



- (51) International Patent Classification:
G06F 9/48 (2006.01) G06F 1/32 (2006.01)
- (21) International Application Number:
PCT/US2013/026873
- (22) International Filing Date:
20 February 2013 (20.02.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/602,287 23 February 2012 (23.02.2012) US
13/418,597 13 March 2012 (13.03.2012) US
- (71) Applicant: QUALCOMM INCORPORATED [US/US];
Attn: International Ip Administration, 5775 Morehouse
Drive, San Diego, California 92121 (US).
- (72) Inventors: GARGASH, Norman S.; 5775 Morehouse
Drive, San Diego, California 92121 (US). CARAWAY,
Grady L.; 5775 Morehouse Drive, San Diego, California
92121 (US). VIJAYARAJAN, Vinod; 5775 Morehouse
Drive, San Diego, California 92121 (US). ULMER, Tracy

A.; 5775 Morehouse Drive, San Diego, California 92121 (US). STUBBS, Joshua H.; 5775 Morehouse Drive, San Diego, California 92121 (US). FRANTZ, Andrew J.; 5775 Morehouse Drive, San Diego, California 92121 (US). Gabriel, Watkins; 5775 Morehouse Drive, San Diego, California 92121 (US).

(74) Agent: COLE, Nicholas Albert; 5775 Morehouse Drive, San Diego, CA 92121 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR SCHEDULING REQUESTS IN A PORTABLE COMPUTING DEVICE

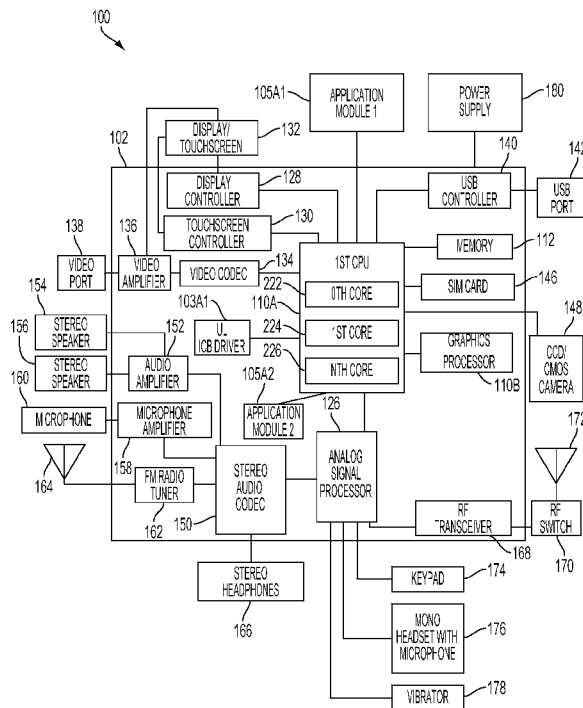
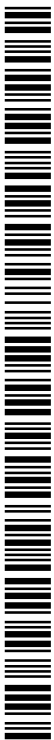


FIG. 1

(57) Abstract: A method and system for managing requests among resources within a portable computing device include a scheduler receiving data from a client for scheduling a plurality of requests. Each request identifies at least one resource and a requested deadline. Next, data from the client is stored by the scheduler in a database. The scheduler then determines times and a sequence for processing the requests based on requested deadlines in the requests and based on current states of resources within the portable computing device. The scheduler then communicates the requests to the resources at the determined times and according to the determined sequence. The scheduler, at its discretion, may schedule a request after its requested deadline in response to receiving a new request command from a client. The scheduler may allow a sleep set corresponding to a sleep processor state to power off a processor.





(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*
 — *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

(88) Date of publication of the international search report:

16 October 2014

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/026873

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F9/48 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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|--------------------------------------|
| X | US 2002/007387 A1 (GINSBERG MICHAEL [US]) 17 January 2002 (2002-01-17) abstract paragraph [0008] - paragraph [0012] paragraph [0029] paragraph [0038] - paragraph [0041] paragraph [0046] - paragraph [0047] paragraph [0062] - paragraph [0068]; figure 4 ----- -/-- | 1-6, 10-16, 20-26, 30-36,40 |

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 | "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 |
| "E" earlier application or patent but published on or after the international filing date | "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 |
| "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) | "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 |
| "O" document referring to an oral disclosure, use, exhibition or other means | "&" document member of the same patent family |
| "P" document published prior to the international filing date but later than the priority date claimed | |

| | |
|--|--|
| Date of the actual completion of the international search 22 May 2014 | Date of mailing of the international search report 28/08/2014 |
|--|--|

| | |
|--|---|
| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016 | Authorized officer Ross, Christopher |
|--|---|

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/026873

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|---|--------------------------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | <p>XAVIER PEREZ-COSTA ET AL: "Overlapping Aware Scheduled Automatic Power Save Delivery Algorithm", INTERNET CITATION, 1 April 2007 (2007-04-01), pages 1-8, XP002562762, Retrieved from the Internet: URL:http://www.ew2007.org/papers/1569014758.pdf [retrieved on 2010-01-12] abstract page 1, right-hand column, line 4, paragraph 1 - paragraph 2 Section A.;; page 2 Section III. OAS-APSD Algorithm;; page 3, left-hand column, line 5 - page 4, left-hand column, line 24; figures 1, 2 -----</p> | 1-6, 10-16, 20-26, 30-36,40 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/026873

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|------------------|-------------------------|------------------|
| US 2002007387 | A1 | NONE | |

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-6, 10-16, 20-26, 30-36, 40

This group regards request scheduling with deadlines in conjunction with power management. Resources can be put into a sleep state, and unexpected requests received during a scheduled sleep state are handled according to the needs of the requests.

2. claims: 7-9, 17-19, 27-29, 37-39

These claims are concerned with resource handling and request processing when unscheduling previously scheduled requests.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/026873

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.:

1-6, 10-16, 20-26, 30-36, 40

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.