

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT7751130

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
Name		Execution Date
INTEL CORPORATION		12/29/2021
RECEIVING PARTY DATA		
Name:	SK HYNIX NAND PRODUCT SOLUTIONS CORP.	
Street Address:	3101 N. 1ST STREET	
City:	SAN JOSE	
State/Country:	CALIFORNIA	
Postal Code:	95134	
PROPERTY NUMBERS Total: 60		
Property Type	Number	
Patent Number:	9330784	
Patent Number:	9857992	
Patent Number:	9323542	
Patent Number:	9043681	
Patent Number:	9135446	
Patent Number:	10091213	
Patent Number:	9543024	
Patent Number:	9202577	
Patent Number:	9251060	
Patent Number:	9047187	
Patent Number:	8990655	
Patent Number:	9116694	
Patent Number:	9201824	
Patent Number:	9772778	
Patent Number:	8804421	
Patent Number:	9032139	
Patent Number:	9354973	
Patent Number:	9093170	
Patent Number:	9502104	
Patent Number:	9223503	

PATENT

Property Type	Number
Patent Number:	9298552
Patent Number:	9535777
Patent Number:	9619167
Patent Number:	10120608
Patent Number:	10067829
Patent Number:	9025380
Patent Number:	9491345
Patent Number:	9208888
Patent Number:	9471488
Patent Number:	9645829
Patent Number:	10454495
Patent Number:	10108339
Patent Number:	9778848
Patent Number:	10114556
Patent Number:	9678677
Patent Number:	10180797
Patent Number:	9418000
Patent Number:	9819362
Patent Number:	9502082
Patent Number:	9679658
Patent Number:	9870169
Patent Number:	6834323
Patent Number:	9773764
Patent Number:	6785767
Patent Number:	7308531
Patent Number:	6477086
Patent Number:	6931498
Patent Number:	10043573
Application Number:	16987165
Patent Number:	10379782
Patent Number:	11194372
Patent Number:	8924601
Patent Number:	9936582
Application Number:	17241976
Application Number:	17231893
Application Number:	17203174
Application Number:	17222048
Application Number:	17214819

Property Type	Number
Application Number:	17543398
Patent Number:	9529668

CORRESPONDENCE DATA

Fax Number: (212)931-8521

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.

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ATTORNEY DOCKET NUMBER:	1912040.120
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NAME OF SUBMITTER:	PHILIP R. POH
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SIGNATURE:	/Philip R. Poh/
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DATE SIGNED:	01/19/2023
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Total Attachments: 43

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PATENT ASSIGNMENT AGREEMENT

This PATENT ASSIGNMENT AGREEMENT (this "Agreement"), dated as of December 29, 2021 (the "Effective Date"), is by and between Intel Corporation, a Delaware corporation and having its principal place of business at 2200 Mission College Boulevard, Santa Clara, CA 95054 ("Intel"), and SK hynix NAND Product Solutions Corp., a Delaware corporation and having its principal place of business at 3101 N. 1st Street, San Jose, CA 95134 ("Solidigm") (each of Intel and Solidigm, a "Party," and collectively, the "Parties").

RECITALS

WHEREAS, Intel, Solidigm and SK hynix Inc. executed that certain Amended and Restated SSD IP and Technology Assignment and License Agreement dated as of December 29, 2021 (the "ITALA");

WHEREAS, pursuant to the ITALA, Intel assigned to Solidigm all of Intel's right, title and interest in and to the patents listed on Exhibit 1 hereto (the "Transferred Patents");

WHEREAS, the Parties desire to enter into this Agreement to confirm, and provide notice of, Solidigm's right, title and interest in and to the Transferred Patents;

NOW, THEREFORE, for good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, and intending to be legally bound, the Parties hereby agree as follows:

ARTICLE I PATENT ASSIGNMENT

1.1. Patent Assignment. Intel hereby sells, transfers, assigns, conveys and delivers to Solidigm, and Solidigm hereby purchases, acquires and accepts from Intel, all right, title and interest in and to the Transferred Patents, including (a) continuations, divisionals, continuations-in-part to the extent entitled to claim priority from any of the issued patents or pending patent applications included in the Transferred Patents; (b) reissues, reexaminations, substitutions, renewals and extensions of any of the issued patents or pending patent applications included in the Transferred Patents, or subpart (a) above, as the case may be; and (c) any patents issuing on any of the foregoing, in each case, wherever and whenever existing.

1.2. No Modification of ITALA. Intel and Solidigm hereby agree and acknowledge that nothing in this Agreement shall in any way be interpreted to modify, replace or supersede, whether by implication, estoppel or otherwise, the ITALA. The Parties agree that, in the event of any discrepancy or inconsistency, the terms of the ITALA shall prevail over the terms of this Agreement, or any document entered into pursuant to this Agreement.

1.3. Governing Law. This Agreement, and all claims or causes of action based upon, arising out of, or related to this Agreement, shall be governed by and construed in accordance with the Laws of the State of Delaware without reference to the conflicts of law principles that would result in the application of the Laws of a different jurisdiction.

EXECUTION VERSION

1.4. Counterparts. This Agreement may be executed in multiple counterparts, and by any of the Parties in separate counterparts, each of which when executed shall be deemed to be an original but all of which taken together shall constitute one and the same agreement. The words "execution," "signed," "signature," "delivery," and words of like import in or relating to this Agreement or any agreement, instrument, certificate or other document to be signed in connection with this Agreement shall be deemed to include electronic signatures, deliveries or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be. Neither Party may raise the use of electronic signatures, deliveries or the keeping of records in electronic form, or the fact that any signature or agreement or instrument was transmitted electronically, as a defense to the formation of a contract, and each Party hereby forever waives any such defense, except to the extent that such defense relates to lack of authenticity.

1.5. Further Assurances. Intel shall, and shall cause its Affiliates to, from time to time at the request of Solidigm, without any additional consideration, furnish Solidigm such further information or assurances, execute and deliver such additional documents, instruments and conveyances, and take such other actions and do such other things, as may be reasonably necessary or appropriate to carry out the provisions of this Agreement.

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EXECUTION VERSION

IN WITNESS WHEREOF, this Agreement has been signed by or on behalf of each of the Parties
as of the day first above written.

Intel Corporation
By: 
Name: Jeff Desjard
Title: VP, Intel Patent Group

SK hynix NAND Product Solutions Corp.

DocuSigned by:
By: 
Name: Stephen Muller
Title: General Counsel

EXECUTION VERSION

Exhibit I

Transferred Patents

(ATTACHED)

Schedule 1.1-P(SSD)
Transferred SSD Patents

	Country	Status	Number - Filing	Number - Publication	Number - Patent	Title	Date - Filing	Date - Granted
1.	US	PAT- Active	15097650	US20190042444	10909040	ADAPTIVE CALIBRATION OF NONVOLATILE MEMORY CHANNEL BASED ON PLATFORM POWER MANAGEMENT STATE	4/19/2012	2/2/2021
2.	US	PAT- Active	15095938	US20190033593	10453540	METHOD AND APPARATUS TO PRIORITIZE READ RESPONSE TIME IN A POWER-LIMITED STORAGE DEVICE	4/23/2018	10/22/2019
3.	US	PAT- Active	15092998	US20190303284	10884916	NON-VOLATILE FILE UPDATE MEDIA	3/29/2012	1/5/2021
4.	CN	APP- Pending	2019101489060	CN110322914		NON-VOLATILE FILE UPDATE MEDIA	2/26/2019	
5.	DE	APP- Pending	1020191046710	DE102019104671		NON-VOLATILE FILE UPDATE MEDIA	2/26/2019	
6.	US	PAT- Active	15093367	US20190042140	10877686	MASS STORAGE DEVICE WITH HOST INITIATED BUFFER FLUSHING	4/13/2018	12/29/2020
7.	CN	APP- Pending	2019101912163	CN110377224		MASS STORAGE DEVICE WITH HOST INITIATED BUFFER FLUSHING	3/13/2019	
8.	DE	APP- Pending	1020191061261	DE102019106126		MASS STORAGE DEVICE WITH HOST INITIATED BUFFER FLUSHING	3/11/2019	
9.	US	PAT- Active	150910476	US20190042111	10747439	METHOD AND APPARATUS FOR POWER-FAIL SAFE COMPRESSION AND DYNAMIC CAPACITY FOR A STORAGE DEVICE	3/2/2018	8/18/2020
10.	US	APP- Pending	16054583	US20190042146		NAND-BASED STORAGE DEVICE WITH PARTITIONED NONVOLATILE WRITE BUFFER	8/3/2018	
11.	US	APP- Pending	16213274	US20190167976		APPARATUS AND METHOD FOR ASSIGNING VELOCITIES TO WRITE DATA	12/7/2018	
12.	US	APP- Pending	161176707	US20200135616		Choked Flow Cooling	10/31/2018	
13.	US	PAT- Active	16367638	US20190227749	10877696	Independent NAND memory operations by plane	3/28/2019	12/29/2020
14.	US	PAT- Active	16269986	US20190171564	11138104	SELECTION OF MASS STORAGE DEVICE STREAMS FOR GARBAGE COLLECTION BASED ON LOGICAL SATURATION	2/7/2019	10/5/2021
15.	CN	APP- Pending	2020100823175	CN111558680		SELECTION OF MASS STORAGE DEVICE STREAMS FOR GARBAGE COLLECTION BASED ON LOGICAL SATURATION	2/7/2020	
16.	DE	APP- Pending	1020101027818	DE102020102781		SELECTION OF MASS STORAGE DEVICE STREAMS FOR GARBAGE COLLECTION BASED ON LOGICAL SATURATION	2/4/2020	

17.	US	APP- Pending	16/831689	US20200225857		TECHNIQUES TO PREDICT OR DETERMINE TIME-TO-READY FOR A STORAGE DEVICE	3/26/2020	
18.	US	PAT- Active	16/282725	US20190188073	10908996	DISTRIBUTION OF A CODEWORD ACROSS INDIVIDUAL STORAGE UNITS TO REDUCE THE BIT ERROR RATE	2/22/2019	2/2/2021
19.	EP	APP- Pending	201543931	EP3699762		DISTRIBUTION OF A CODEWORD ACROSS INDIVIDUAL STORAGE UNITS TO REDUCE THE BIT ERROR RATE	1/29/2020	
20.	US	PAT- Active	16/242471	US20190138468	10795838	USING TRANSFER BUFFER TO HANDLE HOST READ COLLISIONS IN SSD	1/8/2019	10/6/2020
21.	US	PAT- Active	16/292825	US20190196562	10990151	REDUCTION OF SSD BURST CURRENT USING POWER LOSS ENERGY STORE	3/5/2019	4/27/2021
22.	US	APP- Pending	16/727794	US20200135284		SOLID STATE DRIVE (SSD) WITH IN-FLIGHT ERASURE ITERATION SUSPENSION	12/26/2019	
23.	US	APP- Pending	16/532996	US20190361614		METHOD AND APPARATUS TO IMPROVE WRITE BANDWIDTH OF A BLOCK-BASED MULTI-LEVEL CELL NON-VOLATILE MEMORY	8/6/2019	
24.	EP	APP- Pending	201811353	EP3772682		METHOD AND APPARATUS TO IMPROVE WRITE BANDWIDTH OF A BLOCK-BASED MULTI-LEVEL CELL NON-VOLATILE MEMORY	6/19/2020	
25.	US	APP- Pending	16/692090	US20200089407		INTER ZONE WRITE FOR ZONED NAMESPACES	11/22/2019	
26.	US	APP- Pending	16/586214	US20200027503		METHOD AND APPARATUS TO IMPROVE READ LATENCY OF A MULTI-THRESHOLD LEVEL CELL BLOCK-BASED NON-VOLATILE MEMORY	9/27/2019	
27.	US	APP- Pending	16/723878	US20200167274		ZONED NAMESPACE WITH ZONE GROUPING	12/20/2019	
28.	KR	APP- Pending	10-2020-0123900	KR20210080171		ZONED NAMESPACE WITH ZONE GROUPING	9/24/2020	
29.	US	APP- Pending	16/712647	US20200117369		SOLID STATE DRIVE WITH MULTIPLEXED INTERNAL CHANNEL ACCESS DURING PROGRAM DATA TRANSFERS	12/12/2019	
30.	US	APP- Closed	15/857530	US20190034105		STORAGE DEVICE HAVING PROGRAMMED CELL STORAGE DENSITY MODES THAT ARE A FUNCTION OF STORAGE DEVICE CAPACITY UTILIZATION	12/28/2017	
31.	CN	APP- Pending	2018114331578	CN110058800		STORAGE DEVICE HAVING PROGRAMMED CELL STORAGE DENSITY MODES THAT ARE A FUNCTION OF STORAGE DEVICE CAPACITY UTILIZATION	11/28/2018	
32.	DE	APP- Pending	1020181301642	DE102018130164		STORAGE DEVICE HAVING PROGRAMMED CELL STORAGE DENSITY MODES THAT ARE A FUNCTION OF STORAGE DEVICE CAPACITY UTILIZATION	11/28/2018	
33.	JP	APP- Pending	2018-190660	JP2019121350		STORAGE DEVICE HAVING PROGRAMMED CELL STORAGE DENSITY MODES THAT ARE A FUNCTION OF STORAGE DEVICE CAPACITY UTILIZATION	10/5/2018	

34.	KR	APP- Pending	10-2018-0148718	KR10-2019-0080733		STORAGE DEVICE HAVING PROGRAMMED CELL STORAGE DENSITY MODES THAT ARE A FUNCTION OF STORAGE DEVICE CAPACITY UTILIZATION	11/27/2018	
35.	US	PAT- Active	15/280725	US20180088823	10275156	MANAGING SOLID STATE DRIVE DEFECT REDUNDANCIES AT SUB-BLOCK GRANULARITY	9/29/2016	4/30/2019
36.	CN	APP- Pending	2017800532170	CN109643575		MANAGING SOLID STATE DRIVE DEFECT REDUNDANCIES AT SUB-BLOCK GRANULARITY	8/29/2017	
37.	EP	APP- Pending	178571113	EP3520112		MANAGING SOLID STATE DRIVE DEFECT REDUNDANCIES AT SUB-BLOCK GRANULARITY	8/29/2017	
38.	US	PAT- Active	15/282640	US20180095822	9946598	HANDLING OPEN CIRCUITS WHILE WRITING DATA BY MOVING THEM TO THE LEAST VULNERABLE LOCATION IN AN ERROR CORRECTION CODE CODEWORD	9/30/2016	4/17/2018
39.	US	PAT- Active	15/228729	US20180039429	10095424	APPARATUS AND METHOD FOR PROGRAMMING NON-VOLATILE MEMORY USING A MULTI-CELL STORAGE CELL GROUP	8/4/2016	10/9/2018
40.	US	PAT- Active	15/276588	US20180090201	10083742	METHOD AND APPARATUS FOR PROGRAMMING NON-VOLATILE MEMORY USING A MULTI-CELL STORAGE CELL GROUP TO PROVIDE ERROR LOCATION INFORMATION FOR RETENTION ERRORS	9/26/2016	9/25/2018
41.	CN	APP- Pending	2017800594463	CN109844864		METHOD AND APPARATUS FOR PROGRAMMING NON-VOLATILE MEMORY USING A MULTI-CELL STORAGE CELL GROUP TO PROVIDE ERROR LOCATION INFORMATION FOR RETENTION	8/24/2017	
42.	EP	APP- Pending	178536439	EP3516660		METHOD AND APPARATUS FOR PROGRAMMING NON-VOLATILE MEMORY USING A MULTI-CELL STORAGE CELL GROUP TO PROVIDE ERROR LOCATION INFORMATION FOR RETENTION	8/24/2017	
43.	US	PAT- Active	15/276696	US20180088810	10528462	STORAGE DEVICE HAVING IMPROVED WRITE UNIFORMITY STABILITY	9/26/2016	1/7/2020
44.	US	PAT- Active	15/410667	US20180203490	10120424	CONDUCTIVE STRESS-RELIEF WASHERS IN MICROELECTRONIC ASSEMBLIES	1/19/2017	11/6/2018
45.	US	PAT- Active	15/637481		10109361	COARSE PASS AND FINE PASS MULTI-LEVEL NVM PROGRAMMING	6/29/2017	10/23/2018
46.	CN	APP- Pending	2018106981042	CN109213689		COARSE PASS AND FINE PASS MULTI-LEVEL NVM PROGRAMMING	6/29/2018	
47.	EP	APP- Pending	181749672	EP3422351		COARSE PASS AND FINE PASS MULTI-LEVEL NVM PROGRAMMING	5/29/2018	
48.	US	PAT- Active	15/71237	US20190102296	10268578	DATA PRESERVATION AND RECOVERY IN A MEMORY COMPONENT	9/29/2017	4/23/2019
49.	US	PAT- Active	15/627928	US20180366204	10236069	WORD LINE READ DISTURB ERROR REDUCTION THROUGH FINE GRAINED ACCESS COUNTER MECHANISM	6/20/2017	3/19/2019

