504630905 11/07/2017

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT4677623

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date	
YU CAI	10/04/2017	
HAIBO LI	10/04/2017	
FAN ZHANG	10/04/2017	

RECEIVING PARTY DATA

Name:	SK HYNIX MEMORY SOLUTIONS INC.		
Street Address:	3103 NORTH FIRST STREET		
City:	SAN JOSE		
State/Country:	CALIFORNIA		
Postal Code:	95134		

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	15783780

CORRESPONDENCE DATA

Fax Number: (571)327-5452

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent

using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 571-327-5450

Email: ipntlaw@ipntlaw.com
Correspondent Name: IP&T GROUP LLP

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Address Line 4: VIENNA, VIRGINIA 22182

ATTORNEY DOCKET NUMBER:	P16HS0022
NAME OF SUBMITTER:	MYUNG SOO KIM
SIGNATURE:	/Myung Soo KIM/
DATE SIGNED:	11/07/2017

Total Attachments: 3

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PATENT 504630905 REEL: 044054 FRAME: 0065

Attorney Docket No.: P16HS0022

ASSIGNMENT OF AND DECLARATION FOR APPLICATION FOR UNITED STATES LETTERS PATENT

WHEREAS	Yu CAI	, hereinafter	referred to collectively as the
assignor and inventor	r, has invented a certain i	improvement relating to	
M	EMORY SYSTEM OF	3D NAND FLASH AND OPERATING MET	HOD THEREOF,
on [] the specification h	as Appl of which was filed under	Inited States Patent and Trademark Office on lication Serial No(if applicable); the Patent Cooperation Treaty ontates of America being designated.	, and was amended
AND WHEREA	.s <u>SK Hyni</u>	x Memory Solutions Inc.	
application, including	g any and all divisions ar	icant, is desirous of acquiring the entire right, titled continuations thereof, and in and to said inventant and all renewals, reissues and prolongations the	tion and any and all patents
consideration paid be assigns, sells and trainterest in and to said any and all patents wassignee, and said as all divisions and coincluding any and all anywise arising from including any and assignee's successor	by said assignee to said insfers to said assignee, a displication, including which may be granted the signee's successors and a partinuations thereof, and il renewals, reissues and nor appertaining theretall renewals, reissues all renewals, reissues and in content and the said renewals, reissues and all renewals, reissues and all renewals, reissues and all renewals, reissues and all renewals, reissues and and renewals.	for and in consideration of One Dollar (\$1.00) assignor, the receipt of which is hereby acknown and said assignee's successors and assigns, the fit any and all divisions and continuations thereof, a serefor, including any and all renewals, reissues assigns, to have, hold, exercise and enjoy the said I the said invention and any and all patents we prolongations thereof, with all the rights, power, for and during the term or terms of any and and prolongations thereof, for the use and beneficial a manner as the said assignorable and beneficial as a said assignorable and beneficial a manner as the said assignorable and the said assignor	wiledged, said assignor hereby all and exclusive right, title and and in and to said invention and and prolongations thereof; said d application, including any and thich may be granted therefor, rs, privileges and advantages in all such patents when granted, efit of said assignee, and said
	acts relating to the obtain	to perform, upon the request of said assignee, a ming or to the asserting of said patents, including	
	d on any and all division	requests the Commissioner of Patents and Trade is and continuations thereof, to said assignee, an	
		eby declare that the above-identified application tor or an original joint inventor of a claimed inve	
	knowledge that any will nent of not more than fiv	ful false statement made in this declaration is pre (5) years, or both.	unishable under 18 U.S.C. 1001
ASSIGNOR (INVE	NTOR):		
Signature:	(27	Date: October 4, 2017	
Printed or Typed Na	ame: Yu CAI		••••



