

TRADEMARK ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

ETAS ID: TM504946

SUBMISSION TYPE:	NEW ASSIGNMENT		
NATURE OF CONVEYANCE:	SECURITY INTEREST		
CONVEYING PARTY DATA			
Name	Formerly	Execution Date	Entity Type
Quantum Corporation		12/27/2018	Corporation: DELAWARE
RECEIVING PARTY DATA			
Name:	PNC Bank, National Association		
Street Address:	500 First Avenue		
Internal Address:	Commercial Loan Service Center/DCC		
City:	Pittsburgh		
State/Country:	PENNSYLVANIA		
Postal Code:	15219		
Entity Type:	National Banking Association: UNITED STATES		
PROPERTY NUMBERS Total: 54			
Property Type	Number	Word Mark	
Registration Number:	2123355	ADIC	
Registration Number:	1610492	AMASS	
Registration Number:	5324222	ARTICO	
Registration Number:	4685455	Q BE CERTAIN	
Registration Number:	2926907	CERTANCE	
Registration Number:	3399422	DLT	
Registration Number:	2864338	DLT	
Registration Number:	2518368	DLT SUPER TAPE	
Registration Number:	2373379	DLT TAPE	
Registration Number:	2864339	DLTTAPE	
Registration Number:	3655418	DXI	
Registration Number:	4172746	DXI ACCENT	
Registration Number:	4679234	DXI V1000	
Registration Number:	4175224	DXI-SERIES	
Registration Number:	5010401	DX-SERIES	
Registration Number:	2294666	FASTSTOR	
Registration Number:	2211317	FILESERV	
Serial Number:	88162338	FLEXTIER	

OP \$1365.00 2123355

Property Type	Number	Word Mark
Registration Number:	4590993	LATTUS
Registration Number:	4306048	NDX
Registration Number:	4388069	O
Registration Number:	4388070	O
Registration Number:	4388073	O
Registration Number:	2669251	PATHLIGHT
Registration Number:	4685094	PRESERVING THE WORLD'S MOST IMPORTANT DA
Registration Number:	4581554	Q-CLOUD
Registration Number:	2075239	QUANTUM
Registration Number:	1089619	QUANTUM
Registration Number:	2434568	QUANTUM
Registration Number:	0926161	QUANTUM
Registration Number:	2392749	QUANTUM
Registration Number:	4583134	QUANTUM
Registration Number:	2411810	QUANTUM
Registration Number:	1749927	QUANTUM
Registration Number:	2386775	QUANTUM
Registration Number:	5365782	QUANTUM CERTIFIED
Serial Number:	88162345	QUANTUM CLOUD
Registration Number:	4175381	QUANTUM DXI-SERIES
Registration Number:	5010402	QUANTUM DX-SERIES
Serial Number:	87029719	QUANTUM EXPERIENCE
Registration Number:	3732299	QUANTUM VISION
Registration Number:	2881314	SCALAR
Registration Number:	2030788	SCALAR
Registration Number:	3078209	SDLTTAPE
Registration Number:	3018998	STORAGECARE
Registration Number:	2468420	STORNEXT
Registration Number:	2987717	SUPERLOADER
Registration Number:	4388065	SYMFORM
Registration Number:	4388066	SYMFORM
Registration Number:	4388068	SYMFORM
Registration Number:	1869317	TAPESTOR
Registration Number:	1464451	VIPER
Registration Number:	5214652	XCELLIS
Registration Number:	2397488	JEWELRY MASTER

CORRESPONDENCE DATA

Fax Number: 2158325619

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 2155695619

Email: pecsenye@blankrome.com

Correspondent Name: Timothy D. Pecsénye

Address Line 1: One Logan Square

Address Line 2: 8th Floor

Address Line 4: Philadelphia, PENNSYLVANIA 19103

ATTORNEY DOCKET NUMBER: 074658-16079

NAME OF SUBMITTER: Timothy D. Pecsénye

SIGNATURE: /Timothy D. Pecsénye/

DATE SIGNED: 01/08/2019

Total Attachments: 33

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THE LIENS AND SECURITY INTERESTS SECURING THE OBLIGATIONS AS EVIDENCED HEREBY ARE SUBJECT TO THE PROVISIONS OF THE INTERCREDITOR AGREEMENT, DATED AS OF THE DATE HEREOF (AS AMENDED OR MODIFIED FROM TIME TO TIME), BY AND AMONG AGENT, AS ABL AGENT, AND U.S. BANK NATIONAL ASSOCIATION, AS TERM AGENT. IN THE EVENT OF ANY CONFLICT BETWEEN THE TERMS OF THE INTERCREDITOR AGREEMENT AND THIS AGREEMENT, THE TERMS OF THE INTERCREDITOR AGREEMENT SHALL GOVERN AND CONTROL.