50.	US	PAT- Active	15/640484	US20190004796	10372446	TECHNOLOGY TO DYNAMICALLY MODULATE MEMORY DEVICE READ GRANULARITY	7/1/2017	8/6/2019
51.	US	PAT- Active	15/699930	US20190079681	10409500	MULTIPLE INDIRECTION GRANULARITIES FOR MASS STORAGE DEVICES	9/8/2017	9/10/2019
52.	US	PAT- Active	15/720492	US20190103159	10242734	RESUMING STORAGE DIE PROGRAMMING AFTER POWER LOSS	9/29/2017	3/26/2019
53.	US	PAT- Active	15/719444	US20190095110	10254979	RELOCATING OR ABORTING A BLOCK OF DATA BY A HOST BASED ON MEDIA POLICIES MANAGED BY A STORAGE DEVICE	9/28/2017	4/9/2019
54.	US	PAT- Active	15/703907	US20190079859	10592408	APPARATUS COMPUTER PROGRAM PRODUCT SYSTEM AND METHOD FOR MANAGING MULTIPLE REGIONS OF A MEMORY DEVICE	9/13/2017	3/17/2020
55.	US	PAT- Active	15/717835	US20190096490	10446238	PSEUDO SINGLE PASS NAND MEMORY PROGRAMMING	9/27/2017	10/15/2019
56.	US	PAT- Active	10/461281	US20040255283	7533374	ADAPTIVELY STORING SYSTEM CODE IN NON-VOLATILE STORAGE	6/12/2003	5/12/2009
57.	US	PAT- Active	10/607772	US20040268026	7299379	MAINTAINING CACHE INTEGRITY BY RECORDING WRITE ADDRESSES IN A LOG	6/27/2003	11/20/2007
58.	CN	PAT- Active	2004800143349	CN1826590	ZL2004800143349	NON-VOLATILE CACHE INTEGRITY	6/9/2004	4/1/2009
59.	US	PAT- Active	11/320529	US20070171708	7531489	MULTI-LEVEL MEMORY CELL SENSING	12/28/2005	6/23/2009
60.	US	PAT- Active	11/321434	US20070156954	7627713	METHOD AND APPARATUS TO MAINTAIN DATA INTEGRITY IN DISK CACHE MEMORY DURING AND AFTER PERIODS OF CACHE INACCESSIBILITY	12/29/2005	12/1/2009
61.	US	PAT- Active	13/086636	US20110283139	8347141	METHOD AND APPARATUS TO MAINTAIN DATA INTEGRITY IN DISK CACHE MEMORY DURING AND AFTER PERIODS OF CACHE INACCESSIBILITY	4/14/2011	1/1/2013
62.	US	PAT- Active	11/172608	US20070005928	7797479	TECHNIQUE TO WRITE TO A NON-VOLATILE MEMORY	6/30/2005	9/14/2010
63.	US	PAT- Active	11/240840	US20070079055	7500081	POWER-UP IMPLEMENTATION FOR BLOCK-ALTERABLE MEMORY WITH ZERO-SECOND ERASE TIME	9/30/2005	3/3/2009
64.	US	PAT- Active	11/266119	US20070168698	7516267	RECOVERING FROM A NON-VOLATILE MEMORY FAILURE	11/3/2005	4/7/2009
65.	CN	PAT- Active	2006800409816	CN101300554	ZL2006800409816	RECOVERING FROM A NON-VOLATILE MEMORY FAILURE	11/2/2006	7/4/2012
66.	US	PAT- Active	11/542007	US20080082899	8006164	MEMORY CELL SUPPLY VOLTAGE CONTROL BASED ON ERROR DETECTION	9/29/2006	8/23/2011
67.	US	PAT- Active	13/215949	US20110307761	8667367	MEMORY CELL SUPPLY VOLTAGE CONTROL BASED ON ERROR DETECTION	8/23/2011	3/4/2014

68.	US	PAT- Active	13/626435	US20130024752	8769376	MEMORY CELL SUPPLY VOLTAGE CONTROL BASED ON ERROR DETECTION	9/25/2012	7/1/2014
69.	DE	PAT- Active	1020070469545	DE102007046954	102007046954	MULTIPLYING A PARALLEL BUS INTERFACE AND A FLASH MEMORY INTERFACE	10/1/2007	4/24/2014
70.	GB	PAT- Active	7190143	GB2442846	2442846	MEMORY CELL SUPPLY VOLTAGE CONTROL BASED ON ERROR DETECTION	9/28/2007	1/28/2009
71.	KR	PAT- Active	10-2010-0050076	KR20100081284	10-1386784	MEMORY CELL SUPPLY VOLTAGE CONTROL BASED ON ERROR DETECTION	10/1/2007	4/1/2014
72.	KR	PAT- Active	10-2013-0161112	KR20140008278	10-1547026	MEMORY CELL SUPPLY VOLTAGE CONTROL BASED ON ERROR DETECTION	10/1/2007	8/18/2015
73.	US	PAT- Active	12/517062	US20120124315	8510533	METHOD OF MANAGING DATA ON A NON-VOLATILE MEMORY	12/27/2006	8/13/2013
74.	DE	MTR- Closed	1120060041851	DE112006004185		Method for managing data in a non-volatile memory	12/27/2006	
75.	US	PAT- Active	11/644270	US20080155207	7650459	HIGH SPEED INTERFACE FOR NON-VOLATILE MEMORY	12/21/2006	1/19/2010
76.	US	PAT- Active	11/644630	US20080155204	8006044	FLEXIBLE SELECTION COMMAND FOR NON-VOLATILE MEMORY	12/21/2006	8/23/2011
77.	US	PAT- Active	13/191875	US20120047334	8458415	FLEXIBLE SELECTION COMMAND FOR NON-VOLATILE MEMORY	7/27/2011	6/4/2013
78.	US	PAT- Active	11/644474	US20080155287	8489780	POWER SAVING IN NAND FLASH MEMORY	12/21/2006	7/16/2013
79.	DE	PAT- Active	1120070030151	DE112007003015	112007003015	METHOD AND APPARATUS OF CACHE ASSISTED ERROR DETECTION AND CORRECTION IN MEMORY	11/8/2007	10/1/2020
80.	US	PAT- Active	11/724811	US20080228999	7725645	DUAL USE FOR DATA VALID SIGNAL IN NON-VOLATILE MEMORY	3/16/2007	5/25/2010
81.	US	PAT- Active	11/701302	US20080181043	7609562	CONFIGURABLE DEVICE ID IN NON-VOLATILE MEMORY	1/31/2007	10/27/2009
82.	US	PAT- Active	11/683631	US20080222490	8122323	METHOD APPARATUS AND SYSTEM FOR DYNAMIC ECC CODE RATE ADJUSTMENT	3/8/2007	2/21/2012
83.	CN	PAT- Active	2008800014948	CN101611385	ZL2008800014948	A METHOD APPARATUS AND SYSTEM FOR DYNAMIC ECC CODE RATE ADJUSTMENT	3/4/2008	11/13/2013
84.	JP	PAT- Active	2012-084226	JP2012155737	5364911	A METHOD APPARATUS AND SYSTEM FOR DYNAMIC ECC CODE RATE ADJUSTMENT	3/4/2008	9/20/2013
85.	US	PAT- Active	11/772188	US20090003092	7688628	DEVICE SELECTION CIRCUIT AND METHOD	6/30/2007	3/30/2010
86.	US	PAT- Active	11/840421	US20090046509	7802132	TECHNIQUE TO IMPROVE AND EXTEND ENDURANCE AND RELIABILITY OF MULTI-LEVEL MEMORY CELLS IN A MEMORY DEVICE	8/17/2007	9/21/2010

87.	US	PAT- Active	11/854388	US20090070527	7895397	USING INTER-ARRIVAL TIMES OF DATA REQUESTS TO CACHE DATA IN A COMPUTING ENVIRONMENT	9/12/2007	2/22/2011
88.	US	PAT- Active	12/006013	US20090172253	7917689	METHODS AND APPARATUSES FOR NONVOLATILE MEMORY WEAR LEVELING	12/28/2007	3/29/2011
89.	US	PAT- Active	11/965652	US20090172249	7886110	DYNAMICALLY ADJUSTING CACHE POLICY BASED ON DEVICE LOAD IN A MASS STORAGE SYSTEM	12/27/2007	2/8/2011
90.	US	PAT- Active	12/006280	US20090172466	7941692	NAND POWER FAIL RECOVERY	12/31/2007	5/10/2011
91.	US	PAT- Active	13/086237	US20110258487	8316257	NAND POWER FAIL RECOVERY	4/13/2011	11/20/2012
92.	US	PAT- Active	12/215235	US20090327608	8621144	ACCELERATED RESUME FROM HIBERNATION IN A CACHED DISK SYSTEM	6/26/2008	12/31/2013
93.	US	PAT- Active	12/215923	US20090327759	8555086	ENCRYPTING DATA ON A NON-VOLATILE MEMORY	6/30/2008	10/8/2013
94.	US	PAT- Active	12/215762	US20090327584	8166229	APPARATUS AND METHOD FOR MULTILEVEL CACHE UTILIZATION	6/30/2008	4/24/2012
95.	US	PAT- Active	13/450882	US20120203960	8386701	APPARATUS AND METHOD FOR MULTILEVEL CACHE UTILIZATION	4/19/2012	2/26/2013
96.	DE	APP- Pending	1120090004318	DE112009000431		APPARATUS AND METHOD FOR MULTILEVEL CACHE UTILIZATION	6/24/2009	
97.	US	PAT- Active	12/283832	US20090292969	8365039	ADJUSTABLE READ REFERENCE FOR NON-VOLATILE MEMORY	9/16/2008	1/29/2013
98.	US	PAT- Active	12/283861	US20090292970	8276028	USING ERROR INFORMATION FROM NEARBY LOCATIONS TO RECOVER UNCORRECTABLE DATA IN NON-VOLATILE MEMORY	9/16/2008	9/25/2012
99.	US	PAT- Active	12/164663	US20090323961	8300825	DATA ENCRYPTION AND/OR DECRYPTION BY INTEGRATED CIRCUIT	6/30/2008	10/30/2012
100.	US	PAT- Active	13/661654	US20130124876	9031238	DATA ENCRYPTION AND/OR DECRYPTION BY INTEGRATED CIRCUIT	10/26/2012	5/12/2015
101.	US	PAT- Active	12/319208	US20100169743	8438455	ERROR CORRECTION IN A SOLID STATE DISK	12/31/2008	5/7/2013
102.	KR	PAT- Active	10-2011-7015123	KR20110089452	10-1298827	IMPROVED ERROR CORRECTION IN A SOLID STATE DISK	12/22/2009	8/14/2013
103.	TW	PAT- Active	98144758	TW201030760	1449051	IMPROVED ERROR CORRECTION IN A SOLID STATE DISK	12/24/2009	8/11/2014
104.	US	PAT- Active	12/231965	US20100061056	10251273	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	9/8/2008	4/2/2019
105.	US	PAT- Active	16/281045	US20190182958	10555417	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	2/20/2019	2/4/2020

106.	CN	PAT- Active	2009801350137	CN102150262	ZL2009801350137	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	8/27/2009	2/27/2013
107.	DE	App. Pending	1120090021557	DE112009002155		MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	8/27/2009	
108.	GB	PAT- Active	11048097	GB2475658	2475658	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	8/27/2009	11/28/2012
109.	JP	PAT- Active	2011-526113	JP2012502476	5448003	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	8/27/2009	1/10/2014
110.	JP	PAT- Active	2013-195262	JP2014030042	632681	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	8/27/2009	11/2/2017
111.	SG	PAT- Active	201100955-2	SG168882	168882	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD	8/27/2009	10/14/2013
112.	TW	PAT- Active	98129247	TW201026184	1444120	MAINBOARD ASSEMBLY INCLUDING A PACKAGE OVERLYING A DIE DIRECTLY ATTACHED TO THE MAINBOARD A METHOD OF FABRICATING A MAINBOARD ASSEMBLY AND A COMPUTING SYSTEM	8/31/2009	7/1/2014
113.	US	PAT- Active	12/345997	US20100169710	7925925	DELTA CHECKPOINTS FOR A NON-VOLATILE MEMORY INDIRECTION TABLE	12/30/2008	4/12/2011
114.	US	PAT- Active	13/084890	US20110276827	8312326	DELTA CHECKPOINTS FOR A NON-VOLATILE MEMORY INDIRECTION TABLE	4/17/2011	11/13/2012
115.	US	PAT- Active	13/533372	US20130097341	8572321	APPARATUS AND METHOD FOR SEGMENTED CACHE UTILIZATION	6/26/2012	10/29/2013
116.	BR	PAT- Active	PI0923876-0	BRPI0923876-0	PI0923876-0	HYBRID MEMORY DEVICE	12/17/2009	9/24/2020
117.	US	PAT- Active	12/316986	US20100162084	8291297	DATA ERROR RECOVERY IN NON-VOLATILE MEMORY	12/18/2008	10/16/2012
118.	KR	PAT- Active	10-2011-7007710	KR20110065497	10-1248352	DATA ERROR RECOVERY IN NON-VOLATILE MEMORY	12/3/2009	3/21/2013
119.	US	PAT- Active	12/460221	US20110016372	8407564	PREDICTION AND CANCELLATION OF SYSTEMATIC NOISE SOURCES IN NON-VOLATILE MEMORY	7/15/2009	3/26/2013
120.	US	PAT- Active	12/495573	US20100332730	8612666	METHOD AND SYSTEM FOR MANAGING A NAND FLASH MEMORY BY PAGING SEGMENTS OF A LOGICAL TO PHYSICAL ADDRESS MAP TO A NON-VOLATILE MEMORY	6/30/2009	12/17/2013
121.	US	PAT- Active	12/462721	US20110035535	8566506	TRACKING A LIFETIME OF WRITE OPERATIONS TO A NON-VOLATILE MEMORY STORAGE	8/7/2009	10/22/2013
122.	US	PAT- Active	14/038728	US20140101374	8874834	TRACKING A LIFETIME OF WRITE OPERATIONS TO A NON-VOLATILE MEMORY STORAGE	9/26/2013	10/28/2014
123.	US	PAT- Active	12/639700	US20110145478	8386650	METHOD TO IMPROVE A SOLID STATE DISK PERFORMANCE BY USING A PROGRAMMABLE BUS ARBITER	12/16/2009	2/26/2013

124.	CN	PAT- Active	2010105976854	CN102103467	ZL2010105976854	METHOD TO IMPROVE A SOLID STATE DISK PERFORMANCE BY USING A PROGRAMMABLE BUS ARBITER	12/16/2010	4/30/2014
125.	DE	APP. Pending	1020100504327	DE102010050432		METHOD TO IMPROVE A SOLID STATE DISK PERFORMANCE BY USING A PROGRAMMABLE BUS ARBITER	11/4/2010	
126.	GB	PAT- Active	10187623	GB2476343	2476343	METHOD TO IMPROVE A SOLID STATE DISK PERFORMANCE BY USING A PROGRAMMABLE BUS ARBITER	11/5/2010	10/31/2012
127.	TW	PAT- Active	99137632	TW201145029	1454928	METHOD AND SYSTEM TO IMPROVE A SOLID STATE DRIVE PERFORMANCE BY USING A PROGRAMMABLE BUS ARBITER AND STORAGE MEDIUM THEREOF	11/2/2010	10/1/2014
128.	US	PAT- Active	12/638496	US20110145306	8386537	METHOD FOR TRIMMING DATA ON NON-VOLATILE FLASH MEDIA	12/15/2009	2/26/2013
129.	CN	PAT- Active	2010105884299	CN102096639	ZL2010105884299	METHOD FOR TRIMMING DATA ON NON-VOLATILE FLASH MEDIA	12/10/2010	6/11/2014
130.	US	PAT- Active	12/647538	US20110161551	8949565	VIRTUAL AND HIDDEN SERVICE PARTITION AND DYNAMIC ENHANCED THIRD PARTY DATA STORE	12/27/2009	2/3/2015
131.	US	PAT- Active	12/784616	US20110289388	8370719	PERSISTENT MOVING READ REFERENCE	5/21/2010	2/5/2013
132.	GB	PAT- Active	11072691	GB2480522	2480522	PERSISTENT MOVING READ REFERENCE	4/28/2011	8/7/2013
133.	US	PAT- Active	12/752659	US20110246705	8621141	METHOD AND SYSTEM FOR WEAR LEVELING IN A SOLID STATE DRIVE	4/1/2010	12/31/2013
134.	GB	PAT- Active	11042991	GB2479235	2479235	METHOD AND SYSTEM FOR WEAR LEVELING IN A SOLID STATE DRIVE	3/14/2011	4/2/2014
135.	KR	PAT- Active	10-2011-0028957	KR20110110720	10-1283289	METHOD AND SYSTEM FOR WEAR LEVELING IN A SOLID STATE DRIVE	3/30/2011	7/1/2013
136.	US	PAT- Active	12/748746	US20110239094	8433985	ERROR CORRECTION MECHANISMS FOR FLASH MEMORIES	3/29/2010	4/30/2013
137.	CN	PAT- Active	201110077021X	CN102208213	ZL201110077021X	ERROR CORRECTION MECHANISM FOR FLASH MEMORIES	3/29/2011	6/11/2014
138.	DE	PAT- Active	1020110146806	DE102011014680	102011014680	ERROR CORRECTION MECHANISM FOR FLASH MEMORIES	3/22/2011	1/15/2015
139.	GB	PAT- Active	11050143	GB2479248	2479248	ERROR CORRECTION MECHANISM FOR FLASH MEMORIES	3/24/2011	7/4/2012
140.	US	PAT- Active	12/752929	US20110246756	8578161	PROTOCOL FOR AUTHENTICATING FUNCTIONALITY IN A PERIPHERAL DEVICE	4/1/2010	11/5/2013
141.	US	PAT- Active	14/051364	US20140032907	9059854	PROTOCOL FOR AUTHENTICATING FUNCTIONALITY IN A PERIPHERAL DEVICE	10/10/2013	6/16/2015
142.	US	PAT- Active	12/825858	US20110320915	8533550	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	6/29/2010	9/10/2013