Attorney Docket No.: P16HS0022

ASSIGNMENT OF AND DECLARATION FOR APPLICATION FOR UNITED STATES LETTERS PATENT

WHEREAS Haibo LI hereinafter referred to collectively as the
assignor and inventor, has invented a certain improvement relating to
MEMORY SYSTEM OF 3D NAND FLASH AND OPERATING METHOD THEREOF .
[X] said application being attached hereto; [] said application having been filed in the United States Patent and Trademark Office on
AND WHEREAS SK Hynix Memory Solutions Inc.
hereinafter referred to as the assignee or applicant, is desirous of acquiring the entire right, title and interest in and to said application, including any and all divisions and continuations thereof, and in and to said invention and any and all patents which may be granted therefor, including any and all renewals, reissues and prolongations thereof; NOW THIS WITNESSETH, that for and in consideration of One Dollar (\$1.00), and other good and valuable consideration paid by said assignee to said assigner, the receipt of which is hereby acknowledged, said assignor hereby assigns, sells and transfers to said assignee, and said assignee's successors and assigns, the full and exclusive right, title and interest in and to said application, including any and all divisions and continuations thereof, and in and to said invention and any and all patents which may be granted therefor, including any and all renewals, reissues and prolongations thereof; said assignee, and said assignee's successors and assigns, to have, hold, exercise and enjoy the said application, including any and all divisions and continuations thereof, and the said invention and any and all patents which may be granted therefor including any and all renewals, reissues and prolongations thereof, with all the rights, powers, privileges and advantages in anywise arising from or appertaining thereto, for and during the term or terms of any and all such patents when granted including any and all renewals, reissues and prolongations thereof, for the use and benefit of said assignee, and said assignee's successors and assigns, in as ample and beneficial a manner as the said assignor might or could have held and enjoyed the same, if this assignment had not been made
AND said assignor hereby agrees to perform, upon the request of said assignee, or said assignee's successors of assigns, any and all acts relating to the obtaining or to the asserting of said patents, including any and all renewals, reissues and prolongations thereof.
AND said assignor authorizes and requests the Commissioner of Patents and Trademarks to issue Letters Patent or said application, and on any and all divisions and continuations thereof, to said assignee, and said assignee's successors and assigns, in accordance herewith.
As an above-named inventor, I hereby declare that the above-identified application was made or authorized to be made by me, and 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. 100 by fine or imprisonment of not more than five (5) years, or both.
ASSIGNOR (INVENTOR):
Signature: Date: October 4, 2017
Printed or Typed Name: Haibo LI
ASSIGNMENT OF AND DECLARATION FOR APPLICATION

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SK hynix

Attorney Docket No.: P16HS0022

FOR UNITED STATES LETTERS PATENT

WHEREAS	Fan ZHANG	· · · · · · · · · · · · · · · · · · ·	, h	nereinafter refer	red to col	lectively
as the assignor and inv	entor, has invented a cert					
MEMORY S	SYSTEM OF 3D NAND	FLASH AND OPI	ERATING METHOD) THEREOF		
[X] said application b		ted States Patent an ation Serial No. (if applicable); e Patent Cooperatic	d Trademark Office or	n , ar		amended
AND WHEREAS	S SK Hynix	Memory Solution	s Inc.			~~~~
application, including	as the assignee or applica any and all divisions and therefor, including any a	continuations there	of, and in and to said in	nvention and an		
consideration paid by assigns, sells and tran interest in and to said any and all patents whas assignee, and said ass all divisions and con including any and all anywise arising from including any and all assignee's successors	WITNESSETH, that for a said assignee to said assignee, and application, including an hich may be granted there ignee's successors and assitunations thereof, and to renewals, reissues and proof appertaining thereto, il renewals, reissues and and assigns, in as ample his assignment had not be	ssignor, the receipt d said assignee's sur- y and all divisions a efor, including any signs, to have, hold, he said invention rolongations thereof for and during the prolongations there and beneficial a	of which is hereby a cessors and assigns, t and continuations there and all renewals, reiss exercise and enjoy the and any and all paten with all the rights, p term or terms of any eof, for the use and	cknowledged, and and except, and in and sues and prolone as aid applications which may lowers, privileg and all such penefit of said	said assig lusive right to said invegations the on, including be grante es and ad- atents who d assigned	nor hereby ht, title and vention and hereof; said ing any and d therefor, vantages in en granted, e, and said
	ssignor hereby agrees to cts relating to the obtaini reof.					
	ssignor authorizes and recon any and all divisions and herewith.	0				
	e-named inventor, I hereb I am the original inventor					
	nowledge that any willfuent of not more than five (de in this declaration	is punishable u	nder 18 U	J.S.C. 1001
ASSIGNOR (INVEN	(TOR):					
Signature:		I	Date: October 4, 2017			
Printed or Typed Nar	ne: Fan ZHAN	IG				

ASSIGNMENT OF AND DECLARATION FOR APPLICATION FOR UNITED STATES LETTERS PATENT Page 3 of 4