AMENDED AND RESTATED INTELLECTUAL PROPERTY SECURITY AGREEMENT

This AMENDED AND RESTATED INTELLECTUAL PROPERTY SECURITY AGREEMENT (this "Agreement"), dated as of December 27, 2018, is made by QUANTUM CORPORATION, a Delaware corporation ("Quantum" and together with each Person joined hereto as a "Grantor" from time to time, collectively, "Grantors" and each a "Grantor"), in favor of PNC BANK, NATIONAL ASSOCIATION, a national banking association, in its capacity as "Agent" under the Credit Agreement referenced below (together with its successors and permitted assigns in such capacity, including any replacement or successor "Agent" appointed under the Credit Agreement, the "Agent").

W I T N E S E T H:

WHEREAS, pursuant to that certain Amended and Restated Revolving Credit and Security Agreement, dated of even date herewith, by and among the Agent, the financial institutions named therein or which hereafter become a party thereto as lenders (collectively, the "Lenders"), the Grantors and each other Person hereafter joined thereto as a borrower or guarantor from time to time (as amended, modified, supplemented, renewed, restated or replaced from time to time, the "Credit Agreement"; capitalized terms used herein but not otherwise defined herein shall have the meanings given to such terms in the Credit Agreement), Agent and Lenders have made and/or will hereinafter make certain extensions of credit to certain of the Grantors upon the terms and subject to the conditions set forth in the Credit Agreement;

WHEREAS, pursuant to the Credit Agreement, Grantors have granted to Agent, for its own benefit and for the ratable benefit of the Secured Parties, security interests in and liens upon substantially all of each Grantor's assets, including without limitation all of each Grantor's Intellectual Property Collateral (as hereinafter defined); and

WHEREAS, Grantors have agreed to execute and deliver this Agreement, and to have a copy of this Agreement filed with the United States Patent and Trademark Office and/or the United States Copyright Office (as applicable), in order to perfect and/or protect all of Agent's security interest in and liens upon the Intellectual Property Collateral;

NOW, THEREFORE, in consideration of the premises and mutual covenants and agreements provided for herein and in the Credit Agreement, and for other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged by each party hereto, and intending to be legally bound, the parties hereto agree as follows:

Section 1. Grant of Security Interest in Intellectual Property Collateral. Without limiting any other grant of any lien by any Grantor in any Collateral under the Credit Agreement or any Other Document, to secure the prompt payment and performance of all Obligations to Agent and each Lender, each of the other Secured Parties and each other holder of any Obligations, each Grantor hereby assigns, pledges and grants to Agent, for its benefit and for the ratable benefit of each Lender and each of the other Secured Parties, a continuing security interest in and to and Lien upon all of such Grantor's right, title and interest in, to and under the following Collateral of such Grantor, all whether now owned and/or existing or hereafter created, arising and/or acquired, and wheresoever located (the "Intellectual Property Collateral"):

(a) all of its registered/issued United States patents and filed United States patent applications, including, without limitation, those referred to on Schedule 1 hereto or on any Schedule to any Supplement (as defined below) delivered hereafter, together with all reissues, reexaminations, continuations, continuations-in-part, divisionals, renewals and extensions of the foregoing;

(b) all of its registered United States trademarks and filed United States trademark applications constituting Collateral, including, without limitation, those referred to on Schedule 2 hereto or on any Schedule to any Supplement delivered hereafter, together with all renewals, reversions and extensions of the foregoing;

(c) all goodwill of the business connected with the use of, and symbolized by, each such trademark and trademark application covered by clause (b) above;