143.	CN	PAT- Active	2011800276069	CN102934093	ZL2011800276069	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	6/28/2011	11/25/2015
144.	US	PAT- Active	13/063930	US20130326313	8924816	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	8/9/2013	12/30/2014
145.	US	PAT- Active	14/339407	US20140337689	9317362	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	7/23/2014	4/19/2016
146.	DE	PAT- Active	118041433	EP2588961	6020110202057	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	6/28/2011	9/30/2015
147.	EP	PAT- Closed	118041433	EP2588961	2588961	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	6/28/2011	9/30/2015
148.	GB	PAT- Active	118041433	EP2588961	2588961	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	6/28/2011	9/30/2015
149.	NL	PAT- Active	118041433	EP2588961	2588961	METHOD AND SYSTEM TO IMPROVE THE PERFORMANCE AND/OR RELIABILITY OF A SOLID-STATE DRIVE	6/28/2011	9/30/2015
150.	US	PAT- Active	12/041915	US20120117348	9064116	TECHNIQUES FOR SECURITY MANAGEMENT PROVISIONING AT A DATA STORAGE DEVICE	11/8/2010	6/23/2015
151.	TW	MTR- Closed	100138638	TW201237625	1498736	DATA STORAGE DEVICE, METHOD FOR SECURITY MANAGEMENT PROVISIONING AT A DATA STORAGE DEVICE, AND COMPUTER READABLE STORAGE MEDIUM	10/25/2011	9/1/2015
152.	CN	PAT- Active	2011800536117	CN103201746	ZL2011800536117	TECHNIQUES FOR SECURITY MANAGEMENT PROVISIONING AT A DATA STORAGE DEVICE	10/31/2011	1/20/2016
153.	US	PAT- Active	12/075944	US20120166699	8589723	METHOD AND APPARATUS TO PROVIDE A HIGH AVAILABILITY SOLID STATE DRIVE	12/22/2010	11/19/2013
154.	DE	PAT- Active	118517440	EP2656228	6020110237535	METHOD AND APPARATUS TO PROVIDE A HIGH AVAILABILITY SOLID STATE DRIVE	12/13/2011	3/2/2016
155.	EP	PAT- Closed	118517440	EP2656228	2656228	METHOD AND APPARATUS TO PROVIDE A HIGH AVAILABILITY SOLID STATE DRIVE	12/13/2011	3/2/2016
156.	GB	PAT- Active	118517440	EP2656228	2656228	METHOD AND APPARATUS TO PROVIDE A HIGH AVAILABILITY SOLID STATE DRIVE	12/13/2011	3/2/2016
157.	NL	PAT- Active	118517440	EP2656228	2656228	METHOD AND APPARATUS TO PROVIDE A HIGH AVAILABILITY SOLID STATE DRIVE	12/13/2011	3/2/2016
158.	US	PAT- Active	12/071831	US20120159285	8549382	STORAGE DRIVE WITH LDPC CODING	12/17/2010	10/1/2013
159.	US	PAT- Active	13/049606	US20120240013	8601351	BCH DECODING WITH MULTIPLE SIGMA POLYNOMIAL CALCULATION ALGORITHMS	3/16/2011	12/3/2013
160.	US	PAT- Active	13/039553	US20120226959	8595397	ADJUSTABLE PROGRAMMING SPEED FOR NAND MEMORY DEVICES	3/3/2011	11/26/2013
161.	KR	PAT- Active	10-2015-7015574	KR20150073224	10-1805997	ADJUSTABLE PROGRAMMING SPEED FOR NAND MEMORY DEVICES	2/9/2012	11/30/2017

162.	US	PAT- Active	13/078226	US20120254699	8510636	DYNAMIC READ CHANNEL CALIBRATION FOR NON-VOLATILE MEMORY DEVICES	4/1/2011	8/13/2013
163.	CN	PAT- Active	2011800750958	CN104040515	ZL20111800750958	PRESENTATION OF DIRECT ACCESSED STORAGE UNDER A LOGICAL DRIVE MODEL	9/30/2011	5/11/2018
164.	CN	PAT- Active	2016103056544	CN106021147	ZL2016103056544	PRESENTATION OF DIRECT ACCESSED STORAGE UNDER A LOGICAL DRIVE MODEL	9/30/2011	4/28/2020
165.	EP	APP- Pending	181963968	EP3438839		PRESENTATION OF DIRECT ACCESSED STORAGE UNDER A LOGICAL DRIVE MODEL	9/30/2011	
166.	US	PAT- Active	13/976262	US20140189212	9417821	PRESENTATION OF DIRECT ACCESSED STORAGE UNDER A LOGICAL DRIVE MODEL	9/30/2011	8/16/2016
167.	US	APP- Closed	15/224006	US20160335208		PRESENTATION OF DIRECT ACCESSED STORAGE UNDER A LOGICAL DRIVE MODEL	7/29/2016	
168.	US	APP- Pending	16/936078	US20200349100		PRESENTATION OF DIRECT ACCESSED STORAGE UNDER A LOGICAL DRIVE MODEL	7/22/2020	
169.	CN	PAT- Active	2011800757069	CN103988185	ZL2011800757069	A SYSTEM APPARATUS AND METHOD FOR SECURE REPLAY PROTECTED STORAGE	12/20/2011	2/15/2017
170.	US	PAT- Active	13/997896	US20140223198	9405707	SECURE REPLAY PROTECTED STORAGE	12/20/2011	8/2/2016
171.	US	PAT- Active	13/631556	US20130159727	9411748	SECURE REPLAY PROTECTED STORAGE	9/28/2012	8/9/2016
172.	US	PAT- Active	13/997081	US20140101465	9753878	EXTENDING THE CAPABILITIES OF EXISTING DEVICES WITHOUT MAKING MODIFICATIONS TO THE EXISTING DEVICES	11/2/2011	9/5/2017
173.	CN	PAT- Active	2011800764414	CN104115231	ZL2011800764414	METHOD APPARATUS AND SYSTEM FOR DETERMINING ACCESS TO A MEMORY ARRAY	12/23/2011	12/26/2017
174.	KR	PAT- Active	10-2014-7017561	KR20140093290	10-1654030	DYNAMIC WINDOW TO IMPROVE NAND MEMORY ENDURANCE	12/29/2011	8/30/2016
175.	US	PAT- Active	13/997212	US20140082460	9330784	DYNAMIC WINDOW TO IMPROVE NAND ENDURANCE	12/29/2011	5/3/2016
176.	US	PAT- Active	15/076963	US20160357458	9857992	DYNAMIC WINDOW TO IMPROVE NAND ENDURANCE	3/22/2016	1/2/2018
177.	CN	PAT- Active	2011800759914	CN104040483	ZL2011800759914	OPTIMIZED COLD BOOT FOR NON-VOLATILE MEMORY	12/27/2011	7/7/2017
178.	US	PAT- Active	13/977081	US20140115315	9323542	OPTIMIZED COLD BOOT FOR NON-VOLATILE MEMORY	12/27/2011	4/26/2016
179.	CN	PAT- Active	2011800759897	CN104011800	ZL2011800759897	CYCLING ENDURANCE EXTENDING FOR MEMORY CELLS OF A NON-VOLATILE MEMORY ARRAY	12/28/2011	3/8/2017
180.	CN	PAT- Active	2012800719714	CN104247273	ZL2012800719714	APPARATUS AND COMPUTER-IMPLEMENTED METHOD FOR RECONSTRUCTING CODEWORDS	3/28/2012	5/17/2017

181.	DE	PAT- Active	1120120061535	DE112012006153	112012006153	RECONSTRUCTING CODEWORDS USING A SIDE CHANNEL	3/28/2012	9/23/2021
182.	US	PAT- Active	13/096151	US20130318395	9043681	RECONSTRUCTING CODEWORDS USING A SIDE CHANNEL	3/28/2012	5/26/2015
183.	US	PAT- Active	13/630043	US20140096260	9135446	SYSTEMS AND METHODS TO PROVIDE SECURE STORAGE	9/28/2012	9/15/2015
184.	US	PAT- Active	14/818654	US20150341371	10091213	SYSTEMS AND METHODS TO PROVIDE SECURE STORAGE	8/5/2015	10/2/2018
185.	US	PAT- Active	13/095145	US20140297924	9543024	NONVOLATILE MEMORY ERASURE TECHNIQUES	3/29/2012	1/10/2017
186.	CN	PAT- Active	2012800721004	CN104205229	ZL2012800721004	SOLID STATE DRIVE MANAGEMENT IN POWER LOSS RECOVERY	6/7/2012	4/5/2019
187.	KR	PAT- Active	10-2014-7027025	KR20140129305	10-1652936	SOLID STATE DRIVE MANAGEMENT IN POWER LOSS RECOVERY	6/7/2012	8/25/2016
188.	US	PAT- Active	13/976002	US20140223231	9202577	SOLID STATE DRIVE MANAGEMENT IN POWER LOSS RECOVERY	6/7/2012	12/1/2015
189.	US	PAT- Active	13/096173	US20140250257	9251060	COMPRESSION-ENABLED BLENDING OF DATA IN NON-VOLATILE MEMORY	3/29/2012	2/2/2016
190.	US	PAT- Active	13/536861	US20140006847	9047187	DEFECT MANAGEMENT IN MEMORY SYSTEMS	6/28/2012	6/2/2015
191.	US	PAT- Active	13/629688	US20140095958	8996655	TECHNIQUES ASSOCIATED WITH ERROR CORRECTION FOR ENCODED DATA	9/28/2012	3/24/2015
192.	CN	PAT- Active	2013800452125	CN104583964	ZL2013800452125	TECHNIQUES ASSOCIATED WITH ERROR CORRECTION FOR ENCODED DATA	6/27/2013	2/2/2018
193.	US	PAT- Active	13/627779	US20140089693	9116694	EFFICIENT LOW POWER EXIT SEQUENCE FOR PERIPHERAL DEVICES	9/26/2012	8/25/2015
194.	EP	PAT- Closed	138430061	EP2901245	2901245	EFFICIENT LOW POWER EXIT SEQUENCE FOR PERIPHERAL DEVICES	6/10/2013	9/27/2017
195.	DE	PAT- Active	138430061	EP2901245	2901245	EFFICIENT LOW POWER EXIT SEQUENCE FOR PERIPHERAL DEVICES	6/10/2013	9/27/2017
196.	GB	PAT- Active	138430061	EP2901245	2901245	EFFICIENT LOW POWER EXIT SEQUENCE FOR PERIPHERAL DEVICES	6/10/2013	9/27/2017
197.	KR	PAT- Active	10-2015-7001966	KR20150023877	10-1642240	EFFICIENT LOW POWER EXIT SEQUENCE FOR PERIPHERAL DEVICES	6/10/2013	7/18/2016
198.	US	PAT- Active	12/57455	US20100185803	9201824	METHOD AND APPARATUS FOR ADAPTIVE DATA CHUNK TRANSFER	1/22/2009	12/1/2015
199.	US	PAT- Active	14/026141	US20160048331	9772778	METHOD AND APPARATUS FOR ADAPTIVE DATA CHUNK TRANSFER	10/29/2015	9/26/2017

200.	DE	PAT- Active	1020100001430	DE102010000143	102010000143	METHOD AND APPARATUS FOR ADAPTIVE DATA CHUNK TRANSFER	1/21/2010	5/22/2014
201.	US	PAT- Active	13/664807	US20140119114	8804421	CENTER READ REFERENCE VOLTAGE DETERMINATION BASED ON ESTIMATED PROBABILITY DENSITY FUNCTION	10/31/2012	8/12/2014
202.	CN	PAT- Active	2013800513078	CN104756194	ZL2013800513078	CENTER READ REFERENCE VOLTAGE DETERMINATION BASED ON ESTIMATED PROBABILITY DENSITY FUNCTION	6/20/2013	9/7/2018
203.	KR	PAT- Active	10-2015-7007791	KR20150047600	10-1669379	CENTER READ REFERENCE VOLTAGE DETERMINATION BASED ON ESTIMATED PROBABILITY DENSITY FUNCTION	6/20/2013	10/19/2016
204.	US	PAT- Active	13/730575	US20140189198	9032139	MEMORY ALLOCATION FOR FAST PLATFORM HIBERNATION AND RESUMPTION OF COMPUTING SYSTEMS	12/28/2012	5/12/2015
205.	US	PAT- Active	13/798370	US20140281813	9354973	DATA INTEGRITY MANAGEMENT IN MEMORY SYSTEMS	3/13/2013	5/31/2016
206.	US	PAT- Active	13/782821	US20140247655	9093170	MULTI-LEVEL CELL (MLC) NON-VOLATILE MEMORY DATA READING METHOD AND APPARATUS	3/1/2013	7/28/2015
207.	US	PAT- Active	14/749337	US20160012887	9502104	MULTI-LEVEL CELL (MLC) NON-VOLATILE MEMORY DATA READING METHOD AND APPARATUS	6/24/2015	11/22/2016
208.	CN	PAT- Active	2014800475742	CN105493194	ZL2014800475742	FLASH MEMORY SYSTEM ENDURANCE IMPROVEMENT USING TEMPERATURE BASED NAND SETTINGS	9/24/2014	7/3/2020
209.	US	PAT- Active	14/039029	US20150095550	9223503	GENERATING RANDOM NUMBERS UTILIZING ENTROPIC NATURE OF NAND FLASH MEMORY MEDIUM	9/27/2013	12/29/2015
210.	US	PAT- Active	14/040554	US20150095736	9298552	USING READ VALUES FROM PREVIOUS DECODING OPERATIONS TO CALCULATE SOFT BIT INFORMATION IN AN ERROR RECOVERY OPERATION	9/27/2013	3/29/2016
211.	CN	PAT- Active	2013800805216	CN106104500	ZL2013800805216	METHOD AND APPARATUS FOR STORING DATA	11/26/2013	5/19/2020
212.	KR	PAT- Active	10-2016-7010361	KR20160060119	10-1744465	METHOD AND APPARATUS FOR STORING DATA	11/26/2013	5/31/2017
213.	US	PAT- Active	14/087282	US20150149818	9535777	DEFECT MANAGEMENT POLICIES FOR NAND FLASH MEMORY	11/22/2013	1/3/2017
214.	CN	PAT- Active	2014800581934	CN105637591	ZL2014800581934	DEFECT MANAGEMENT POLICIES FOR NAND FLASH MEMORY	10/21/2014	6/14/2019
215.	EP	APP- Pending	148645260	EP3072134		DEFECT MANAGEMENT POLICIES FOR NAND FLASH MEMORY	10/21/2014	
216.	KR	PAT- Active	10-2016-7010692	KR20160087799	10-1995748	DEFECT MANAGEMENT POLICIES FOR NAND FLASH MEMORY	10/21/2014	6/27/2019
217.	US	PAT- Active	14/091598	US20150149695	9619167	SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	11/27/2013	4/11/2017
218.	US	PAT- Active	15/462278	US20170322746	10120608	SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	3/17/2017	11/6/2018

