~~

19. (Currently Amended) The method of claim 18, wherein, in the second one of the plurality of states of the main device, the main device periodically transmits the sensor data wirelessly to an external device.

20. (Currently Amended) An apparatus for extending battery life in a mobile application, the apparatus comprising:
means for receiving an oscillator signal from an oscillator;
means for generating a count value based on the oscillator signal;
means for comparing the count value with a first compare value;
means for determining a first expiry event upon the count value matching the first compare value;

means for waking up a main device in response to the first expiry event;

means for communicating a state stored in a state sequencing circuit to the main device while the main device is powered on;

means for tracking a number of times that the main device has been woken up in the stored state; and

means for determining a duration that the main device has been in the stored state based on the number of times that the main device has been woken up in the stored state and a duration between adjacent wake ups of the main device.

21. (Currently Amended) The apparatus of claim 20, further comprising means for receiving a second compare value for a next wakeup cycle from the main device.

22. (Currently Amended) The apparatus of claim 21, further comprising:

means for receiving a sleep signal from the main device; and

means for powering off the main device in the response to the sleep signal.

23. (Currently Amended) The apparatus of claim 22, further comprising

means for comparing the count value with the second compare value after the main device is powered off;

means for determining a second expiry event upon the count value matching the second compare value; and

means for waking up the main device in response to the second expiry event.

24. (Original) The apparatus of claim 20, further comprising means for incrementing the count value at a rate based on a frequency of the oscillator.

25. (Currently Amended) The apparatus of claim 20, further comprising:

means for receiving a control signal from the main device; and

means for coupling the oscillator signal to the main device in response to the control signal.

26. (Currently Amended) The apparatus of claim 20, further comprising:
means for sequentially receiving a plurality of state update signals from the main device,
each of the plurality of state update signal signals corresponding to a different state of the main
device; and
means for updating the state stored in the state sequencing circuit in response to each of
the plurality of state update signals.

27. (Currently Amended) ~~An apparatus for extending battery life in a mobile application, the apparatus comprising:~~
~~means for receiving an oscillator signal from an oscillator;~~
~~means for generating a count value based on the oscillator signal;~~
~~means for comparing the count value with a first compare value;~~
~~means for determining a first expiry event upon the count value matching the first~~
~~compare value;~~
~~means for waking up a device in response to the first expiry event;~~
~~means for communicating a state stored in a state sequencing circuit to the device while~~
~~the device is powered on;~~ The apparatus of claim 20, further comprising:
means for sequentially receiving a plurality of state update signals from the main device;
and
means for updating the state stored in the state sequencing circuit in response to each of
the plurality of state update signals;
wherein each of the plurality of state update signals corresponds to a different one of a
plurality of states of the main device, in a first one of the plurality of states of the main device,
the device periodically checks a contact sensor to detect the presence of a patient, and, in a
second one of the plurality of states of the main device, the device periodically collects sensor
data from one or more sensors, ~~and the means for sequentially receiving the plurality of state~~
~~update signals receives one of the state update signals from the device when the presence of the~~
~~patient is detected by the contact sensor.~~

28. (Currently Amended) The apparatus of claim 27, wherein, in the second one of the plurality of states of the main device, the main device periodically transmits the sensor data wirelessly to an external device.

29. (Previously Presented) The system of claim 1, wherein the state sequencing circuit is configured to change the stored state of the main device when the number of times that the main device has been woken up in the stored state reaches a predetermined number.

30. (Canceled)

31. (Previously Presented) The system of claim 9, wherein the one or more sensors comprises at least one of a pulse oximeter, a blood pressure sensor, or a blood sugar sensor.

32. (Previously Presented) The system of claim 9, wherein the one or more sensors comprises a temperature sensor configured to measure a temperature of the patient.

33. (Previously Presented) The system of claim 1, wherein the processor is in the main device.

34. (Previously Presented) The system of claim 1, wherein the system further comprises a transceiver, and the processor is configured to transmit the duration that the main device has been in the stored state to an external device via the transceiver.

35. (Currently Amended) The system of claim 9, wherein the system further comprises[[:]]

~~a register configured to track a number of times that the main device has been woken up in the second one of the plurality of states; and~~

a transceiver[[:]],

~~wherein~~ and the processor is further configured to transmit at least portion of the sensor data collected by the main device to an external device via the transceiver when the number of

times that the main device has been woken up in the second one of the plurality of states of the main device reaches a predetermined number.

36. (Currently Amended) The system of claim 9, wherein the system further comprises a transceiver, and wherein, in a third one of the plurality of states of the main device, the processor is configured to perform a discovery procedure using the transceiver to discover an external device, and, in the second one of the plurality of states of the main device, the processor is further configured to transmit at least portion of the sensor data collected by the main device to the external device via the transceiver.