(d) all of its registered United States copyrights and filed United States copyright applications, including, without limitation, those referred to on Schedule 3 hereto or on any Schedule to any Supplement delivered hereafter, together with all renewals, reversions and extensions of the foregoing;

(e) any claims for damages by way of any past, present, or future infringement of any of the foregoing and proceeds thereof (including, without limitation, any proceeds resulting under insurance policies); and

(f) all cash, income, royalties, fees, other proceeds, Receivables, accounts and general intangibles that consist of rights of payment to or on behalf of any Grantor, proceeds from the sale, licensing or other disposition of all or any part of, or rights in, the Intellectual Property Collateral by or on behalf of any Grantor, and all rights to sue and recover at law or in equity for any past, present and future infringement, misappropriation, dilution, violation or other impairment thereof;

which such continuing security interest in and lien upon the Intellectual Property Collateral, and this Agreement, shall continue in full force and effect to secure each of the Obligations unless and until all of the Obligations have been Paid in Full and the Credit Agreement has been terminated in accordance with its terms.

Notwithstanding the foregoing, the Intellectual Property Collateral shall not include any Excluded Property.

Section 2. Credit Agreement. The security interests and liens granted pursuant to this Agreement are granted in conjunction with, and in no way limit, the security interests and liens granted to the Agent pursuant to the Credit Agreement and/or any of the Other Documents, and each Grantor hereby acknowledges and agrees that the rights and remedies of the Agent with respect to the security interests in and liens upon the Intellectual Property Collateral made and granted hereby are more fully set forth in the Credit Agreement, the terms and provisions of which are incorporated by reference herein as if fully set forth herein. In the event that any provisions of this Agreement are in conflict with the Credit Agreement, the provisions of the Credit Agreement shall govern.

Section 3. Registration/Filing. This Agreement is intended by the parties to be filed, and each Grantor hereby authorizes Agent to file and record a copy of this Agreement, with the United States Patent and Trademark Office and/or United States Copyright Office, as applicable.

Section 4. Grantors Remains Liable. Each Grantor hereby agrees that, anything herein to the contrary notwithstanding, such Grantor shall retain full and complete responsibility for the prosecution, defense, enforcement or any other necessary or desirable actions in connection with the Intellectual Property Collateral subject to a security interest hereunder.

Section 5. Agreement to Deliver Supplements. Each Grantor hereby covenants and agrees that upon the acquisition by such Grantor of any new Intellectual Property Collateral, Grantors shall, concurrently with the delivery of a Compliance Certificate under Section 9.7, 9.8 or 9.9 of the Credit Agreement with respect to the period in which such acquisition of such new Intellectual Property Collateral occurred, deliver to Agent a duly executed Supplement to this Agreement in the form of Exhibit A hereto (a "Supplement"), listing all such newly acquired Intellectual Property Collateral on Schedule I thereto, pursuant to which Grantors shall reconfirm the grant of a security interest in such newly acquired Intellectual Property Collateral to Agent, for its benefit and for the ratable benefit of the other Secured Parties, to secure the Obligations. Each Supplement is intended by the parties to be filed, and Grantors hereby authorize Agent to file and record a copy of each Supplement, with the United States Patent and Trademark Office and/or United States Copyright Office, as applicable. Regardless of whether any Supplement is delivered by Grantors, and without limiting the generality of the provisions of Section 1 hereof above, Grantors hereby confirm and agree that any and all such after-acquired Intellectual Property Collateral (in each case, other than Excluded Property) shall immediately and automatically upon any Grantor's acquisition of any right, title and interest therein become part of the Intellectual Property Collateral hereunder. Without limiting Grantors' obligations under this Section, each Grantor hereby authorizes Agent, its successors and assigns, and any officer, employee, attorney or agent thereof, as such Grantor's true and lawful attorney-in-fact, with the power, subject in each case to the provisions of the Intercreditor Agreement, to execute and endorse in the name of such Grantor any supplement or other documentation in order to unilaterally modify this Agreement by amending any of the Schedules hereto to include any newly acquired Intellectual Property Collateral of any Grantor and to file the same with the United States Patent and Trademark Office and/or United States Copyright Office, as applicable, in the name of and on behalf of such Grantor. Notwithstanding the foregoing, no failure to so modify this Agreement or amend any Schedule hereto shall in any way affect, invalidate or

detract from Agent's continuing security interest in all Intellectual Property Collateral, whether or not listed on any Schedule hereto.