219.	CN	PAT- Active	2014800590007	CN105659222	ZL2014800590007	SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	10/21/2014	9/17/2019
220.	EP	APP. Closed	148667652	EP3074881		SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	10/21/2014	
221.	KR	PAT- Active	10-2016-7011022	KR20160061412	10-1766240	SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	10/21/2014	8/2/2017
222.	KR	PAT- Active	10-2017-7021598	KR20170002713	10-2164223	SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	10/21/2014	10/5/2020
223.	RU	PAT- Active	2016116679	RU2016116679	2643651	SYSTEM AND METHOD FOR COMPUTING MESSAGE DIGESTS	10/21/2014	2/2/2018
224.	US	PAT- Active	14/106571	US20150169405	10067829	MANAGING REDUNDANCY INFORMATION IN A NON-VOLATILE MEMORY	12/13/2013	9/4/2018
225.	CN	PAT- Active	2014800625203	CN105917414	ZL2014800625203	MANAGING REDUNDANCY INFORMATION IN A NON-VOLATILE MEMORY	11/14/2014	4/9/2019
226.	KR	PAT- Active	10-2016-7010606	KR20160055937	10-1728291	MANAGING REDUNDANCY INFORMATION IN A NON-VOLATILE MEMORY	11/14/2014	4/12/2017
227.	US	PAT- Active	14/098715		9025380	MANAGEMENT OF DATA STORAGE IN A NON-VOLATILE MEMORY SYSTEM	12/6/2013	5/5/2015
228.	US	PAT- Active	14/229554	US20150281537	9491345	ADJUSTMENT OF FLASH DEVICE BASED ON TEMPERATURE	3/28/2014	11/8/2016
229.	CN	PAT- Active	2015100889763	CN104955217	ZL2015100889763	ADJUSTMENT OF FLASH DEVICE BASED ON TEMPERATURE	2/27/2015	11/9/2018
230.	DE	PAT- Active	1020151026872	DE102015102687	102015102687	ADJUSTMENT OF FLASH DEVICE BASED ON TEMPERATURE	2/25/2015	10/31/2018
231.	US	PAT- Active	14/318572	US20150380095	9208888	TECHNIQUES FOR IMPROVING RELIABILITY AND PERFORMANCE OF PARTIALLY WRITTEN MEMORY BLOCKS IN MODERN FLASH MEMORY SYSTEMS	6/27/2014	12/8/2015
232.	US	PAT- Active	14/961424	US20160085668	9471488	TECHNIQUES FOR IMPROVING RELIABILITY AND PERFORMANCE OF PARTIALLY WRITTEN MEMORY BLOCKS IN MODERN FLASH MEMORY SYSTEMS	12/7/2015	10/18/2016
233.	US	PAT- Active	14/319361	US20150378841	9645829	Techniques to Communicate with a Controller for a Non-Volatile Dual In-Line Memory Module	6/30/2014	5/9/2017
234.	CN	PAT- Active	2015800289866	CN106462520	ZL2015800289866	TECHNIQUES TO COMMUNICATE WITH A CONTROLLER FOR A NON-VOLATILE DUAL IN-LINE MEMORY MODULE	5/28/2015	1/21/2020
235.	KR	PAT- Active	10-2016-7033687	KR20160148689	10-1946458	TECHNIQUES TO COMMUNICATE WITH A CONTROLLER FOR A NON-VOLATILE DUAL IN-LINE MEMORY MODULE	5/28/2015	1/31/2019
236.	US	PAT- Active	14/490307	US20160087646	10454495	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	9/18/2014	10/22/2019

237.	CN	PAT- Active	2015800440841	CN106664098	ZL2015800440841	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	11/10/2020
238.	EP	PAT- Closed	158427773	EP3195131	3195131	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	6/26/2019
239.	DE	PAT- Active	158427773	EP3195131	3195131	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	6/26/2019
240.	GB	PAT- Active	158427773	EP3195131	3195131	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	6/26/2019
241.	NL	PAT- Active	158427773	EP3195131	3195131	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	6/26/2019
242.	IN	APP- Pending	201747004071	IN201747004071		APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	
243.	KR	PAT- Active	10-2017-7003915	KR20170030617	10-2242281	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/4/2015	4/14/2021
244.	TW	PAT- Active	104125642	TW201613278	1586112	APPARATUS AND METHOD FOR MAPPING BINARY TO TERNARY AND ITS REVERSE	8/6/2015	6/1/2017
245.	US	PAT- Active	14/573517	US20160179381	10108339	REDUCTION OF INTERMINGLING OF INPUT AND OUTPUT OPERATIONS IN SOLID STATE DRIVES	12/17/2014	10/23/2018
246.	CN	PAT- Active	2015800624987	CN107003811	ZL2015800624987	REDUCTION OF INTERMINGLING OF INPUT AND OUTPUT OPERATIONS IN SOLID STATE DRIVES	11/17/2015	7/3/2020
247.	KR	APP- Pending	10-2017-7013206	KR20170095822		REDUCTION OF INTERMINGLING OF INPUT AND OUTPUT OPERATIONS IN SOLID STATE DRIVES	11/17/2015	
248.	TW	PAT- Active	104136331	TW201636819	1601058	REDUCTION OF INTERMINGLING OF INPUT AND OUTPUT OPERATIONS IN SOLID STATE DRIVES	11/4/2015	10/1/2017
249.	US	PAT- Active	14/499010	US20160092299	9529668	METHOD AND SYSTEM FOR USING NAND PAGE BUFFERS TO IMPROVE THE TRANSFER BUFFER UTILIZATION OF A SOLID STATE DRIVE	9/26/2014	12/27/2016
250.	CN	PAT- Active	2015800458239	CN106575250	ZL2015800458239	METHOD AND SYSTEM FOR USING NAND PAGE BUFFERS TO IMPROVE THE TRANSFER BUFFER UTILIZATION OF A SOLID STATE DRIVE	8/26/2015	6/8/2021
251.	DE	APP- Pending	1120150035699	DE112015003569		METHOD AND SYSTEM FOR USING NAND PAGE BUFFERS TO IMPROVE THE TRANSFER BUFFER UTILIZATION OF A SOLID STATE DRIVE	8/26/2015	
252.	KR	PAT- Active	10-2017-7004512	KR20170035983	10-2282879	METHOD AND SYSTEM FOR USING NAND PAGE BUFFERS TO IMPROVE THE TRANSFER BUFFER UTILIZATION OF A SOLID STATE DRIVE	8/26/2015	7/22/2021
253.	TW	PAT- Active	104127725	TW201626225	1603191	METHOD AND SYSTEM FOR USING NAND PAGE BUFFERS TO IMPROVE THE TRANSFER BUFFER UTILIZATION OF A SOLID STATE DRIVE	8/25/2015	10/21/2017

254.	DE	APP- Pending	1120150035680	DE112015003568		REDUCTION OF PERFORMANCE IMPACT OF UNEVEN CHANNEL LOADING IN SOLID STATE DRIVES	8/26/2015	
255.	KR	APP- Closed	10-2017-7005177	KR20170038863		REDUCTION OF PERFORMANCE IMPACT OF UNEVEN CHANNEL LOADING IN SOLID STATE DRIVES	8/26/2015	
256.	TW	PAT- Active	104127719	TW201626206	1614671	REDUCTION OF PERFORMANCE IMPACT OF UNEVEN CHANNEL LOADING IN SOLID STATE DRIVES	8/25/2015	2/11/2018
257.	US	PAT- Active	14/581723	US20160179376	9778848	METHOD AND APPARATUS FOR IMPROVING READ PERFORMANCE OF A SOLID STATE DRIVE	12/23/2014	10/3/2017
258.	US	PAT- Active	15/723072	US20180121092	10114556	METHOD AND APPARATUS FOR IMPROVING READ PERFORMANCE OF A SOLID STATE DRIVE	10/2/2017	10/30/2018
259.	CN	PAT- Active	2015800635411	CN107003813	ZL2015800635411	METHOD AND APPARATUS FOR IMPROVING READ PERFORMANCE OF A SOLID STATE DRIVE	11/23/2015	11/19/2021
260.	KR	APP- Pending	10-2017-7013818	KR20170099852		METHOD AND APPARATUS FOR IMPROVING READ PERFORMANCE OF A SOLID STATE DRIVE	11/23/2015	
261.	TW	PAT- Active	104138582	TW201636848	1570558	METHOD AND APPARATUS FOR IMPROVING READ PERFORMANCE OF A SOLID STATE DRIVE	11/20/2015	2/11/2017
262.	US	PAT- Active	14/565352	US20160162205	9678677	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	12/9/2014	6/13/2017
263.	US	PAT- Active	15/610615	US20170322739	10180797	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	5/31/2017	1/15/2019
264.	CN	PAT- Active	2015800609830	CN107148613	ZL2015800609830	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	11/9/2015	8/25/2020
265.	EP	PAT- Closed	158667048	EP3230871	3230871	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	11/9/2015	12/9/2020
266.	DE	PAT- Active	158667048	EP3230871	3230871	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	11/9/2015	12/9/2020
267.	GB	PAT- Active	158667048	EP3230871	3230871	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	11/9/2015	12/9/2020
268.	NL	PAT- Active	158667048	EP3230871	3230871	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	11/9/2015	12/9/2020

269.	KR	APP- Pending	10-2017-7012631	KR20170092538		DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	11/9/2015	
270.	TW	PAT- Active	104133710	TW201653141	1585585	DETERMINING ADJUSTMENTS TO THE SPARE SPACE IN A STORAGE DEVICE UNAVAILABLE TO A USER BASED ON A CURRENT CONSUMPTION PROFILE OF A STORAGE DEVICE	10/14/2015	6/1/2017
271.	US	PAT- Active	14/579971	US20160180958	9418000	DYNAMICALLY COMPENSATING FOR DEGRADATION OF A NON-VOLATILE MEMORY DEVICE	12/22/2014	8/16/2016
272.	KR	APP- Pending	10-2017-7013504	KR20170097614		DYNAMICALLY COMPENSATING FOR DEGRADATION OF A NON-VOLATILE MEMORY DEVICE	11/24/2015	
273.	TW	PAT- Active	104138572	TW201655301	1585771	DYNAMICALLY COMPENSATING FOR DEGRADATION OF A NON-VOLATILE MEMORY DEVICE	11/20/2015	6/1/2017
274.	US	PAT- Active	14/671140	US20160283320	9819362	APPARATUS AND METHOD FOR DETECTING AND MITIGATING BIT-LINE OPENS IN FLASH MEMORY	3/27/2015	11/14/2017
275.	CN	PAT- Active	2016800123691	CN107408069	ZL2016800123691	APPARATUS AND METHOD FOR DETECTING AND MITIGATING BIT-LINE OPENS IN FLASH MEMORY	2/10/2016	7/6/2021
276.	US	PAT- Active	14/748728		9502082	POWER MANAGEMENT IN DUAL MEMORY PLATFORMS	6/24/2015	11/22/2016
277.	CN	PAT- Active	2016800301379	CN107667326	ZL2016800301379	POWER MANAGEMENT IN DUAL MEMORY PLATFORMS	5/16/2016	10/1/2021
278.	EP	APP- Closed	168148880	EP3314364		POWER MANAGEMENT IN DUAL MEMORY PLATFORMS	5/16/2016	
279.	US	PAT- Active	14/752817	US20160379715	9679658	METHOD AND APPARATUS FOR REDUCING READ LATENCY FOR A BLOCK ERASABLE NON-VOLATILE MEMORY	6/26/2015	6/13/2017
280.	CN	APP- Pending	2016800304682	CN107636766		METHOD AND APPARATUS FOR REDUCING READ LATENCY FOR A BLOCK ERASABLE NON-VOLATILE MEMORY	5/26/2016	
281.	EP	APP- Pending	168149862	EP3314612		METHOD AND APPARATUS FOR REDUCING READ LATENCY FOR A BLOCK ERASABLE NON-VOLATILE MEMORY	5/26/2016	
282.	US	PAT- Active	14/846102	US20170868482	9870169	INTERLEAVED ALL-LEVEL PROGRAMMING OF NON-VOLATILE MEMORY	9/4/2015	1/16/2018
283.	US	PAT- Active	09/748825	US20020083381	6834323	METHOD AND APPARATUS INCLUDING SPECIAL PROGRAMMING MODE CIRCUITRY WHICH DISABLES INTERNAL PROGRAM VERIFICATION OPERATIONS BY A MEMORY	12/26/2000	12/21/2004
284.	US	PAT- Active	14/978315	US20170179090	9773764	SOLID STATE DEVICE MINIATURIZATION	12/22/2015	9/26/2017
285.	EP	APP- Pending	168797306	EP3394887		SOLID STATE DEVICE MINIATURIZATION	11/22/2016	
286.	TW	PAT- Active	105137841	TW201729370	1712125	SOLID STATE DEVICE MINIATURIZATION	11/18/2016	12/1/2020

287.	US	PAT- Active	09/745550	US20020083264	6785767	HYBRID MASS STORAGE SYSTEM AND METHOD WITH TWO DIFFERENT TYPES OF STORAGE MEDIUM	12/26/2000	8/31/2004
288.	US	PAT- Active	10/863349	US20040225835	7308331	HYBRID MASS STORAGE SYSTEM AND METHOD	6/9/2004	12/11/2007
289.	US	PAT- Closed	09/752936	US20020085424	6477086	LOCAL SENSING OF NON-VOLATILE MEMORY	12/29/2000	11/5/2002
290.	US	PAT- Active	09/827134	US20020144066	6931498	STATUS REGISTER ARCHITECTURE FOR FLEXIBLE READ-WHILE- WRITE DEVICE	4/3/2001	8/16/2005
291.	US	PAT- Active	15/228699	US20180040367	10043573	APPARATUS AND METHOD FOR ENDURANCE FRIENDLY PROGRAMMING USING LOWER VOLTAGE THRESHOLDS	8/4/2016	8/7/2018
292.	CN	APP- Pending	2017800492987	CN109891506		APPARATUS AND METHOD FOR ENDURANCE FRIENDLY PROGRAMMING USING LOWER VOLTAGE THRESHOLDS	7/11/2017	
293.	DE	APP- Pending	1120170039061	DE112017003906		APPARATUS AND METHOD FOR ENDURANCE FRIENDLY PROGRAMMING USING LOWER VOLTAGE THRESHOLDS	7/11/2017	
294.	EP	APP- Pending	202148839	EP3842898		POWER MANAGEMENT IN DUAL MEMORY PLATFORMS	5/16/2016	
295.	US	APP- Pending	16/987165	US20200363997		SSD Managed Host Write Atomicity with Arbitrary Transfer Length	8/6/2020	
296.	US	PAT- Active	15/680435	US20190056886	10379782	HOST MANAGED SOLID STATE DRIVECACHING USING DYNAMIC WRITE ACCELERATION	8/18/2017	8/13/2019
297.	US	PAT- Active	16/642161	US20210072806	11194372	AUTOMATIC VENT FOR SSD COOLING ENHANCEMENT	9/29/2017	12/7/2021
298.	EP	APP- Pending	1797272083	EP3688757		AUTOMATIC VENT FOR SSD COOLING ENHANCEMENT	9/29/2017	
299.	US	PAT- Active	12/384499	US20100257323	8924601	APPARATUS AND METHOD FOR DEFECT REVECTORING IN A MULTI-CHANNEL MASS STORAGE DEVICE	4/6/2009	12/30/2014
300.	US	PAT- Active	14/432195	US20150359100	9956582	INTEGRATED CIRCUIT ASSEMBLIES WITH MOLDING COMPOUND	4/30/2014	4/3/2018
301.	CN	PAT- Active	2014800776951	CN106663674	ZL2014800776951	Integrated circuit assemblies with molding compound	4/30/2014	9/17/2019
302.	GB	PAT- Active	16162141	GB2539137	2539137	Integrated circuit assemblies with molding compound	4/30/2014	4/3/2019
303.	KR	PAT- Active	10-2016-7027143	KR20160129049	10-1965039	INTEGRATED CIRCUIT ASSEMBLIES WITH MOLDING COMPOUND	4/30/2014	3/27/2019
304.	JP	PAT- Active	2016-559925	JP2017510079	6370920	Integrated circuit assemblies with molding compound	4/30/2014	7/20/2018
305.	DE	APP- Pending	1120140064173	DE112014006417		Integrated circuit devices with molding material	4/30/2014	

306.	US	APP. Pending	17/241976	US20210247937		DYNAMIC PROGRAM SUSPEND DISABLE FOR RANDOM WRITE SSD WORKLOAD	4/27/2021	
307.	US	APP. Pending	17/231893	US20210232313		USER CONFIGURABLE SLC MEMORY SIZE	4/15/2021	
308.	US	APP. Pending	17/203174	US20210223979		ON-SSD-COPY TECHNIQUES USING COPY-ON-WRITE	3/16/2021	
309.	US	APP. Pending	17/222048	US20210223998		METHOD AND APPARATUS TO REDUCE NAND DIE COLLISIONS IN HOST CONTROLLED GARBAGE COLLECTION IN A SOLID STATE DRIVE	4/5/2021	
310.	US	APP. Pending	17/214819	US20210216239		HOST CONTROLLED GARBAGE COLLECTION IN A SOLID STATE DRIVE	3/27/2021	
311.	US	APP. Pending	17/543398			AUTOMATIC VENT FOR SSD COOLING ENHANCEMENT	12/6/2021	

