# (12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2013 年 12 月 27 日 (27.12.2013)

WIPO | PCT

(10) 国际公布号
WO 2013/189442 A3

(51) 国际专利分类号:
*G06F 12/08* (2006.01) *G06F 17/30* (2006.01)

(21) 国际申请号: PCT/CN2013/082402

(22) 国际申请日: 2013 年 8 月 27 日 (27.08.2013)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
201210566185.3 2012 年 12 月 24 日 (24.12.2012) CN



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(81) 指定国 (除另有指明，要求每一种可提供的国家保护): 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, 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, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW。

(84) 指定国 (除另有指明，要求每一种可提供的地区保护): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (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, KM, ML, MR, NE, SN, TD, TG)。

本国际公布:
— 包括国际检索报告(条约第 21 条(3))。
— 在修改权利要求的期限届满之前进行，在收到该修改后将重新公布(细则 48.2(h))。


[见续页]

(54) **Title**: MEMORY MANAGEMENT METHOD AND DEVICE

(54) **发明名称** : 一种内存管理方法和装置

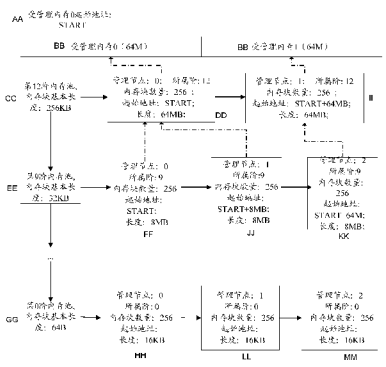


图 1 / FIG. 1

AA MANAGED MEMORY 0 START ADDRESS: START
BB MANAGED MEMORY
CC NO. 12 ORDER MEMORY POOL, MEMORY BLOCK FUNDAMENTAL LENGTH: 256 KB
DD MANAGEMENT NODE: 0; THE ORDER THEREOF: 12; MEMORY BLOCK QUANTITY: 256; START ADDRESS: START; LENGTH: 64 MB
EE NO. 9 ORDER MEMORY POOL, MEMORY BLOCK FUNDAMENTAL LENGTH: 32 KB
FF MANAGEMENT NODE: 0; THE ORDER THEREOF: 9; MEMORY BLOCK QUANTITY: 256; START ADDRESS: START; LENGTH: 8 MB
GG NO. 0 ORDER MEMORY POOL, MEMORY BLOCK FUNDAMENTAL LENGTH: 64 B
HH MANAGEMENT NODE: 0; THE ORDER THEREOF: 0; MEMORY BLOCK QUANTITY: 256; START ADDRESS: LENGTH: 16 KB
II MANAGEMENT NODE: 1; THE ORDER THEREOF: 12; MEMORY BLOCK QUANTITY: 256; START ADDRESS: START + 64 MB; LENGTH: 64 MB
JJ MANAGEMENT NODE: 1; THE ORDER THEREOF: 9; MEMORY BLOCK QUANTITY: 256; START ADDRESS: START + 8 MB; LENGTH: 8 MB
KK MANAGEMENT NODE: 2; THE ORDER THEREOF: 9; MEMORY BLOCK QUANTITY: 256; START ADDRESS: START + 64 MB; LENGTH: 8 MB
LL MANAGEMENT NODE: 1; THE ORDER THEREOF: 0; MEMORY BLOCK QUANTITY: 256; START ADDRESS: LENGTH: 16 KB
MM MANAGEMENT NODE: 2; THE ORDER THEREOF: 0; MEMORY BLOCK QUANTITY: 256; START ADDRESS: LENGTH: 16 KB


(57) **Abstract**: Disclosed is a memory management method. A memory is divided into more than one order of memory pools, and each order of memory pool has at least one management node. In the case of memory application, an order of memory pool is determined according to the size of a memory for which the application is made, and then the memory is allocated to the memory application according to the occupation condition of the order of memory pool in a memory pool management list; and in the case of memory release, according to label information about a memory which needs to be released, the memory is released. Also disclosed at the same time is a memory management device. Using the technical solution of the present invention, a memory block has a variable fundamental length, a high flexibility, and a high utilization rate of memory resources, and can be applied to embedded systems or operating systems with different demands for memory resources.