Section 6. Termination. Upon Payment in Full of all of the Obligations and the termination of the Credit Agreement in accordance with its terms, upon the written request of any Grantor, and at the sole expense of such Grantor, Agent shall execute and deliver to such Grantor an instrument, in form and substance reasonably satisfactory to Agent, in writing in recordable form releasing the lien and security interest of Agent in the Intellectual Property Collateral granted under this Agreement and each Supplement.

Section 7. Miscellaneous. This Agreement, and all matters relating hereto or arising herefrom (whether arising under contract law, tort law or otherwise) shall, in accordance with Section 5-1401 of the General Obligations Law of the State of New York, be governed by and construed in accordance with the laws of the State of New York. Without limiting the generality of the general incorporation of the Credit Agreement herein provided for above, the provisions of Section 16.1 of the Credit Agreement {agreements regarding, consents to and waivers regarding jurisdiction and venue}, Section 16.5 of the Credit Agreement {indemnities by Grantors}, Section 16.6 of the Credit Agreement {notices}, Section 16.9 of the Credit Agreement {expenses} and Article XII of the Credit Agreement {certain waivers including waivers of the rights of jury trial} are hereby specifically incorporated by reference. If any part of this Agreement is contrary to, prohibited by, or deemed invalid under Applicable Laws or regulations, such provision shall be inapplicable and deemed omitted to the extent so contrary, prohibited or invalid, but the remainder hereof shall not be invalidated thereby and shall be given effect so far as possible. This Agreement shall be binding upon and inure to the benefit of Grantors and Agent, and their respective successors and permitted assigns, except that no Grantor may assign or transfer any of its rights or obligations under this Agreement, except in accordance with the provisions of the Credit Agreement. This Agreement may be executed in counterparts, each of which shall constitute an original, but all of which when taken together shall constitute a single contract. Any signature delivered by a party by facsimile or other electronic means of transmission (including email transmission of a PDF copy) shall be deemed to be an original signature hereto.

Section 8. Amendment and Restatement. This Agreement amend and restates, but does not extinguish the obligations evidenced by, that certain Intellectual Property Security Agreement, dated as of October 21, 2016, by Grantor in favor of Agent.

In witness whereof, each Grantor has caused this Amended and Restated Intellectual Property Security Agreement to be executed and delivered by its duly authorized officer as of the date first set forth above.

GRANTOR:

QUANTUM CORPORATION

By: 

Name: J. Michael Dodson

Title: Chief Financial Officer

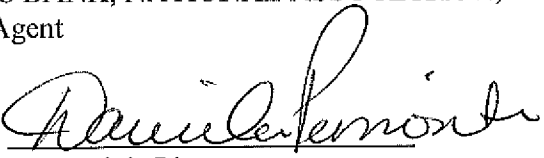
[Signature Page to Amended and Restated Intellectual Property Security Agreement (Quantum)]

TRADEMARK

REEL: 006519 FRAME: 0350

ACCEPTED AND AGREED
as of the date first above written:

PNC BANK, NATIONAL ASSOCIATION,
as Agent

By: 

Name: Daniela Piemonte
Title: Assistant Vice President

[Signature Page to Amended and Restated Intellectual Property Security Agreement (Quantum)]