PATENT

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Dual Use Patent Group 2						
Country	Status	Number - Filing	Number - Publication	Number - Patent	Title	Date - Filing
1. US	PAT- Active	16/183654	US20190673154	11182100	SSD TEMPERATURE CONTROL TECHNIQUE	11/7/2018
2. US	PAT- Active	15/976795	US20190802414	10956323	NONDMA EMULATION USING A HOST MEMORY BUFFER	5/10/2018
3. US	PAT- Active	16/021469	US20190842462	10754785	CHECKPOINTING FOR DRAM-LESS SSD	6/28/2018
4. US	PAT- Active	15/910941	US20190802470	10705977	METHOD OF DIRTY CACHE LINE EVICTION	3/2/2018
5. US	PAT- Active	15/939432	US20190842113	10908825	SSD WITH PERSISTENT DRAM REGION FOR METADATA	3/29/2018
6. CN	PAT- Pending	2019101497828	CN110321249		SSD WITH PERSISTENT DRAM REGION FOR METADATA	2/28/2019
7. EP	PAT- Pending	191600675	EP3447147		SSD WITH PERSISTENT DRAM REGION FOR METADATA	2/28/2019
8. US	PAT- Active	15/972428	US20190842571	10831754	Update-Inset for Key-Value Storage Interface	5/7/2018
9. US	PAT- Active	16/116732	US20190843559	10803921	TEMPERATURE MANAGEMENT IN OPEN-CHANNEL MEMORY DEVICES	8/29/2018
10. US	PAT- Active	16/176465	US2019085075	10996860	METHOD TO IMPROVE MIXED WORKLOAD PERFORMANCE ON STORAGE DEVICES THAT USE CACHED OPERATIONS	10/31/2018
11. US	PAT- Pending	16/213642	US20190114096		STORAGE SYSTEM THAT PROVIDES PROTECTION LEVELS AT STORED DATA ITEM GRANULARITY	12/7/2018
12. US	PAT- Pending	16/181980	US20190873802		SSD Boot Based on Partitioned Endurance Groups	11/6/2018
13. US	PAT- Active	16/211157	US20190108137	10672041	METHOD AND APPARATUS FOR JOURNAL AWARE CACHE MANAGEMENT	12/5/2018
14. US	PAT- Pending	16/293652	US20190205052		EFFICIENT METADATA STORAGE FOR A NON-VOLATILE STORAGE DEVICE	3/7/2019
15. US	PAT- Active	16/458021	US20190326930	11088707	LOW DENSITY PARITY CHECK (LDPC) DECODER ARCHITECTURE WITH CHECK NODE STORAGE (CNS) OR BOUNDED CIRCULANT	6/29/2019
16. US	PAT- Pending	16/813422	US20200226080		SOLID STATE DRIVE WITH EXTERNAL SOFTWARE EXECUTION TO EFFECT INTERNAL SOLID STATE DRIVE OPERATIONS	3/27/2020
17. US	PAT- Pending	16/814788	US20200278893		MAINTAINING STORAGE NAMESPACE IDENTIFIERS FOR LIVE VIRTUALIZED EXECUTION ENVIRONMENT MIGRATION	3/10/2020
18. US	PAT- Pending	16/728457	US20200142825		DIRECT MAP MEMORY EXTENSION FOR STORAGE CLASS MEMORY	12/27/2019

19.	DE	APP- Pending	10/20/20191183	DE102020129118		Direct-map memory expansion for a class-class memory	11/5/2020	
20.	WO	APP- Pending	PCT/CN2020/0760 72	WO202021163973		On-SSD Erasure Coding without using bi-directional commands	2/20/2020	
21.	US	APP- Pending	16/795119	US20200185052		UNDO AND REDO OF SOFT POST PACKAGE REPAIR	2/19/2020	
22.	DE	APP- Pending	10/20/201327684	DE102020132768		UNDO AND RE-RUN SOFT POST-PACKAGE REPAIR	12/9/2020	
23.	US	APP- Pending	16/855139	US20200249980		ADAPTIVE WRITE ACKNOWLEDGMENT FOR STORAGE DEVICES	4/22/2020	
24.	US	APP- Pending	16/874242	US20200273525		SSD WITH REDUCED SECURE ERASE TIME AND ENDURANCE	5/14/2020	
25.	US	APP- Pending	16/903329	US20200319815		COMMUNICATION OF DATA RELOCATION INFORMATION BY STORAGE DEVICE TO HOST TO IMPROVE SYSTEM PERFORMANCE	6/16/2020	
26.	US	APP- Pending	16/998533	US20200379687		STORAGE DEVICE WITH CLIENT RECONFIGURABLE PROTOCOL	8/20/2020	
27.	US	APP- Pending	16/903582	US20200310657		CONFIGURING PARAMETERS OF NON-VOLATILE MEMORY TARGET SUBSYSTEMS FOR WORKLOAD REQUEST QUALITY OF SERVICE	6/17/2020	
28.	US	APP- Pending	17/031012	US20210011706		MEMORY DEVICE FIRMWARE UPDATE AND ACTIVATION WITHOUT MEMORY ACCESS QUIESCENCE	9/24/2020	
29.	US	PAT- Active	16/448935	US20190312594	11159175	NON-UNIFORM ITERATION-DEPENDENT MIN-SUM SCALING FACTORS FOR IMPROVED PERFORMANCE OF SPATIALLY-COUPLED LDPC CODES	6/21/2019	10/26/2021
30.	US	PAT- Active	15/387097	US20180173461	10656873	TECHNOLOGIES FOR PRIORITIZING EXECUTION OF STORAGE COMMANDS	12/21/2016	5/19/2020
31.	US	PAT- Active	15/280669		9691492	DETERMINATION OF DEMARCATION VOLTAGE FOR MANAGING DRIFT IN NON-VOLATILE MEMORY DEVICES	9/29/2016	6/27/2017
32.	CN	APP- Pending	2017806532819	CN109643576		DETERMINATION OF DEMARCATION VOLTAGE FOR MANAGING DRIFT IN NON-VOLATILE MEMORY DEVICES	8/29/2017	
33.	DE	APP- Pending	11/20170049199	DE112017004919		DETERMINATION OF DEMARCATION VOLTAGE FOR MANAGING DRIFT IN NON-VOLATILE MEMORY DEVICES	8/29/2017	
34.	US	PAT- Active	15/394453	US20180189000	10365844	LOGICAL BLOCK ADDRESS TO PHYSICAL BLOCK ADDRESS (L2P) TABLE COMPRESSION	12/29/2016	7/30/2019
35.	US	PAT- Active	15/631476	US20180375530	10547327	SELF-CONFIGURING ERROR CONTROL CODING	6/23/2017	1/28/2020
36.	US	PAT- Active	15/640169	US20190004715	10606488	SELECTIVE DATA FLUSH IN A STORAGE DRIVE	6/30/2017	3/31/2020

37.	US	PAT- Active	15/639450	US20190004726	10216445	KEY-VALUE DEDUPLICATION	6/30/2017	2/26/2019
38.	US	PAT- Active	15/636974	US20190004768	10496371	KEY-VALUE COMPACTION	6/29/2017	12/3/2019
39.	EP	APP- Pending	181749706	EP3422215		KEY-VALUE COMPACTION	5/29/2018	
40.	US	PAT- Active	15/639651	US20190005079	10678768	LOGICAL BAND-BASED KEY-VALUE STORAGE STRUCTURE	6/30/2017	6/9/2020
41.	US	PAT- Active	15/715758	US20190009507	10340024	SOLID STATE DRIVE PHYSICAL BLOCK REVECTORING TO IMPROVE CLUSTER FAILURE RATES	9/26/2017	7/2/2019
42.	US	PAT- Active	11/645043	US20080151648	7567471	HIGH SPEED FANNED OUT SYSTEM ARCHITECTURE AND INPUT/OUTPUT CIRCUITS FOR NON-VOLATILE MEMORY	12/21/2006	7/28/2009
43.	JP	PAT- Active	2012-067836	JP2012155837	5261803	HIGH SPEED FANNED OUT SYSTEM ARCHITECTURE AND INPUT/OUTPUT CIRCUITS FOR NON-VOLATILE MEMORY	12/17/2007	5/10/2013
44.	US	PAT- Active	12/415595	US20100250834	8171219	METHOD AND SYSTEM TO PERFORM CACHING BASED ON FILE-LEVEL HEURISTICS	3/31/2009	5/1/2012
45.	CN	PAT- Active	2010101585781	CN101853208	ZL2010101585781	METHOD AND SYSTEM TO PERFORM CACHING BASED ON FILE-LEVEL HEURISTICS	3/31/2010	12/10/2014
46.	DE	APP- Pending	1020100133892	DE102010013389		METHOD AND SYSTEM TO PERFORM CACHING BASED ON FILE-LEVEL HEURISTICS	3/30/2010	
47.	GB	PAT- Active	10053056	GB2469373	2469373	METHOD AND SYSTEM TO PERFORM CACHING BASED ON FILE-LEVEL HEURISTICS	3/29/2010	10/19/2011
48.	US	PAT- Active	12/414385	US20100250833	8195891	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	3/30/2009	6/5/2012
49.	US	PAT- Active	13/473419	US20120290774	8700858	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	5/16/2012	4/15/2014
50.	US	PAT- Active	14/184256	US20140173190	9501402	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	2/19/2014	11/22/2016
51.	US	PAT- Active	15/338199	US20170161198	10289556	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	10/28/2016	5/14/2019
52.	US	APP- Closed	16/405918	US20200034304		TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	5/7/2019	
53.	CN	PAT- Active	2010101580398	CN101923499	ZL2010101580398	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	3/29/2010	11/6/2013
54.	DE	APP- Pending	1020100132632	DE102010013263		TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	3/29/2010	
55.	GB	PAT- Active	10053031	GB2469193	2469193	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	3/29/2010	11/7/2012

56.	TW	PAT- Active	99109305	TW201104425	1465906	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	3/29/2010	12/21/2014
57.	TW	PAT- Active	103132963	TW201502783	1556104	TECHNIQUES TO PERFORM POWER FAIL-SAFE CACHING WITHOUT ATOMIC METADATA	3/29/2010	11/1/2016
58.	US	PAT- Active	12/462695	US20110035534	8631187	DUAL-SCOPE DIRECTORY FOR A NON-VOLATILE MEMORY STORAGE SYSTEM	8/7/2009	1/14/2014
59.	CN	PAT- Active	2010102489673	CN102023930	ZL2010102489673	DUAL-SCOPE DIRECTORY FOR A NON-VOLATILE MEMORY STORAGE SYSTEM	8/6/2010	9/10/2014
60.	US	PAT- Active	12/646719	US20110153916	8914568	HYBRID MEMORY ARCHITECTURES	12/23/2009	12/16/2014
61.	US	PAT- Active	14/539866	US20150143034	10134471	HYBRID MEMORY ARCHITECTURES	11/12/2014	11/20/2018
62.	CN	PAT- Active	2010800593647	CN102667735	ZL2010800593647	HYBRID MEMORY ARCHITECTURES	11/29/2010	1/20/2016
63.	CN	PAT- Active	2015108957400	CN105550125	ZL2015108957400	HYBRID MEMORY ARCHITECTURES	11/29/2010	6/30/2020
64.	EP	PAT- Closed	108434333	EP2517109	2517109	HYBRID MEMORY ARCHITECTURES	11/29/2010	3/13/2019
65.	DE	PAT- Active	108434333	EP2517109	2517109	HYBRID MEMORY ARCHITECTURES	11/29/2010	3/13/2019
66.	FR	PAT- Active	108434333	EP2517109	2517109	HYBRID MEMORY ARCHITECTURES	11/29/2010	3/13/2019
67.	GB	PAT- Active	108434333	EP2517109	2517109	HYBRID MEMORY ARCHITECTURES	11/29/2010	3/13/2019
68.	NL	PAT- Active	108434333	EP2517109	2517109	HYBRID MEMORY ARCHITECTURES	11/29/2010	3/13/2019
69.	US	PAT- Active	14/466447	US20140366116	9426147	PROTECTED DEVICE MANAGEMENT	8/22/2014	8/23/2016
70.	HK	PAT- Active	131082736	HK1181146	1181146	PROTECTED DEVICE MANAGEMENT	7/15/2013	12/1/2017
71.	US	PAT- Active	13/419172	US20130246734	9026767	ADAPTIVE ADDRESS MAPPING WITH DYNAMIC RUNTIME MEMORY MAPPING SELECTION	3/13/2012	5/5/2015
72.	TW	PAT- Active	99142341	TW201135459	1525433	ADAPTIVE ADDRESS MAPPING WITH DYNAMIC RUNTIME MEMORY MAPPING SELECTION	12/6/2010	3/11/2016
73.	US	PAT- Active	12/852303	US20120036347	8539245	APPARATUS AND METHOD FOR ACCESSING A SECURE PARTITION IN NON-VOLATILE STORAGE BY A HOST SYSTEM ENABLED AFTER THE SYSTEM EXITS A FIRST INSTANCE OF A SECURE MODE	8/6/2010	9/17/2013

74.	US	PAT- Active	12/890252	US20120079160	9104793	METHOD AND SYSTEM OF ADAPTING COMMUNICATION LINKS TO LINK CONDITIONS ON A PLATFORM	9/24/2010	8/11/2015
75.	CN	PAT- Active	2011800461411	CN103109507	ZL2011860461411	METHOD AND SYSTEM OF ADAPTING COMMUNICATION LINKS TO LINK CONDITIONS ON A PLATFORM	9/23/2011	11/23/2018
76.	DE	PAT- Active	118276724	EP2619956	6020110334786	METHOD AND SYSTEM OF ADAPTING COMMUNICATION LINKS TO LINK CONDITIONS ON A PLATFORM	9/23/2011	12/14/2016
77.	EP	PAT- Closed	118276724	EP2619956	2619956	METHOD AND SYSTEM OF ADAPTING COMMUNICATION LINKS TO LINK CONDITIONS ON A PLATFORM	9/23/2011	12/14/2016
78.	TW	PAT- Active	100134369	TW201217964	1541644	METHOD AND SYSTEM OF ADAPTING COMMUNICATION LINKS TO LINK CONDITIONS ON A PLATFORM	9/23/2011	7/11/2016
79.	US	PAT- Active	12/971670	US20120159041	8769228	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/17/2010	7/1/2014
80.	CN	PAT- Active	2011800608558	CN103262092	ZL2011800608558	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/2/2011	3/30/2016
81.	EP	PAT- Closed	118489525	EP2652666	2652666	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/2/2011	11/14/2018
82.	DE	PAT- Active	118489525	EP2652666	6020110539752	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/2/2011	11/14/2018
83.	FR	PAT- Active	118489525	EP2652666	2652666	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/2/2011	11/14/2018
84.	GB	PAT- Active	118489525	EP2652666	2652666	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/2/2011	11/14/2018
85.	NL	PAT- Active	118489525	EP2652666	2652666	STORAGE DRIVE BASED ANTIMALWARE METHODS AND APPARATUSES	12/2/2011	11/14/2018
86.	US	PAT- Active	13/043085	US20120233521	8612834	APPARATUS SYSTEM AND METHOD FOR DECODING LINEAR BLOCK CODES IN A MEMORY CONTROLLER	3/8/2011	12/17/2013
87.	US	PAT- Active	13/175602	US20130007561	8667360	APPARATUS SYSTEM AND METHOD FOR GENERATING AND DECODING A LONGER LINEAR BLOCK CODEWORD USING A SHORTER BLOCK LENGTH	7/1/2011	3/4/2014
88.	GB	PAT- Active	13231006	GB2510492	2510492	APPARATUS SYSTEM AND METHOD FOR GENERATING AND DECODING A LONGER LINEAR BLOCK CODEWORD USING A SHORTER BLOCK LENGTH	7/2/2012	3/20/2019
89.	KR	PAT- Active	10-2013-7034874	KR20140015602	10-1625273	APPARATUS SYSTEM AND METHOD FOR GENERATING AND DECODING A LONGER LINEAR BLOCK CODEWORD USING A SHORTER BLOCK LENGTH	7/2/2012	5/23/2016
90.	US	PAT- Active	13/175721		8463948	METHOD APPARATUS AND SYSTEM FOR DETERMINING AN IDENTIFIER OF A VOLUME OF MEMORY	7/1/2011	6/11/2013
91.	CN	PAT- Active	2012800422661	CN103765397	ZL2012800422661	Method, apparatus and system for determining an identifier of a volume of memory	7/2/2012	8/17/2016