S103	1	("20120115552").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/02 14:09
S105	1	("20110158303").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/02 17:23
S106	0	determin\$3 near5 duration with adjacent near3 (wak\$3 or 'wake- up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/04/18 12:14
S107	3	determin\$3 near5 duration same adjacent near3 (wak\$3 or 'wake- up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/04/18 12:14
S108	32	(duration or period) near5 adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/04/18 12:17
S109	42	(duration or period) near5 adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or sleep\$3)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/04/18 12:19
S110	1	(14/596087).APP.	US-PGPUB; USPAT	OR	OFF	2017/06/27 18:12
S111	38	(duration or interval) same adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/06/28 13:47
S112	25	(number or count) with adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/06/28 15:52
S114	1	S112 same (state)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/06/28 15:53
S115	1	S112 same (power)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/06/28 15:54
S116	95	(duration or interval or period) same adjacent near3 (wak\$3 or 'wake- up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/06/28 15:54
S117	2976	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2017/06/28 15:54
S118	5	S116 and S117	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/06/28 15:54
S119	189	(wak\$3 or wakeup or 'wake-up')	US-PGPUB;	OR	OFF	2017/07/03

		near3 (processor or cpu) same (timer or count\$3) near5 expir\$5	USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			06:41
S120	131	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with (threshold or limit) near4 register	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 06:49
S121	3305	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) with register	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 06:53
S122	2	(connect\$3 or disconnect\$3) near5 (power or battery) near3 (processor or cpu) with (timer or count\$3) near5 oscillator	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 07:02
S123	33	(duration or period) near5 adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 07:20
S124	2	S119 same (sav\$3 or stor\$3) near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 07:21
S125	93	(sav\$3 or stor\$3) near3 power near3 state same (track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 07:24
S126	21	determin\$3 near3 power near3 state same (track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:04
S127	1	("20120173904").PN.	US-PGPUB; USPAT	OR	OFF	2017/07/03 08:05
S128	2	S126.ab,clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:07
S129	37	(duration or period) with adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:07
S131	2	S129 same (power adj2 state)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:07
S132	770	determin\$3 near5 (duration or period) with (power adj2 state)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/07/03 08:08

			IBM_TDB			
S134	9252	(duration or period) with (power adj2 state)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:10
S135	2	S134 same adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:10
S136	15141	(activat\$3 or enabl\$3 or connect\$3 or wak\$3) near3 (processor or cpu) with (timer or count\$3 or timeout)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:12
S137	94	S136 same (sav\$3 or stor\$3) near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:13
S138	2981	G06F1/3206.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 08:13
S139	1	S137 and S138	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:13
S140	2370	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 08:13
S141	0	S137 and S140	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:13
S142	3574	G06F1/3296.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 08:14
S143	1	S137 and S142	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:14
S144	158	S134 and S136	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:15
S145	9	S144 and S138	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:15
S146	1	("20130198540").PN.	US-PGPUB; USPAT	OR	OFF	2017/07/03 08:17
S147	95	(duration or interval or period) same adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:19

S148	2370	G06F1/28.CPC.	US-PGPUB; USPAT	OR	ON	2017/07/03 08:38
S149	1	S147 and S148	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:38
S150	2	S144 and S140	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:51
S151	4	S144 and S142	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:54
S152	40	S137.ab,clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:58
S153	28	S125.ab,clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 08:58
S154	111	(duration or interval or period or cycle) same adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:13
S155	111	(duration or interval or period or cycle) same adjacent near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:16
S156	1	S155 same (sav\$3 or stor\$3) near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:18
S157	3	S155 same power near3 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:20
S158	70332	(duration or interval or period or cycle) with (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:22
S159	41	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) same (duration or period) with power adj2 state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:24
S160	10	S159.ab,clm.	US-PGPUB; USPAT; FPRS;	OR	OFF	2017/07/03 09:24

			EPO; JPO; DERWENT; IBM_TDB			
S161	50331	(duration or interval or period or cycle) near7 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:28
S162	11	S137 and S161	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:28
S163	6	(track\$3 or monitor\$3 or count\$3) near5 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1) same S132	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:31
S164	754	(duration or period or interval or cycle) with (adjacent or subsequent or successive) near3 (wak\$3 or 'wake-up\$1' or wakeup or interrupt\$1)	US-PGPUB; USPAT	OR	OFF	2017/07/03 09:40
S165	4	S121 same S164	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/03 09:44

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BIB DATA SHEET

CONFIRMATION NO. 6012

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/596,087	01/13/2015	713	2118	QCOM-3146US (143971)		
APPLICANTS QUALCOMM, Incorporated, San Diego, CA; INVENTORS Robert Bruce Ganton, San Diego, CA; Robert Scott Ballam, Eatons Hill, AUSTRALIA; ** CONTINUING DATA ***** This appln claims benefit of 61/992,039 05/12/2014 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/26/2015						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /GAYATHRI SAMPATH/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 6	TOTAL CLAIMS 28 35	INDEPENDENT CLAIMS 3
ADDRESS Loza & Loza, LLP/Qualcomm 305 N. Second Ave., #127 Upland, CA 91786 UNITED STATES						
TITLE ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS						
FILING FEE RECEIVED 4600	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		

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Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14596087	01/13/2015	Robert Bruce Ganton	QCOM-3146US 143971	6012

TITLE OF INVENTION:

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$960	\$0	\$960	10/10/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS

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.