TRADEMARK
REEL: 006519 FRAME: 0351

Schedule 1
to
Amended and Restated Intellectual Property Security Agreement

Patents and Patent Applications

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
METHOD FOR REDUCING RADIO FREQUENCY EMISSIONS ON HIGH-SPEED SERIAL BUSES	6380873	4/30/2002	Quantum Corp
MAGNETIC TAPE CARTRIDGE WITH BRAKE RELEASE MEMBER PUSH ROD CONTACTING REEL GEAR HOLE VIA PROTRUSIONS	6667852	12/23/2003	Quantum Corp
MEASURING READER/WRITER OFFSET IN A TAPE DRIVE HEAD	8154811	4/10/2012	Quantum Corp
MEDIA CARTRIDGE AUTOLOADER	7242549	7/10/2007	Quantum Corp
MEDIA CARTRIDGE AUTOLOADER	7365935	4/29/2008	Quantum Corp
MEDIA CARTRIDGE AUTOLOADER	7365936	4/29/2008	Quantum Corp
MEDIA CARTRIDGE AUTOLOADER	7502199	3/10/2009	Quantum Corp
A METHOD FOR RELIABLE AND EFFICIENT FILESYSTEM METADATA CONVERSION	8190655	5/29/2012	Quantum Corporation
A METHOD FOR RELIABLE AND EFFICIENT FILESYSTEM METADATA CONVERSION	8577939	11/5/2013	Quantum Corporation
A METHOD FOR SERIALIZING AND SYNCHRONIZING DATA PACKETS BY UTILIZING A PHYSICAL LOCK SYSTEM AND CONTROL DATA STRUCTURE FOR MUTUAL EXCLUSION LOCK	6067587	5/23/2000	Quantum Corporation
COMBINING HASH BASED DUPLICATION WITH SUB-BLOCK DIFFERENCING TO DEDUPLICATE DATA	8442942	5/14/2013	Quantum Corporation
METHOD FOR INCREASING DEDUPLICATION SPEED ON DATA STREAMS FRAGMENTED BY SHUFFLING	8280860	10/2/2012	Quantum Corporation
ADAPTING A TIMER BOUNDED ARBITRATION PROTOCOL	8260830	9/4/2012	Quantum Corporation
ADAPTING A TIMER BOUNDED ARBITRATION PROTOCOL	8442948	5/14/2013	Quantum Corporation
ADAPTIVE COLLABORATIVE DE-DUPLICATION	8849898	9/30/2014	Quantum Corporation
ADAPTIVE CORRECTION OF SYMMETRICAL AND ASYMMETRICAL SATURATION IN MAGNETIC RECORDING DEVICES	8760789	6/24/2014	Quantum Corporation
ADAPTIVE CORRECTION OF SYMMETRICAL AND ASYMMETRICAL SATURATION IN MAGNETIC RECORDING DEVICES	9305591	4/5/2016	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
ADAPTIVE DISTURBANCE COMPENSATION WITH MULTI-RATE SYNCHRONIZED SAMPLING	8773800	7/8/2014	Quantum Corporation
ADAPTIVE DISTURBANCE COMPENSATION WITH MULTI-RATE SYNCHRONIZED SAMPLING	9047900	6/2/2015	Quantum Corporation
ADAPTIVE ERASURE CODES	10044374	8/7/2018	Quantum Corporation
ADAPTIVE EXPERIENCE BASED DE-DUPLICATION	(13373990)	(12/7/2011)	Quantum Corporation
ADAPTIVE FILTER USING SHIFTED REVERSE INTERPOLATION	8300758	10/30/2012	Quantum Corporation
ADAPTIVE STORAGE MANAGEMENT FOR OPTIMIZING MULTI-TIER DATA STORAGE SYSTEM	9965389	5/8/2018	Quantum Corporation
ADAPTIVE STORAGE MANAGEMENT FOR OPTIMIZING MULTI-TIER DATA STORAGE SYSTEM	(15943883)	(4/3/2018)	Quantum Corporation
ADJACENT TRACK READERS	7755863	7/13/2010	Quantum Corporation
ADJUSTING REDUNDANCY IN AN ERASURE CODE OBJECT STORE TO ACCOUNT FOR VARYING DATA VALUE	9344120	5/17/2016	Quantum Corporation
APPARATUS AND METHOD FOR PARTITIONING DATA BLOCKS	7933939	4/26/2011	Quantum Corporation