92.	CN	PAT- Active	2012800422661	CN105765397	ZL2012800422661	METHOD APPARATUS AND SYSTEM FOR DETERMINING AN IDENTIFIER OF A VOLU ME OF MEMORY	7/2/2012	8/17/2016
93.	JP	PAT- Active	2014-519231	JP2014518427	5901759	METHOD APPARATUS AND SYSTEM FOR DETERMINING AN IDENTIFIER OF A VOLU ME OF MEMORY	7/2/2012	3/18/2016
94.	US	PAT- Active	13/234446	US20130073786	8954650	APPARATUS SYSTEM AND METHOD FOR IMPROVING READ ENDURANCE FOR A NON-VOLATILE MEMORY	9/16/2011	2/10/2015
95.	CN	PAT- Active	2011800750962	CN103946811	ZL2011800750962	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	8/11/2017
96.	CN	PAT- Active	2017107538165	CN107608910	ZL2017107538165	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	7/2/2021
97.	EP	PAT- Closed	118730126	EP2761464	2761464	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	10/24/2018
98.	EP	APP- Pending	182013417	EP3451176		APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	
99.	DE	PAT- Active	118730126	EP2761464	2761464	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	10/24/2018
100.	FR	PAT- Active	118730126	EP2761464	2761464	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	10/24/2018
101.	GB	PAT- Active	118730126	EP2761464	2761464	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	10/24/2018
102.	NL	PAT- Active	118730126	EP2761464	2761464	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	10/24/2018
103.	TW	PAT- Active	101132014	TW201324148	1454915	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/3/2012	10/1/2014
104.	US	PAT- Active	13/994731	US20130268728	9378142	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	9/30/2011	6/28/2016
105.	US	PAT- Active	15/192871	US20170031821	10102126	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	6/24/2016	10/16/2018
106.	US	PAT- Active	16/052581	US20180341588	11132298	APPARATUS AND METHOD FOR IMPLEMENTING A MULTI-LEVEL MEMORY HIERARCHY HAVING DIFFERENT OPERATING MODES	8/1/2018	9/28/2021
107.	TW	PAT- Active	101149528	TW201346545	1596474	METHOD FOR SYSTEM ACCESS OF NON VOLATILE SEMICONDUCTOR STORAGE AS RANDOM ACCESS MEMORY AND SEMICONDUCTOR CHIP	12/24/2012	8/21/2017
108.	US	PAT- Active	13/993170	US20130268731	9244848	HOST CONTROLLED HYBRID STORAGE DEVICE	10/10/2011	1/26/2016
109.	US	PAT- Active	15/004162	US20160217069	10204039	HOST CONTROLLED HYBRID STORAGE DEVICE	1/22/2016	2/12/2019
110.	CN	PAT- Active	2011800746327	CN104011689	ZL2011800746327	NONVOLATILE MEMORY WEAR MANAGEMENT	11/4/2011	12/15/2017

111.	US	PAT- Active	13/991392	US20130268725	9141536	NONVOLATILE MEMORY WEAR MANAGEMENT	11/4/2011	9/22/2015
112.	US	PAT- Active	13/991400	US20140089760	9092349	STORAGE OF CODEWORD PORTIONS	12/14/2011	7/28/2015
113.	US	PAT- Active	13/997845	US20130304978	9448922	HIGH-PERFORMANCE STORAGE STRUCTURES AND SYSTEMS FEATURING MULTIPLE NON-VOLATILE MEMORIES	12/21/2011	9/20/2016
114.	US	PAT- Active	13/977084	US20130339589	9195589	ADAPTIVE CONFIGURATION OF NON-VOLATILE MEMORY	12/27/2011	11/24/2015
115.	US	PAT- Active	14/879008	US20160203864	10026475	ADAPTIVE CONFIGURATION OF NON-VOLATILE MEMORY	10/8/2015	7/17/2018
116.	US	PAT- Active	16/035443	US20190057737	10504591	ADAPTIVE CONFIGURATION OF NON-VOLATILE MEMORY	7/13/2018	12/10/2019
117.	CN	PAT- Active	2013800448632	CN104541280	ZL2013800448632	ALTERNATIVE BOOT PATH SUPPORT FOR UTILIZING NON-VOLATILE MEMORY DEVICES	6/24/2013	5/18/2018
118.	KR	PAT- Active	10-2015-7003009	KR20150927828	10-1663072	ALTERNATIVE BOOT PATH SUPPORT FOR UTILIZING NON-VOLATILE MEMORY DEVICES	6/24/2013	9/29/2016
119.	CN	PAT- Active	2012800720247	CN104221291	ZL2012800720247	UPDATING VARIABLE NODES ASSOCIATED WITH AN ITERATIVE DECODER	3/28/2012	2/23/2018
120.	US	PAT- Active	13/997195	US20130339817	9172399	UPDATING VARIABLE NODES ASSOCIATED WITH AN ITERATIVE DECODER	3/28/2012	10/27/2015
121.	US	PAT- Active	13/525567	US20130336040	9257162	ALTERNATE CONTROL SETTINGS	6/18/2012	2/9/2016
122.	US	PAT- Active	15/018109	US20160260499	10062444	DEVICES SYSTEM AND METHODS FOR IMPLEMENTING ALTERNATE CONTROL SETTINGS	2/8/2016	8/28/2018
123.	US	PAT- Active	13/633690	US20140095742	8745296	SERIAL STORAGE PROTOCOL COMPATIBLE FRAME CONVERSION AT LEAST IN PART BEING COMPATIBLE WITH SATA AND ONE PACKET BEING COMPATIBLE WITH PCIE PROTOCOL	10/2/2012	6/3/2014
124.	CN	PAT- Active	2013800457307	CN104798010	ZL2013800457307	SERIAL STORAGE PROTOCOL COMPATIBLE FRAME CONVERSION AT LEAST IN PART	6/17/2013	5/25/2018
125.	US	PAT- Active	13/630548	US20140095766	9015404	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	9/28/2012	4/21/2015
126.	CN	PAT- Active	2013800448384	CN104541241	ZL2013800448384	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	6/13/2013	12/28/2018
127.	DE	PAT- Active	138419924	EP2901267	2901267	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	6/13/2013	12/20/2017
128.	EP	PAT- Closed	138419924	EP2901267	2901267	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	6/13/2013	12/20/2017
129.	FR	PAT- Active	138419924	EP2901267	2901267	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	6/13/2013	12/20/2017

130.	NL	PAT- Active	138419924	EP2901267	2901267	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	6/13/2013	12/20/2017
131.	GB	PAT- Active	138419924	EP2901267	2901267	PERSISTENT LOG OPERATIONS FOR NON-VOLATILE MEMORY	6/13/2013	12/20/2017
132.	US	PAT- Active	13/538221	US20140006659	8645594	DRIVER-ASSISTED BASE ADDRESS REGISTER MAPPING	6/29/2012	2/4/2014
133.	US	PAT- Active	13/928875	US20150006831	9323539	CONSTRUCTING PERSISTENT FILE SYSTEM FROM SCATTERED PERSISTENT REGIONS	6/27/2013	4/26/2016
134.	US	PAT- Active	13/628356	US20140089563	9183091	CONFIGURATION INFORMATION BACKUP IN MEMORY SYSTEMS	9/27/2012	11/10/2015
135.	US	PAT- Active	14/877144	US20160054925	9552159	CONFIGURATION INFORMATION BACKUP IN MEMORY SYSTEMS	10/7/2015	1/24/2017
136.	US	PAT- Active	15/377200	US20170139631	9817600	CONFIGURATION INFORMATION BACKUP IN MEMORY SYSTEMS	12/13/2016	11/14/2017
137.	US	PAT- Active	13/629295	US20140089758	8949698	METHOD APPARATUS AND SYSTEM FOR HANDLING DATA FAILURES	9/27/2012	2/3/2015
138.	US	PAT- Active	13/630541	US20140095956	8990670	ENDURANCE AWARE ERROR-CORRECTING CODE (ECC) PROTECTION FOR NON-VOLATILE MEMORIES	9/28/2012	3/24/2015
139.	CN	PAT- Active	2013800448651	CN104541249	ZL2013800448651	ENDURANCE AWARE ERROR-CORRECTING CODE (ECC) PROTECTION FOR NON-VOLATILE MEMORIES	6/12/2013	3/13/2018
140.	US	PAT- Active	13/948702	US20150032936	9323664	TECHNIQUES FOR IDENTIFYING READ/WRITE ACCESS COLLISIONS FOR A STORAGE MEDIUM	7/23/2013	4/26/2016
141.	US	PAT- Active	13/726303	US20140181367	9128824	IN-PLACE CHANGE BETWEEN TRANSIENT AND PERSISTENT STATE FOR DATA STRUCTURES ON NON-VOLATILE MEMORY	12/24/2012	9/8/2015
142.	US	PAT- Active	14/815508	US20160034224	9335944	IN-PLACE CHANGE BETWEEN TRANSIENT AND PERSISTENT STATE FOR DATA STRUCTURES ON NON-VOLATILE MEMORY	7/31/2015	5/10/2016
143.	CN	PAT- Active	201380061116X	CN104781794	ZL201380061116X	IN-PLACE CHANGE BETWEEN TRANSIENT AND PERSISTENT STATE FOR DATA STRUCTURES IN NON-VOLATILE MEMORY	6/19/2013	11/21/2017
144.	US	PAT- Active	13/682885	US20140143474	9032137	FLEXIBLE WEAR MANAGEMENT FOR NON-VOLATILE MEMORY	11/21/2012	5/12/2015
145.	US	PAT- Active	14/705195	US20150309926	9501405	FLEXIBLE WEAR MANAGEMENT FOR NON-VOLATILE MEMORY	5/6/2015	11/22/2016
146.	CN	PAT- Active	201380054985X	CN104756088	ZL201380054985X	FLEXIBLE WEAR MANAGEMENT FOR NON-VOLATILE MEMORY	6/13/2013	8/11/2017
147.	KR	PAT- Active	10-2015-7009653	KR20150056621	10-1596652	FLEXIBLE WEAR MANAGEMENT FOR NON-VOLATILE MEMORY	6/13/2013	2/16/2016
148.	US	PAT- Active	13/687951	US20140149825	8959407	SCALING FACTORS FOR HARD DECISION READS OF CODEWORDS DISTRIBUTED ACROSS DIE	11/28/2012	2/17/2015

149.	US	PAT- Active	13/727561	US20140181618	9043674	ERROR DETECTION AND CORRECTION APPARATUS AND METHOD	12/26/2012	5/26/2015
150.	CN	PAT- Active	201380061532X	CN104798047	ZL201380061532X	ERROR DETECTION AND CORRECTION APPARATUS AND METHOD	6/24/2013	8/11/2017
151.	KR	PAT- Active	10-2015-70111972	KR20150068452	10-1668972	ERROR DETECTION AND CORRECTION APPARATUS AND METHOD	6/24/2013	10/18/2016
152.	TW	PAT- Active	102142830	TW201435895	I546815	ERROR DETECTION AND CORRECTION APPARATUS AND METHOD	11/25/2013	8/21/2016
153.	US	PAT- Active	13/723062	US20140181614	9246516	TECHNIQUES FOR ERROR CORRECTION OF ENCODED DATA	12/20/2012	1/26/2016
154.	US	PAT- Active	13/725809	US20140181615	9026888	METHOD SYSTEM AND APPARATUS FOR PROVIDING ACCESS TO ERROR CORRECTION INFORMATION	12/21/2012	5/5/2015
155.	US	PAT- Active	13/718422	US20140173242	9317212	METHOD AND APPARATUS FOR CONTROLLING A STORAGE DEVICE	12/18/2012	4/19/2016
156.	CN	PAT- Active	2013800600485	CN104798007	ZL2013800600485	METHOD AND APPARATUS FOR CONTROLLING A STORAGE DEVICE	6/13/2013	2/13/2018
157.	EP	APP- Pending	138658463	EP2936276		METHOD AND APPARATUS FOR CONTROLLING A STORAGE DEVICE	6/13/2013	
158.	KR	PAT- Active	10-2015-7010308	KR20150058472	10-1726339	METHOD AND APPARATUS FOR CONTROLLING A STORAGE DEVICE	6/13/2013	4/6/2017
159.	BR	APP- Pending	112015019392-7	BR112015019392		MEMORY LATENCY MANAGEMENT	2/26/2014	
160.	CN	PAT- Active	2014800088400	CN105210046	ZL2014800088400	MEMORY LATENCY MANAGEMENT	2/26/2014	10/19/2021
161.	EP	PAT- Closed	147781629	EP2972916	2972916	MEMORY LATENCY MANAGEMENT	2/26/2014	12/30/2020
162.	DE	PAT- Active	147781629	EP2972916	2972916	MEMORY LATENCY MANAGEMENT	2/26/2014	12/30/2020
163.	GB	PAT- Active	147781629	EP2972916	2972916	MEMORY LATENCY MANAGEMENT	2/26/2014	12/30/2020
164.	NL	PAT- Active	147781629	EP2972916	2972916	MEMORY LATENCY MANAGEMENT	2/26/2014	12/30/2020
165.	IN	APP- Pending	4593/CHENP/2015			MEMORY LATENCY MANAGEMENT	2/26/2014	
166.	JP	PAT- Active	2016-500400	JP2016510927	6137582	MEMORY LATENCY MANAGEMENT	2/26/2014	5/12/2017
167.	KR	PAT- Active	10-2015-7021196	KR20150104165	10-1669784	MEMORY LATENCY MANAGEMENT	2/26/2014	10/20/2016

168.	MY	PAT- Active	PI2013000863		MY-180992-A	MEMORY LATENCY MANAGEMENT	3/13/2013	12/15/2020
169.	RU	MTR- Closed	2015133910	RU2015133910	2618938	MEMORY ACCESS TIME MANAGEMENT	2/26/2014	5/11/2017
170.	US	PAT- Active	14/775848	US20160034345	9904592	MEMORY LATENCY MANAGEMENT	2/26/2014	2/27/2018
171.	US	PAT- Active	15/756039	US20190129792	10572339	MEMORY LATENCY MANAGEMENT	2/27/2018	2/25/2020
172.	US	PAT- Active	13/804247	US20140281600	9213400	APPARATUS AND METHOD TO PROVIDE NEAR ZERO POWER DEVSLP IN SATA DRIVES	3/14/2013	12/15/2015
173.	US	PAT- Active	13/780690	US20140245096	9698830	SINGLE-BIT FIRST ERROR CORRECTION	2/28/2013	7/4/2017
174.	US	PAT- Active	13/792117	US20140258805	9071281	SELECTIVE PROVISION OF ERROR CORRECTION FOR MEMORY	3/10/2013	6/30/2015
175.	US	PAT- Active	13/948715	US20150032841	10353631	TECHNIQUES FOR MOVING DATA BETWEEN A NETWORK INPUT/OUTPUT DEVICE AND A STORAGE DEVICE	7/23/2013	7/16/2019
176.	US	APP- Closed	16/418405	US20190272124		TECHNIQUES FOR MOVING DATA BETWEEN A NETWORK INPUT/OUTPUT DEVICE AND A STORAGE DEVICE	5/21/2019	
177.	CN	PAT- Active	2014103526930	CN104348902	ZL2014103526930	TECHNIQUES FOR MOVING DATA BETWEEN A NETWORK INPUT/OUTPUT DEVICE AND A STORAGE DEVICE	7/23/2014	11/12/2019
178.	DE	APP- Pending	1020141104234	DE102014110423		TECHNIQUES FOR MOVING DATA BETWEEN A NETWORK INPUT/OUTPUT DEVICE AND A STORAGE DEVICE	7/23/2014	
179.	BR	APP- Pending	112015027470-6	BR112015027470		ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	
180.	CN	PAT- Active	2014800244733	CN105164635	ZL2014800244733	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	6/14/2019
181.	EP	PAT- Active	148035793	EP3005079	3005079	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	11/17/2021
182.	IN	APP- Pending	6894/CHENP/2015			ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	
183.	JP	PAT- Active	2016-512117	JP2016517988	6160848	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	6/23/2017
184.	KR	PAT- Active	10-2015-7028207	KR20150128907	10-1764044	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	7/26/2017
185.	US	PAT- Active	13/943762	US20150026386	9483397	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2013	11/1/2016
186.	BR	APP- Pending	112015031202-0	BR112015031202		ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	