(57) **摘要**: 本发明公开了一种内存管理方法，将内存划分为一阶以上内存池，每阶内存池具有至少一个管理节点，申请内存时，根据申请内存大小确定出阶内存池，再根据内存池管理列表中阶内存池的占用情况为内存申请分配内存；释放内存时，根据需释放内存的标记信息，对内存进行释放；同时本发明还公开了一种内存管理装置。利用本发明的技术方案，内存块基本长度可变、灵活性强、内存资源利用率高，可适用于不同内存资源需求的嵌入式系统或操作系统。


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— 根据申请人的请求，在条约第 21 条(2)(a)所规定的期限届满之前进行。

(88) **国际检索报告公布日期**: 2014 年 2 月 13 日

# INTERNATIONAL SEARCH REPORT

International application No.
**PCT/CN2013/082402**

**A. CLASSIFICATION OF SUBJECT MATTER**

See the extra sheet

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)

IPC: G06F 12/-, G06F 17/-

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)

CNKI, CNPAT, WPI, EPODOC: memory, pool?, node?, size?, rank, manage+, tag

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | CN 1635482 A (DTVIATECHLABS CO., LTD.), 06 July 2005 (06.07.2005), see description, page 1, paragraph 1 to page 6, penultimate paragraph, and figures 1-3 | 1, 4, 6, 9 |
| A | CN 1963788 A (ZTE CORP.), 16 May 2007 (16.05.2007), see the whole document | 1-10 |
| A | US 6505283 B1 (CANON KABUSHIKI KAISHA), 07 January 2003 (07.01.2003), see the whole document | 1-10 |
| PX | CN 103077126 A (ZTE CORP.), 01 May 2013 (01.05.2013), see claims 1-10 | 1-10 |

☐ 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 | Date of mailing of the international search report |
|---|---|
| 30 October 2013 (30.10.2013) | **12 December 2013 (12.12.2013)** |
| Name and mailing address of the ISA/CN:<br>State Intellectual Property Office of the P. R. China<br>No. 6, Xitucheng Road, Jimenqiao<br>Haidian District, Beijing 100088, China<br>Facsimile No.: (86-10) 62019451 | Authorized officer<br>**WANG, Xiaofei**<br>Telephone No.: (86-10) **62412614** |

# INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
**PCT/CN2013/082402**

| Patent Documents referred in the Report | Publication Date | Patent Family | Publication Date |
|---|---|---|---|
| CN 1635482 A | 06.07.2005 | None | |
| CN 1963788 A | 16.05.2007 | None | |
| US 6505283 B1 | 07.01.2003 | JP 2000112814 A | 21.04.2000 |
| | | AU 5267299 A | 13.04.2000 |
| CN 103077126 A | 01.05.2013 | None | |

# INTERNATIONAL SEARCH REPORT

International application No.

**PCT/CN2013/082402**

**CONTINUATION: CLASSIFICATION OF SUBJECT MATTER**

G06F 12/08 (2006.01) i

G06F 17/30 (2006.01) i

# 国际检索报告

国际申请号
**PCT/CN2013/082402**

**A. 主题的分类**

见附加页

按照国际专利分类(IPC)或者同时按照国家分类和 IPC 两种分类

**B. 检索领域**

检索的最低限度文献(标明分类系统和分类号)

IPC：G06F12/-，G06F17/-

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)：CNKI，CNPAT，WPI，EPODOC：内存，池，节点，管理，大小，阶，等级，标记，memory, pool?, node?, size?, rank, manage+, tag

**C. 相关文件**

| 类　型* | 引用文件，必要时，指明相关段落 | 相关的权利要求 |
|---|---|---|
| X | CN1635482A（北京中视联数字系统有限公司）06.7 月 2005（06.07.2005）参见说明书第 1 页第 1 段-第 6 页倒数第 2 段及附图 1-3 | 1，4，6，9 |
| A | CN1963788A（中兴通讯股份有限公司）16.5 月 2007（16.05.2007）参见全文 | 1-10 |
| A | US6505283B1（CANON KABUSHIKI KAISHA）07.1 月 2003（07.01.2003）参见全文 | 1-10 |
| PX | CN103077126A（中兴通讯股份有限公司）01.5 月 2013（01.05.2013）参见权利要求 1-10 | 1-10 |

☐ 其余文件在 C 栏的续页中列出。　　☒ 见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

"E" 在国际申请日的当天或之后公布的在先申请或专利

"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件（如具体说明的）

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

| 国际检索实际完成的日期 | 国际检索报告邮寄日期 |
|---|---|
| 30.10 月 2013（30.10.2013） | **12.12 月 2013 (12.12.2013)** |
| ISA/CN 的名称和邮寄地址：<br>中华人民共和国国家知识产权局<br>中国北京市海淀区蓟门桥西土城路 6 号 100088<br>传真号：　(86-10)62019451 | 受权官员<br>王晓飞<br>电话号码：(86-10) **62412614** |

# 国际检索报告
关于同族专利的信息

国际申请号
**PCT/CN2013/082402**

| 检索报告中引用的专利文件 | 公布日期 | 同族专利 | 公布日期 |
|---|---|---|---|
| CN1635482A | 06.07.2005 | 无 | |
| CN1963788A | 16.05.2007 | 无 | |
| US6505283B1 | 07.01.2003 | JP2000112814A | 21.04.2000 |
| | | AU5267299A | 13.04.2000 |
| CN103077126A | 01.05.2013 | 无 | |

续：主题的分类

G06F12/08（2006.01）i

G06F17/30（2006.01）i