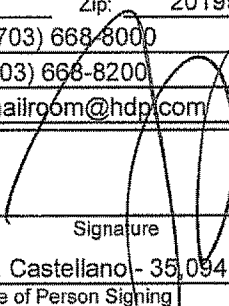


Form PTO-1595 (Rev. 01-09)  
OMB No. 0651-0027 (exp. 02/28/2009)U.S. DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office**RECORDATION FORM COVER SHEET  
PATENTS ONLY**

To the Director of the U.S. Patent and Trademark Office: Please record the attached documents or the new address(es) below.

<b>1. Name of conveying party(ies):</b> Byeong-In Choe (08/11/2011), Jae-Hoon Jang (08/11/2011), Sun-Il Shim (08/11/2011), Han-Soo Kim (08/11/2011), and Additional name(s) of conveying party(ies) attached? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>2. Name and address of receiving party(ies)</b> Name: <u>Samsung Electronics Co., Ltd.</u> Internal Address: _____ Street Address: _____  416 Maetan-dong, Yeongtong-gu  City: <u>Suwon-si, Gyeonggi-do</u> State: _____ Country: <u>Republic of Korea</u> Zip: _____ Additional name(s) & address(es) attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>3. Nature of conveyance/Execution Date(s):</b> Execution Date(s): <u>in parentheses after inventor name</u> <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Merger <input type="checkbox"/> Change of Name <input type="checkbox"/> Security Agreement <input type="checkbox"/> Joint Research Agreement <input type="checkbox"/> Government Interest Assignment <input type="checkbox"/> Executive Order 9424, Confirmatory License <input type="checkbox"/> Other _____	<b>4. Application or patent number(s):</b> <input type="checkbox"/> This document is being filed together with a new application. A. Patent Application No.(s) <u>13/221,380</u>  B. Patent No.(s)  Additional numbers attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>5. Name and address to whom correspondence concerning document should be mailed:</b> Name: <u>John A. Castellano</u> <u>HARNESS, DICKEY &amp; PIERCE, P.L.C.</u> Internal Address: <u>Atty. Dkt.: 9862-000479/US</u> Street Address: <u>P.O. Box 8910</u>  City: <u>Reston</u> State: <u>VA</u> Zip: <u>20195</u> Phone Number: <u>(703) 668-8000</u> Fax Number: <u>(703) 668-8200</u> Email Address: <u>dcmalroom@hdp.com</u>	<b>6. Total number of applications and patents involved:</b> <span style="border: 1px solid black; padding: 2px 10px;">1</span>  <b>7. Total fee (37 CFR 1.21(h) &amp; 3.41)</b> \$ <u>40.00</u>  <input checked="" type="checkbox"/> Authorized to be charged to deposit account <input type="checkbox"/> Enclosed <input type="checkbox"/> None required (government interest not affecting title)
<b>8. Payment Information</b>  Deposit Account Number <u>08-0750</u> Authorized User Name <u>John A. Castellano</u>	
<b>9. Signature:</b> <div style="text-align: center; margin-top: 20px;">  </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 60%;"> <u>John A. Castellano - 35,094</u>          Name of Person Signing       </div> <div style="width: 35%; text-align: right;"> <u>August 31, 2011</u>          Date       </div> </div> <div style="display: flex; justify-content: flex-end; margin-top: 10px;">         Total number of pages including cover sheet, attachments, and documents: <span style="border: 1px solid black; padding: 2px 10px;">5</span> </div>	

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**PATENT**  
**REEL: 026836 FRAME: 0660**

<b>RECORDATION FORM COVER SHEET (PTO-1595)</b> (supplemental sheet)	
<b>Additional Conveying Party(ies)/Execution Date(s) (1. Continued):</b>  Jin-Man Han (08/10/2011)	
<b>Additional Assignees (2. Continued):</b>	
Assignee Name: _____	
Internal Address: _____	
Street Address: _____	
City: _____ State: _____ Country: _____ Zip: _____	
Assignee Name: _____	
Internal Address: _____	
Street Address: _____	
City: _____ State: _____ Country: _____ Zip: _____	
Assignee Name: _____	
Internal Address: _____	
Street Address: _____	
City: _____ State: _____ Country: _____ Zip: _____	
<b>Additional Applications and/or Patents (4. Continued):</b>	
Additional Patent Application Numbers 4A. Continued:	Additional Patent Numbers 4B. Continued:
Additional numbers attached? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Atty. Dkt. No. 9862-000479/US