187.	BR	APP- Pending	122018075830-9			ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	
188.	CN	PAT- Active	201480034413X	CN105340020	ZL201480634413X	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	8/20/2019
189.	CN	APP- Pending	201910030866X	CN110047546		ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	
190.	EP	PAT- Closed	148271422	EP3022740	3022740	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	3/6/2019
191.	EP	PAT- Closed	191505072	EP3489956	3489956	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	9/8/2021
192.	DE	PAT- Active	148271422	EP3022740	6020140425011	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	3/6/2019
193.	FR	PAT- Active	148271422	EP3022740	3022740	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	3/6/2019
194.	GB	PAT- Active	148271422	EP3022740	3022740	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	3/6/2019
195.	NL	PAT- Active	148271422	EP3022740	3022740	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	3/6/2019
196.	IN	APP- Pending	7214/CHEN/2015	IN7214CHN2015		ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	
197.	JP	PAT- Active	2016-521922	JP2016525240	6112595	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	3/24/2017
198.	KR	PAT- Active	10-2015-7032963	KR20160003720	10-1686376	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	12/7/2016
199.	RU	PAT- Active	2015154180	RU2015154180	2638006	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	12/8/2017
200.	CN	PAT- Active	201380079111X	CN105474179	ZL201380079111X	MEMORY CONTROLLER WITH DISTRIBUTION TRANSFORMER	9/25/2013	9/18/2018
201.	KR	PAT- Active	10-2016-7004200	KR20160033750	10-1845382	MEMORY CONTROLLER WITH DISTRIBUTION TRANSFORMER	9/25/2013	3/29/2018
202.	US	PAT- Active	14/129066	US20150135036	9317364	MEMORY CONTROLLER WITH DISTRIBUTION TRANSFORMER	9/25/2013	4/19/2016
203.	CN	PAT- Active	2013800790761	CN105453049	ZL2013800790761	USE OF ERROR CORRECTION POINTERS TO HANDLE ERRORS IN MEMORY	9/24/2013	5/28/2019
204.	DE	APP- Pending	1120130074540	DE112013007454		USE OF ERROR CORRECTION POINTERS TO HANDLE ERRORS IN MEMORY	9/24/2013	
205.	JP	PAT- Active	2016-541945	JP2016530655	6377751	USE OF ERROR CORRECTION POINTERS TO HANDLE ERRORS IN MEMORY	9/24/2013	8/3/2018

206.	KR	PAT- Active	10-2016-7002386	KR20160027059	10-1697052	USE OF ERROR CORRECTION POINTERS TO HANDLE ERRORS IN MEMORY	9/24/2013	1/10/2017
207.	US	PAT- Active	14/129070	US20150089310	9250990	USE OF ERROR CORRECTION POINTERS TO HANDLE ERRORS IN MEMORY	9/24/2013	2/2/2016
208.	US	PAT- Active	14/079750	US20150134875	9292213	MAINTAINING AT LEAST ONE JOURNAL AND/OR AT LEAST ONE DATA STRUCTURE BY CIRCUITRY	11/14/2013	3/22/2016
209.	CN	PAT- Active	2013800792127	CN105706059	ZL2013800792127	ERROR CORRECTION IN NONVOLATILE MEMORY	9/27/2013	9/6/2019
210.	KR	PAT- Active	10-2016-7003655	KR20160033722	10-1767018	ERROR CORRECTION IN NONVOLATILE MEMORY	9/27/2013	8/3/2017
211.	US	PAT- Active	14/126310	US20150220387	9619324	ERROR CORRECTION IN NONVOLATILE MEMORY	9/27/2013	4/11/2017
212.	US	PAT- Active	14/039129	US20150095563	9317421	MEMORY MANAGEMENT	9/27/2013	4/19/2016
213.	BR	APP- Pending	112016003873-8	BR112016003873		MEMORY MANAGEMENT	9/18/2014	
214.	CN	PAT- Active	2014800473249	CN105474183	ZL2014800473249	MEMORY MANAGEMENT	9/18/2014	10/23/2018
215.	GB	PAT- Active	16033755	GB2532667	2532667	MEMORY MANAGEMENT	9/18/2014	9/23/2020
216.	KR	PAT- Active	10-2016-7005237	KR20160039262	10-1743409	MEMORY MANAGEMENT	9/18/2014	5/29/2017
217.	RU	PAT- Active	2016107014	RU2016107014	2643499	MEMORY MANAGEMENT	9/18/2014	2/1/2018
218.	EP	APP- Pending	138944186	EP3049944		BLOCK STORAGE APERTURES TO PERSISTENT MEMORY	9/26/2013	
219.	KR	PAT- Active	10-2016-7002219	KR20160024995	10-1842621	BLOCK STORAGE APERTURES TO PERSISTENT MEMORY	9/26/2013	3/21/2018
220.	US	PAT- Active	14/141215	US20150188570	9411683	ERROR CORRECTION IN MEMORY	12/26/2013	8/9/2016
221.	US	PAT- Active	14/140261	US20150178204	9600413	COMMON PLATFORM FOR ONE-LEVEL MEMORY ARCHITECTURE AND TWO-LEVEL MEMORY ARCHITECTURE	12/24/2013	3/21/2017
222.	US	PAT- Active	15/427880	US20170147214	10228861	COMMON PLATFORM FOR ONE-LEVEL MEMORY ARCHITECTURE AND TWO-LEVEL MEMORY ARCHITECTURE	2/8/2017	3/12/2019
223.	US	APP- Pending	16/274866	US20190179531		COMMON PLATFORM FOR ONE-LEVEL MEMORY ARCHITECTURE AND TWO-LEVEL MEMORY ARCHITECTURE	2/13/2019	
224.	US	PAT- Active	14/658021	US20150269108	9734116	METHOD APPARATUS AND SYSTEM FOR CONFIGURING A PROTOCOL STACK OF AN INTEGRATED CIRCUIT CHIP	3/13/2015	8/15/2017

225.	US	PAT- Active	15/671900	US20180210857	10282341	METHOD APPARATUS AND SYSTEM FOR CONFIGURING A PROTOCOL STACK OF AN INTEGRATED CIRCUIT CHIP	8/8/2017	5/7/2019
226.	MY	PAT- Active	PI2014700666		MY-187344-A	METHOD APPARATUS AND SYSTEM FOR CONFIGURING A PROTOCOL STACK OF AN INTEGRATED CIRCUIT CHIP	3/20/2014	9/22/2021
227.	US	PAT- Active	14/229345	US20150278003	966853	PROTECTING A MEMORY DEVICE FROM BECOMING UNUSABLE	3/28/2014	3/28/2017
228.	US	PAT- Active	14/223439	US20150268709	9740258	HOLD-UP ENERGY STORAGE AND MANAGEMENT	3/24/2014	8/22/2017
229.	US	PAT- Active	14/318573	US20150378615	9477409	ACCELERATING BOOT TIME ZEROING OF MEMORY BASED ON NON-VOLATILE MEMORY (NVM) TECHNOLOGY	6/27/2014	10/25/2016
230.	CN	PAT- Active	2015800277854	CN106462410	ZL2015800277854	ACCELERATING BOOT TIME ZEROING OF MEMORY BASED ON NON-VOLATILE MEMORY (NVM) TECHNOLOGY	6/1/2015	8/11/2020
231.	EP	APP- Pending	158108670	EP3161622		ACCELERATING BOOT TIME ZEROING OF MEMORY BASED ON NON-VOLATILE MEMORY (NVM) TECHNOLOGY	6/1/2015	
232.	KR	PAT- Active	10-2016-7033076	KR20160146991	10-1862112	ACCELERATING BOOT TIME ZEROING OF MEMORY BASED ON NON-VOLATILE MEMORY (NVM) TECHNOLOGY	6/1/2015	5/23/2018
233.	US	PAT- Active	14/314181	US20150378814	9396065	EXTENSIBLE MEMORY HUB	6/25/2014	7/19/2016
234.	US	PAT- Active	15/175697	US20160364143	10372339	EXTENSIBLE MEMORY HUB	6/7/2016	8/6/2019
235.	US	PAT- Active	14/543935	US20160140364	9626531	SECURE CONTROL OF SELF-ENCRYPTING STORAGE DEVICES	11/18/2014	4/18/2017
236.	KR	APP- Pending	10-2017-7011447	KR20170085489		SECURE CONTROL OF SELF-ENCRYPTING STORAGE DEVICES	10/19/2015	
237.	TW	PAT- Active	104132857	TW201633208	1596503	SECURE CONTROL OF SELF-ENCRYPTING STORAGE DEVICES	10/6/2015	8/21/2017
238.	US	PAT- Active	14/492168	US20160085959	9870462	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	9/22/2014	1/16/2018
239.	CN	APP- Pending	2015800448307	CN107077556		PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	
240.	EP	PAT- Closed	158451732	EP3198518	3198518	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	12/9/2020
241.	DE	PAT- Active	158451732	EP3198518	3198518	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	12/9/2020
242.	FR	PAT- Active	158451732	EP3198518	3198518	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	12/9/2020
243.	GB	PAT- Active	158451732	EP3198518	3198518	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	12/9/2020

244.	NL	PAT- Active	158451732	EP3198518	3198518	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	12/9/2020
245.	IN	APP- Pending	201747004089	IN201747004089		PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	
246.	KR	PAT- Active	10-2017-7004439	KR20170032425	10-2240181	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/31/2015	4/8/2021
247.	TW	PAT- Active	104125803	TW201629820	1614632	PREVENTION OF CABLE-SWAP SECURITY ATTACK ON STORAGE DEVICES	8/7/2015	2/11/2018
248.	US	PAT- Active	14/493956	US20160085621	9652321	RECOVERY ALGORITHM IN NON-VOLATILE MEMORY	9/23/2014	5/16/2017
249.	CN	PAT- Active	2015800448468	CN106663472	ZL2015800448468	RECOVERY ALGORITHM IN NON-VOLATILE MEMORY	8/20/2015	8/27/2021
250.	KR	PAT- Active	10-2017-7004432	KR20170032424	10-2242872	RECOVERY ALGORITHM IN NON-VOLATILE MEMORY	8/20/2015	4/15/2021
251.	TW	PAT- Active	104125962	TW201618119	1587308	RECOVERY ALGORITHM IN NON-VOLATILE MEMORY	8/10/2015	6/11/2017
252.	US	PAT- Active	14/975569	US20170177381	10235526	SECURE RESUME FROM A LOW POWER STATE	12/18/2015	3/19/2019
253.	US	APP- Closed	14/498030	US20160094619		TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	9/26/2014	
254.	EP	PAT- Closed	158444141	EP3198458	3198458	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	8/18/2021
255.	JP	PAT- Active	2017-510647	JP2017534942	6569962	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	8/16/2019
256.	KR	PAT- Active	10-2017-7005007	KR20170034425	10-2320150	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	10/26/2021
257.	TW	PAT- Active	104127731	TW201629787	1662414	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/25/2015	6/11/2019
258.	US	PAT- Active	14/568417	US20160176846	9575853	ACCELERATED DATA RECOVERY IN A STORAGE SYSTEM	12/12/2014	2/21/2017
259.	US	PAT- Active	15/398651	US20170212814	10289500	ACCELERATED DATA RECOVERY IN A STORAGE SYSTEM	1/4/2017	5/14/2019
260.	CN	PAT- Active	2015800616321	CN107111535	ZL2015800616321	ACCELERATED DATA RECOVERY IN A STORAGE SYSTEM	11/13/2015	5/11/2021
261.	CN	APP- Pending	2018100520682	CN108089951		ACCELERATED DATA RECOVERY IN A STORAGE SYSTEM	11/13/2015	
262.	KR	APP- Pending	10-2017-7012863	KR20170093798		ACCELERATED DATA RECOVERY IN A STORAGE SYSTEM	11/13/2015	

263.	KR	APP- Pending	10-2018-7002334	KR20180011365		ACCELERATED DATA RECOVERY IN A STORAGE SYSTEM	11/13/2015	
264.	US	PAT- Active	14/557070	US20160156372	9798622	APPARATUS AND METHOD FOR INCREASING RESILIENCE TO RAW BIT ERROR RATE	12/1/2014	10/24/2017
265.	KR	APP- Pending	10-2017-7012651	KR20170094135		APPARATUS AND METHOD FOR REDUCING LATENCY BETWEEN HOST AND A STORAGE DEVICE	10/30/2015	
266.	TW	PAT- Active	104133713	TW201626232	1614604	APPARATUS AND METHOD FOR REDUCING LATENCY BETWEEN HOST AND A STORAGE DEVICE	10/14/2015	2/11/2018
267.	US	PAT- Active	14/670574	US20160283394	9588901	CACHING AND TIERING FOR CLOUD STORAGE	3/27/2015	3/7/2017
268.	US	PAT- Active	15/450698	US20180024937	10423535	CACHING AND TIERING FOR CLOUD STORAGE	3/6/2017	9/24/2019
269.	CN	PAT- Active	2016101579468	CN106020714	ZL2016101579468	CACHING AND TIERING FOR CLOUD STORAGE	3/18/2016	6/4/2019
270.	EP	PAT- Closed	161547096	EP3073364	3073364	CACHING AND TIERING FOR CLOUD STORAGE	2/8/2016	11/25/2020
271.	DE	PAT- Active	161547096	EP3073364	6020160483971	CACHING AND TIERING FOR CLOUD STORAGE	2/8/2016	11/25/2020
272.	FR	PAT- Active	161547096	EP3073364	3073364	CACHING AND TIERING FOR CLOUD STORAGE	2/8/2016	11/25/2020
273.	GB	PAT- Active	161547096	EP3073364	3073364	CACHING AND TIERING FOR CLOUD STORAGE	2/8/2016	11/25/2020
274.	NL	PAT- Active	161547096	EP3073364	3073364	CACHING AND TIERING FOR CLOUD STORAGE	2/8/2016	11/25/2020
275.	US	PAT- Active	14/671929	US20160283159	9753666	EFFICIENT DATA COMPRESSION FOR SOLID-STATE MEMORY	3/27/2015	9/5/2017
276.	US	PAT- Active	14/672080	US20160283143	9830093	METHOD AND APPARATUS FOR IMPROVING IMMUNITY TO DEFECTS IN A NON-VOLATILE MEMORY	3/27/2015	11/28/2017
277.	CN	PAT- Active	2016800123494	CN107408019	ZL2016800123494	METHOD AND APPARATUS FOR IMPROVING IMMUNITY TO DEFECTS IN A NON-VOLATILE MEMORY	2/18/2016	7/20/2021
278.	KR	APP- Pending	10-2017-7023663	KR20170130380		METHOD AND APPARATUS FOR IMPROVING IMMUNITY TO DEFECTS IN A NON-VOLATILE MEMORY	2/18/2016	
279.	CN	APP- Pending	201680018928X	CN107430554		IMPROVING STORAGE CACHE PERFORMANCE BY USING COMPRESSIBILITY OF THE DATA AS A CRITERIA FOR CACHE INSERTION	2/18/2016	
280.	KR	APP- Pending	10-2017-7023488	KR20170129701		IMPROVING STORAGE CACHE PERFORMANCE BY USING COMPRESSIBILITY OF THE DATA AS A CRITERIA FOR CACHE INSERTION	2/18/2016	