APPARATUS AND METHOD FOR VIRTUALIZING DATA STORAGE MEDIA, SUCH AS FOR USE IN A DATA STORAGE LIBRARY PROVIDING RESOURCE VIRTUALIZATION	7743205	6/22/2010	Quantum Corporation
APPARATUS AND METHOD FOR VIRTUALIZING DATA STORAGE MEDIA, SUCH AS FOR USE IN A DATA STORAGE LIBRARY PROVIDING RESOURCE VIRTUALIZATION	8612697	12/17/2013	Quantum Corporation
ASSIGNING A PHYSICAL ADDRESS TO A DATA STORAGE DEVICE	8166262	4/24/2012	Quantum Corporation
ASSOCIATING EVENTS WITH THE STATE OF A DATA SET	7447850	11/4/2008	Quantum Corporation
AUTOMATED STORAGE LIBRARY GRIPPER APPARATUS AND METHOD	7212375	5/1/2007	Quantum Corporation
AUTOMATED STORAGE LIBRARY GRIPPER WITH FINGER POSITION DETECTOR	7193810	3/20/2007	Quantum Corporation
AUTOMATED TAPE CARTRIDGE AUTOLOADER/LIBRARY SYSTEM	6829116	12/7/2004	Quantum Corporation
AUTOMATED TAPE LIBRARY	6710962	3/23/2004	Quantum Corporation
AUTO-SERVO TAPE SYSTEM AND ASSOCIATED RECORDING HEAD	7499235	3/3/2009	Quantum Corporation
AUTO-SERVO TAPE SYSTEM AND ASSOCIATED RECORDING HEAD	7649707	1/19/2010	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
BACKWARD COMPATIBLE HEAD AND HEAD POSITIONING ASSEMBLY FOR A LINEAR DIGITAL TAPE DRIVE	6188532	2/13/2001	Quantum Corporation
BLOCKLET PATTERN IDENTIFICATION	8886616	11/11/2014	Quantum Corporation
BUCKLER FOR A TAPE DRIVE	6092754	7/25/2000	Quantum Corporation
CARTRIDGE BUCKLER FOR A TAPE DRIVE	6095445	8/1/2000	Quantum Corporation
CARTRIDGE MAGAZINE FOR A TAPE LIBRARY	6580582	6/17/2003	Quantum Corporation
CARTRIDGE REEL CENTERING DEVICE	7395982	7/8/2008	Quantum Corporation
CARTRIDGE TRANSPORT ASSEMBLY	7387485	6/17/2008	Quantum Corporation
CASTELLATION TECHNIQUE FOR IMPROVED LIFT-OFF OF PHOTORESIST IN THIN-FILM DEVICE PROCESSING AND A THIN-FILM DEVICE MADE THEREBY	6716515	4/6/2004	Quantum Corporation
CENTER REEL LOCK STORAGE DEVICE	7481389	1/27/2009	Quantum Corporation
CHANNEL PROCESSOR USING REDUCED COMPLEXITY LDPC DECODER	7222289	5/22/2007	Quantum Corporation
CLASSIFYING DATA FOR DEDUPLICATION AND STORAGE	9176978	11/3/2015	Quantum Corporation
CLOUD BASED DE-DUPLICATION	8886716	11/11/2014	Quantum Corporation
CLOUD-BASED SOLID STATE DEVICE (SSD) WITH DYNAMICALLY VARIABLE ERROR CORRECTING CODE (ECC) SYSTEM	(14722905)	(5/27/2015)	Quantum Corporation
CLUSTERED STORAGE NETWORK	7991951	8/2/2011	Quantum Corporation
CLUSTERED STORAGE NETWORK	8266376	9/11/2012	Quantum Corporation
CLUSTERED STORAGE NETWORK	8683123	3/25/2014	Quantum Corporation
CLUSTERED STORAGE NETWORK	9804804	10/31/2017	Quantum Corporation
COLLABORATIVE, DISTRIBUTED, DATA DE-DUPLICATION	8543551	9/24/2013	Quantum Corporation
COMBINED ASYNCHRONOUS AND SYNCHRONOUS FOUNTAIN CODE STORAGE IN AN OBJECT STORE	9304852	4/5/2016	Quantum Corporation
COMBINED ASYNCHRONOUS AND SYNCHRONOUS FOUNTAIN CODE STORAGE IN AN OBJECT STORE	9798617	10/24/2017	Quantum Corporation
COMPRESSED LEVEL TWO BLOCK BUFFER METADATA CACHE	9176887	11/3/2015	Quantum Corporation
CONFIGURABLE DATA GENERATOR	8983916	3/17/2015	Quantum Corporation