**ASSIGNMENT**

WHEREAS, the undersigned, hereinafter referred to collectively as Assignor, has invented:

**VERTICAL MEMORY DEVICES AND METHODS OF MANUFACTURING THE SAME**

for which Assignor is about to make or has made United States or International application for patent

- (a) ☒ executed on even date preparatory to filing (each inventor should sign this Assignment on the same day as he/she signs the Declaration and Power of Attorney);
- (b) ☐ executed on \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_; or
- (c) ☐ filed on \_\_\_\_\_, and assigned Serial No. \_\_\_\_\_ or PCT International Application No. \_\_\_\_\_; and

WHEREAS, Samsung Electronics Co., Ltd., 416, Maetan-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea, hereinafter referred to as Assignee, is desirous of acquiring all right, title, and interest therein:

NOW, THEREFORE, for good and valuable consideration, the receipt and adequacy whereof is hereby acknowledged, Assignor hereby confirms any prior assignment to Assignee, and to the extent that Assignor has not already done so, agrees to assign, and hereby does, sell, assign and transfer unto Assignee and its successors in interest, the full and exclusive right, title and interest in the United States of America and throughout the world, including the right to claim priority under the laws of the United States, the Paris Convention, and any foreign countries, to the inventions as described in the aforesaid application, to the aforesaid application itself, and all divisions, continuations, continuations-in-part, or other applications claiming priority directly or indirectly from the aforesaid application, and any United States or foreign Letters Patent, utility model, or other similar rights which may be granted thereon, including reissues, reexaminations and extensions thereof, and all copyright rights throughout the world in the aforesaid application and the subject matter disclosed therein, these rights, title and interest to be held and enjoyed by Assignee to the full end of the term for which the Letters Patent, utility model, or other similar rights, are granted and any extensions thereof as fully and entirely as the same would have been held by Assignor had this assignment and sale not been made, and the right to sue for, and recover for past infringements of, or liabilities for, any of the rights relating to any of the applications, patents, utility models, or other similar rights, resulting therefrom, and the copyright rights;

Assignor hereby covenants and agrees to execute all instruments or documents required or requested for the making and prosecution of any applications of any type for patent, utility model, or other similar rights, and for copyright, in the United States and in all foreign countries including, but not limited to, any provisional, continuation, continuation-in-part, divisional, renewal or substitute thereof, and as to letters patent any reissue, re-examination, or extension thereof, and for litigation regarding, or for the purpose of protecting title and to the said invention, the United States application for patent, or Letters Patent therefor, and to testify in support thereof, for the benefit of Assignee without further or other compensation than that above set forth;

Assignor hereby covenants that no assignment, sale, license, agreement or encumbrance has been or will be entered into which would conflict with this Assignment; and

Assignor hereby requests the United States Patent and Trademark Office to issue the Letters Patent of the United States of America to Assignee, and requests that any official of any country or countries foreign to the United States, whose duty it is to issue or grant patents and applications as aforesaid, to issue the Letters Patent, Utility Model Registration or other similar right to Assignee.

The undersigned hereby grant(s) the law firm of Harness, Dickey & Pierce, P.L.C. the power to insert on this Assignment any further identification which may be necessary or desirable in order to comply with the rules of the U.S. Patent and Trademark Office for recordation of this document.

Atty. Dkt. No. 9862-000479/US

## ASSIGNMENT

CHOE Kyeong-In

Byeong-In CHOE

2011 / Aug / 11

Dated

Jaehoon Jang

Jae-Hoon JANG

2011 / Aug / 11

Dated

Sun Il Shim

Sun-Il SHIM

2011 / Aug / 11

Dated

H.S. Kim

Han-Soo KIM

2011. 8. 11

Dated

Jin Man Han

Jin-Man HAN

8/16/2011

Dated