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(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 patent attorneys or agents. If no name is listed, no name will be printed.

1 Loza & Loza, LLP/Qualcomm
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)

QUALCOMM Incorporated

San Diego, California

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 enclosed:

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☒ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies

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☐ A check in the amount of the fee(s) is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 170026

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

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

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Authorized Signature /Chui-kiu Teresa Wong/

Date 07-17-2017

Typed or printed name Chui-kiu Teresa Wong

Registration No. 48,042

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IPR2025-01015

Qualcomm Inc. v. Collabo Innovations, Inc.

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Electronic Patent Application Fee Transmittal				
Application Number:		14596087		
Filing Date:		13-Jan-2015		
Title of Invention:		ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS		
First Named Inventor/Applicant Name:		Robert Bruce Ganton		
Filer:		Chui-Kiu Teresa Wong/Joann Vachon		
Attorney Docket Number:		QCOM-3146US (143971)		
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:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
UTILITY APPL ISSUE FEE	1501	1	960	960
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt

EFS ID:	29810346
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	112246
Filer:	Chui-Kiu Teresa Wong/Joann Vachon
Filer Authorized By:	Chui-Kiu Teresa Wong
Attorney Docket Number:	QCOM-3146US (143971)
Receipt Date:	18-JUL-2017
Filing Date:	13-JAN-2015
Time Stamp:	10:47:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$960
RAM confirmation Number	071817INTEFSW00008988170026
Deposit Account	170026
Authorized User	Joann Vachon

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

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

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)
 37 CFR 1.20 (Post Issuance fees)
 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	Issue Fee Payment (PTO-85B)	143971_Fee-Transmittal-IFP_07-17-17.pdf	221178	no	2
			e4e234b703d8208c9d794c2a03e7860e526e77db		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32737	no	2
			ee2a464241ba5d33b189835d1935fbac8963783		

Warnings:

Information:

Total Files Size (in bytes):			253915
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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.

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.

"FEE ADDRESS" INDICATION FORM**Address to:**
Mail Stop M Correspondence
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**Fax to:**
571-273-6500**- OR -**

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application.

When to check the first box below: If you have a Customer Number to represent the fee address. **When to check the second box below:** If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:



Customer Number:

23696**OR**

The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
	14/596,087

Completed by (check one):



Applicant/Inventor

/Eugene Worley/

Signature

Attorney or Agent of record 47186

(Reg. No.)

Eugene Worley

Typed or printed name

Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)949-535-1442

Requester's telephone number



Assignee recorded at Reel _____ Frame _____

July 18, 2017

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

* Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.363. 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 1.11 and 1.14. This collection is estimated to take 5 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 COMPLETE D FORMS TO THIS ADDRESS.

SEND TO: Mail Stop M Correspondence, 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.*

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.

Electronic Acknowledgement Receipt	
EFS ID:	29811861
Application Number:	14596087
International Application Number:	
Confirmation Number:	6012
Title of Invention:	ELECTRONIC DEVICE FOR EXTENDING BATTERY LIFE IN MOBILE APPLICATIONS
First Named Inventor/Applicant Name:	Robert Bruce Ganton
Customer Number:	112246
Filer:	Eugene R. Worley/Michalene Winkelspecht
Filer Authorized By:	Eugene R. Worley
Attorney Docket Number:	QCOM-3146US (143971)
Receipt Date:	18-JUL-2017
Filing Date:	13-JAN-2015
Time Stamp:	12:09:28
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	Maintenance Fee Address Change	143971_Maintenance_Fee_Address_Form.pdf	318905	no	2
			2f5bb21c8d4234f1881e6dbf9771746cf6b4af61		
Warnings:					

Information:	
Total Files Size (in bytes):	318905
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>	



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www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/596,087	08/22/2017	9740265	QCOM-3146US (143971)	6012

112246 7590 08/02/2017
Loza & Loza, LLP/Qualcomm
305 N. Second Ave., #127
Upland, CA 91786

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 152 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):

Robert Bruce Ganton, San Diego, CA;
QUALCOMM, Incorporated, San Diego, CA;
Robert Scott Ballam, Eatons Hill, AUSTRALIA;

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