281.	US	PAT- Active	14/671968	US20160283116	9760281	SEQUENTIAL WRITE STREAM MANAGEMENT	3/27/2015	9/12/2017
282.	CN	APP- Pending	2016800190821	CN107430493		SEQUENTIAL WRITE STREAM MANAGEMENT	2/19/2016	
283.	EP	APP- Pending	167736503	EP3374806		SEQUENTIAL WRITE STREAM MANAGEMENT	2/19/2016	
284.	JP	PAT- Active	2017-542850	JP2018511112	6729914	SEQUENTIAL WRITE STREAM MANAGEMENT	2/19/2016	7/6/2020
285.	KR	APP- Pending	10-2017-7023540	KR20170130376		SEQUENTIAL WRITE STREAM MANAGEMENT	2/19/2016	
286.	US	PAT- Active	14/671493	US20160284393	10008250	SINGLE LEVEL CELL WRITE BUFFERING FOR MULTIPLE LEVEL CELL NON-VOLATILE MEMORY	3/27/2015	6/26/2018
287.	CN	PAT- Active	2016800191256	CN107466418	ZL2016800191256	COST OPTIMIZED SINGLE LEVEL CELL MODE NON-VOLATILE MEMORY FOR MULTIPLE LEVEL CELL MODE NON-VOLATILE MEMORY	2/18/2016	5/7/2021
288.	KR	APP- Pending	10-2017-7023700	KR20170131376		COST OPTIMIZED SINGLE LEVEL CELL MODE NON-VOLATILE MEMORY FOR MULTIPLE LEVEL CELL MODE NON-VOLATILE MEMORY	2/18/2016	
289.	US	PAT- Active	14/752554	US20160378396	9952801	ACCELERATED ADDRESS INDIRECTION TABLE LOOKUP FOR WEAR-LEVELED NON-VOLATILE MEMORY	6/26/2015	4/24/2018
290.	CN	APP- Pending	2016800304502	CN107743620		ACCELERATED ADDRESS INDIRECTION TABLE LOOKUP FOR WEAR-LEVELED NON-VOLATILE MEMORY	5/26/2016	
291.	US	PAT- Active	14/752585	US20160378623	9792190	HIGH PERFORMANCE PERSISTENT MEMORY	6/26/2015	10/17/2017
292.	US	PAT- Active	15/728414	US20180032414	10783048	HIGH PERFORMANCE PERSISTENT MEMORY	10/9/2017	9/22/2020
293.	CN	PAT- Active	2016800303586	CN107636600	ZL2016800303586	HIGH PERFORMANCE PERSISTENT MEMORY	5/1/2016	8/13/2021
294.	EP	PAT- Closed	168148807	EP3317768	3317768	HIGH PERFORMANCE PERSISTENT MEMORY	5/1/2016	6/23/2021
295.	TW	PAT- Active	105114179	TW201712551	I709856	HIGH PERFORMANCE PERSISTENT MEMORY	5/6/2016	11/1/2020
296.	CN	APP- Pending	2016800246437	CN107533349		POWER PROTECTED MEMORY WITH CENTRALIZED STORAGE	5/19/2016	
297.	US	PAT- Active	14/809132	US20170025400	9972610	SYSTEM-IN-PACKAGE LOGIC AND METHOD TO CONTROL AN EXTERNAL PACKAGED MEMORY DEVICE	7/24/2015	5/15/2018
298.	CN	PAT- Active	2016800368519	CN107750394	ZL2016800368519	SYSTEM-IN-PACKAGE LOGIC AND METHOD TO CONTROL AN EXTERNAL PACKAGED MEMORY DEVICE	5/17/2016	8/6/2021

299.	TW	PAT- Active	105117748	TW201705397	1703683	SYSTEM-IN-PACKAGE LOGIC AND METHOD TO CONTROL AN EXTERNAL PACKAGED MEMORY DEVICE	6/4/2016	9/1/2020
300.	US	PAT- Active	14/862488	US20170083393	9766963	SECURE TUNNELING ACCESS TO DEBUG TEST PORTS ON NON- VOLATILE MEMORY STORAGE UNITS	9/23/2015	9/19/2017
301.	US	PAT- Active	15/707475	US20180067794	10671466	SECURE TUNNELING ACCESS TO DEBUG TEST PORTS ON NON- VOLATILE MEMORY STORAGE UNITS	9/18/2017	6/2/2020
302.	US	PAT- Active	14/866192	US201700990752	10061516	METHODS AND APPARATUS TO CONFIGURE PERFORMANCE OF A SOLID STATE DRIVE BASED ON HOST WRITE BANDWIDTH	9/25/2015	8/28/2018
303.	US	PAT- Active	16/113804	US20190065057	10817180	METHODS AND APPARATUS TO CONFIGURE PERFORMANCE OF A SOLID STATE DRIVE BASED ON HOST WRITE BANDWIDTH	8/27/2018	10/27/2020
304.	US	PAT- Active	14/866291	US20170091022	10120751	Techniques to Recover Data Using Exclusive OR (XOR) Parity Information	9/25/2015	11/6/2018
305.	US	PAT- Closed	09/608476		6681304	METHOD AND DEVICE FOR PROVIDING HIDDEN STORAGE IN NON-VOLATILE MEMORY	6/30/2000	1/20/2004
306.	CN	APP- Pending	2016800452684	CN108027711		TECHNOLOGIES FOR MANAGING A RESERVED HIGH- PERFORMANCE MEMORY REGION OF A SOLID STATE DRIVE	8/2/2016	
307.	DE	APP- Pending	11/20160039980	DE112016003998		TECHNOLOGIES FOR MANAGING A RESERVED HIGH- PERFORMANCE MEMORY REGION OF A SOLID STATE DRIVE	8/2/2016	
308.	US	PAT- Active	14/932870	US20170123946	10303571	DATA RECOVERY IN MEMORY DEVICES	11/4/2015	5/28/2019
309.	CN	APP- Pending	2016800573161	CN108463807		TEMPERATURE DEPENDENT MULTIPLE MODE ERROR CORRECTION	9/30/2016	
310.	EP	PAT- Active	168604817	EP3368984	3368984	TEMPERATURE DEPENDENT MULTIPLE MODE ERROR CORRECTION	9/30/2016	10/26/2021
311.	US	PAT- Active	15/778616	US20180293134	10698765	TECHNIQUES TO RECOVER DATA IN A NETWORK STORAGE SYSTEM	12/23/2015	6/30/2020
312.	US	APP- Closed	14/975487	US20170177482		COMPUTING SYSTEM HAVING MULTI-LEVEL SYSTEM MEMORY CAPABLE OF OPERATING IN A SINGLE LEVEL SYSTEM MEMORY MODE	12/18/2015	
313.	US	PAT- Active	14/977292	US20170179977	10250278	COMPRESSION OF A SET OF INTEGERS	12/21/2015	4/2/2019
314.	US	PAT- Active	14/977305	US20170177057	9857859	TECHNIQUES TO POWER DOWN OUTPUT POWER RAILS FOR A STORAGE DEVICE	12/21/2015	1/2/2018
315.	CN	APP- Pending	2016800679039	CN108351817		TECHNIQUES TO POWER DOWN OUTPUT POWER RAILS FOR A STORAGE DEVICE	11/17/2016	
316.	DE	APP- Pending	11/20160058586	DE112016005858		TECHNIQUES TO POWER DOWN OUTPUT POWER RAILS FOR A STORAGE DEVICE	11/17/2016	
317.	US	PAT- Active	15/055153	US20170249991	10163508	SUPPORTING MULTIPLE MEMORY TYPES IN A MEMORY SLOT	2/26/2016	12/25/2018

318.	CN	APP- Pending	201780008328X	CN108604456		SUPPORTING MULTIPLE MEMORY TYPES IN A MEMORY SLOT	1/4/2017	
319.	DE	APP- Pending	1120170010209	DE112017001020		SUPPORTING MULTIPLE MEMORY TYPES IN A MEMORY SLOT	1/4/2017	
320.	US	PAT- Active	14/975272	US20170177374	9921916	MANAGEMENT OF POWER LOSS IN A MEMORY DEVICE	12/18/2015	3/20/2018
321.	US	PAT- Active	14/979922	US20170184733	9971045	MEMORY WITH ENHANCEMENT TO PERFORM RADIATION MEASUREMENT	12/28/2015	5/15/2018
322.	DE	APP- Pending	1120160061021	DE112016006102		MEMORY WITH ENHANCEMENT TO PERFORM RADIATION MEASUREMENT	10/12/2016	
323.	US	PAT- Active	15/001358	US20170206023	9842022	TECHNOLOGIES FOR REDUCING LATENCY IN READ OPERATIONS	1/20/2016	12/12/2017
324.	US	PAT- Active	15/089133	US20170286293	9971685	WEAR LEVELING BASED ON A SWAPPING OPERATION BETWEEN SETS OF PHYSICAL BLOCK ADDRESSES OF A NON-VOLATILE MEMORY	4/1/2016	5/15/2018
325.	TW	APP- Pending	106104618	TW201802682		WEAR LEVELING BASED ON A SWAPPING OPERATION BETWEEN SETS OF PHYSICAL BLOCK ADDRESSES OF A NON-VOLATILE MEMORY	2/13/2017	
326.	US	PAT- Active	15/086050	US20170286221	9916199	METHOD AND APPARATUS FOR AN ERROR TOLERANCE AWARE DATA RETENTION SCHEME IN A STORAGE DEVICE FOR MULTISCALE ERROR TOLERANT DATA	3/30/2016	3/13/2018
327.	CN	APP- Pending	2017800146433	CN108701086		METHOD AND APPARATUS FOR PROVIDING A CONTIGUOUSLY ADDRESSABLE MEMORY REGION BY REMAPPING AN ADDRESS SPACE	1/31/2017	
328.	DE	APP- Pending	1120170011183	DE112017001118		METHOD AND APPARATUS FOR PROVIDING A CONTIGUOUSLY ADDRESSABLE MEMORY REGION BY REMAPPING AN ADDRESS SPACE	1/31/2017	
329.	US	PAT- Active	15/086040	US20170288867	10355858	AUTHENTICATING A SYSTEM TO ENABLE ACCESS TO A DIAGNOSTIC INTERFACE IN A STORAGE DEVICE	3/30/2016	7/16/2019
330.	EP	APP- Pending	168947307	EP3430869		DATA STORAGE SYSTEM CONNECTORS WITH PARALLEL ARRAY OF DENSE MEMORY CARDS AND HIGH AIRFLOW	3/14/2016	
331.	US	PAT- Active	16/083411	US20190104632	10721832	DATA STORAGE SYSTEM CONNECTORS WITH PARALLEL ARRAY OF DENSE MEMORY CARDS AND HIGH AIRFLOW	3/14/2016	7/21/2020
332.	US	PAT- Active	16/932635	US20210007235	11102902	DATA STORAGE SYSTEM CONNECTORS WITH PARALLEL ARRAY OF DENSE MEMORY CARDS AND HIGH AIRFLOW	7/17/2020	8/24/2021
333.	US	PAT- Active	15/201370	US20180004688	10459845	LOAD REDUCED NONVOLATILE MEMORY INTERFACE	7/1/2016	10/29/2019
334.	US	APP- Pending	16/664535	US20200133899		LOAD REDUCED NONVOLATILE MEMORY INTERFACE	10/25/2019	

335.	CN	APP- Pending	2017800339347	CN109313617		LOAD REDUCED NONVOLATILE MEMORY INTERFACE	6/2/2017	
336.	DE	APP- Pending	1120170033349	DE112017003334		LOAD REDUCED NONVOLATILE MEMORY INTERFACE	6/2/2017	
337.	US	APP- Pending	16/946739	US20200333859		DATA STORAGE SYSTEM WITH PARALLEL ARRAY OF DENSE MEMORY CARDS AND HIGH AIRFLOW	7/2/2020	
338.	TW	PAT- Active	106102396	TW201735021	I744278	MEMORY CARDS AND HIGH AIRFLOW	1/23/2017	11/1/2021
339.	US	PAT- Active	15/176650	US20170357462	10296250	DATA STORAGE SYSTEM WITH PARALLEL ARRAY OF DENSE MEMORY CARDS AND HIGH AIRFLOW	6/8/2016	5/21/2019
340.	US	PAT- Active	15/089333	US20170286014	10019198	METHOD AND APPARATUS FOR IMPROVING PERFORMANCE OF SEQUENTIAL LOGGING IN A STORAGE DEVICE	4/1/2016	7/10/2018
341.	CN	APP- Pending	2017800147277	CN108701089		METHOD AND APPARATUS FOR PROCESSING SEQUENTIAL WRITES TO PORTIONS OF AN ADDRESSABLE UNIT	3/2/2017	
342.	DE	APP- Pending	1120170017017	DE112017001701		METHOD AND APPARATUS FOR PROCESSING SEQUENTIAL WRITES TO PORTIONS OF AN ADDRESSABLE UNIT	3/2/2017	
343.	US	PAT- Active	15/394653	US20180188952	10521121	WRITES TO PORTIONS OF AN ADDRESSABLE UNIT	12/29/2016	12/31/2019
344.	US	PAT- Active	15/197617	US20180004410	10055137	APPARATUS SYSTEM AND METHOD FOR THROTTLING A RATE AT WHICH COMMANDS ARE ACCEPTED IN A STORAGE DEVICE	6/29/2016	8/21/2018
345.	US	PAT- Active	16/105363	US20190146669	10579269	METHOD SYSTEM AND APPARATUS FOR NESTED SUSPEND AND RESUME IN A SOLID STATE DRIVE	8/20/2018	3/3/2020
346.	US	PAT- Active	15/277936	US20180088658	10345885	METHOD SYSTEM AND APPARATUS FOR NESTED SUSPEND AND RESUME IN A SOLID STATE DRIVE	9/27/2016	7/9/2019
347.	US	PAT- Active	15/199780	US20180004598	10504608	POWER CONTROL OF A MEMORY DEVICE THROUGH A SIDEBAND CHANNEL OF A MEMORY BUS	6/30/2016	12/10/2019
						LINKED-LIST INTERLINEATION OF DATA		

Transferred Patents

	Country	Status	Number - filing	Number - Publication	Number - Patent	Title	Date - filing	Date - Granted
1	DE	PAT-Active	14803579.3	3005079.0	602014081317.8	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	11/17/2021
2	FR	PAT-Active	14803579.3	3005079.0	3005079.0	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	11/17/2021
3	UK	PAT-Active	14803579.3	3005079.0	3005079.0	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	11/17/2021
4	NL	App-In-Preparation	14803579.3	3005079.0	3005079.0	ON-THE-FLY PERFORMANCE ADJUSTMENT FOR SOLID STATE STORAGE DEVICES	5/27/2014	11/17/2021
5	DE	PAT-Active	19150507.2	3489956.0	602014080074.2	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	9/8/2021
6	FR	PAT-Active	19150507.2	3489956.0	3489956.0	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	9/8/2021
7	UK	PAT-Active	19150507.2	3489956.0	3489956.0	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	9/8/2021
8	NL	PAT-Active	19150507.2	3489956.0	3489956.0	ERASE MANAGEMENT IN MEMORY SYSTEMS	7/16/2014	9/8/2021
9	DE	PAT-Active	13894418.6	3049944.0	3049944.0	BLOCK STORAGE APERTURES TO PERSISTENT MEMORY	9/26/2013	1/12/2022
10	FR	PAT-Active	13894418.6	3049944.0	3049944.0	BLOCK STORAGE APERTURES TO PERSISTENT MEMORY	9/26/2013	1/12/2022
11	UK	PAT-Active	13894418.6	3049944.0	3049944.0	BLOCK STORAGE APERTURES TO PERSISTENT MEMORY	9/26/2013	1/12/2022
12	NL	App-In-Preparation	13894418.6	3049944.0	3049944.0	BLOCK STORAGE APERTURES TO PERSISTENT MEMORY	9/26/2013	1/12/2022
13	DE	PAT-Active	15844414.1	3198458.0	3198458.0	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	8/18/2021

PATENT

REEL: 062437 FRAME: 0300

	Country	Status	Number - filing	Number - Publication	Number - Patent	Title	Date - filing	Date - Grated
14	FR	PAT-Active	15844414.1	3198458.0	3198458.0	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	8/18/2021
15	UK	PAT-Active	15844414.1	3198458.0	3198458.0	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	8/18/2021
16	NL	PAT-Active	15844414.1	3198458.0	3198458.0	TECHNOLOGIES FOR ACCELERATING COMPUTE INTENSIVE OPERATIONS USING SOLID STATE DRIVES	8/31/2015	8/18/2021
17	CN	Pending	202110835295.4	113535093.0		HIGH PERFORMANCE PERSISTENT MEMORY	5/11/2016	
18	DE	PAT-Active	16814880.7	3317768.0	3317768.0	HIGH PERFORMANCE PERSISTENT MEMORY	5/11/2016	6/23/2021
19	FR	PAT-Active	16814880.7	3317768.0	3317768.0	HIGH PERFORMANCE PERSISTENT MEMORY	5/11/2016	6/23/2021
20	UK	PAT-Active	16814880.7	3317768.0	3317768.0	HIGH PERFORMANCE PERSISTENT MEMORY	5/11/2016	6/23/2021
21	NL	PAT-Active	16814880.7	3317768.0	3317768.0	HIGH PERFORMANCE PERSISTENT MEMORY	5/11/2016	6/23/2021
22	DE	PAT-Active	16860481.7	3368984.0	3368984.0	TEMPERATURE DEPENDENT MULTIPLE MODE ERROR CORRECTION	9/30/2016	10/20/2021
23	FR	PAT-Active	16860481.7	3368984.0	3368984.0	TEMPERATURE DEPENDENT MULTIPLE MODE ERROR CORRECTION	9/30/2016	10/20/2021
24	UK	PAT-Active	16860481.7	3368984.0	3368984.0	TEMPERATURE DEPENDENT MULTIPLE MODE ERROR CORRECTION	9/30/2016	10/20/2021
25	NL	APP-In-Preparation	16860481.7	3368984.0	3368984.0	TEMPERATURE DEPENDENT MULTIPLE MODE ERROR CORRECTION	9/30/2016	10/20/2021
26	EP	APP-Pending	21182182.2	3920675.0		DATA STORAGE SYSTEM CONNECTORS WITH PARALLEL ARRAY OF DENSE MEMORY CARDS AND HIGH AIRFLOW	3/14/2016	

PATENT

RECORDED: 01/19/2023

REEL: 062437 FRAME: 0301