CONSIDERING MULTIPLE LOOKUPS IN BLOOM FILTER DECISION MAKING	8296274	10/23/2012	Quantum Corporation
CONTEXT AWARE PARTITIONING OF PEER GROUPS WITH GLOBALLY COHERENT DE-DUPLICATION REPOSITORY	8504595	8/6/2013	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
CONTROL METHOD FOR TAPE DRIVE TO COMPENSATE FOR SYSTEM DISTURBANCES WITHOUT USE OF FEED-FORWARD SENSOR	8699174	4/15/2014	Quantum Corporation
CONTROLLING CONFIGURABLE VARIABLE DATA REDUCTION	8176292	5/8/2012	Quantum Corporation
CONTROLLING CONFIGURABLE VARIABLE DATA REDUCTION	(13460921)	(5/1/2012)	Quantum Corporation
CONTROLLING TAPE LAYOUT FOR DE-DUPLICATION	8719235	5/6/2014	Quantum Corporation
CORRECTING DATA HAVING MORE DATA BLOCKS WITH ERRORS THAN REDUNDANCY BLOCKS	7228467	6/5/2007	Quantum Corporation
CORRECTING DATA USING REDUNDANCY BLOCKS	7290197	10/30/2007	Quantum Corporation
CORRELATION RECEIVER FOR DEMODULATING SERVO TRACK INFORMATION	7230782	6/12/2007	Quantum Corporation
CREATING A BACKUP VOLUME USING A DATA PROFILE OF A HOST VOLUME	7185031	2/27/2007	Quantum Corporation
CREATING A SELF-CONTAINED PORTABLE OUTPUT FILE	8595195	11/26/2013	Quantum Corporation
CREATING AND MANAGING LINKS TO DEDUPLICATION INFORMATION	8442954	5/14/2013	Quantum Corporation
CREATING VIRTUAL PRIVATE CONNECTIONS BETWEEN END POINTS ACROSS A SAN	6845387	1/18/2005	Quantum Corporation
CURRENT CONTROL LOOP BIAS CALIBRATION BY INTEGRATION	7038417	5/2/2006	Quantum Corporation
DATA ALLOCATION SYSTEM	8176270	5/8/2012	Quantum Corporation
DATA ALLOCATION SYSTEM	8335898	12/18/2012	Quantum Corporation
DATA ALLOCATION SYSTEM	9262345	2/16/2016	Quantum Corporation
DATA AWARE DEDUPLICATION OBJECT STORAGE (DADOS)	(15386484)	(12/21/2016)	Quantum Corporation
DATA CLASSIFICATION AWARE OBJECT STORAGE	(14244935)	(4/4/2014)	Quantum Corporation
DATA COMPRESSION WITH SELECTIVE ENCODING OF SHORT MATCHES	7215259	5/8/2007	Quantum Corporation
DATA CONTROL SYSTEM FOR VIRTUAL ENVIRONMENT	9183130	11/10/2015	Quantum Corporation
DATA CONTROL SYSTEM FOR VIRTUAL ENVIRONMENT	(14509749)	(10/8/2014)	Quantum Corporation
DATA CONTROL SYSTEMS FOR VIRTUAL ENVIRONMENTS	8707005	4/22/2014	Quantum Corporation
DATA DE-DUPLICATION AND SOLID STATE MEMORY DEVICE	8572312	10/29/2013	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
DATA DE-DUPLICATION BY PREDICTING THE LOCATIONS OF SUB-BLOCKS WITHIN THE REPOSITORY	8225060	7/17/2012	Quantum Corporation
DATA DEDUPLICATION WITH ADAPTIVE ERASURE CODE REDUNDANCY	9503127	11/22/2016	Quantum Corporation
DATA DEDUPLICATION WITH ADAPTIVE ERASURE CODE REDUNDANCY	9692452	6/27/2017	Quantum Corporation
DATA DEDUPLICATION WITH ADAPTIVE ERASURE CODE REDUNDANCY	(15602726)	(5/23/2017)	Quantum Corporation
DATA ERROR DETECTION DURING MEDIA WRITE	7624328	11/24/2009	Quantum Corporation
DATA FLOW CONTROL AND BRIDGING ARCHITECTURE ENHANCING PERFORMANCE OF REMOVABLE DATA STORAGE SYSTEMS	7493430	2/17/2009	Quantum Corporation
DATA FLOW CONTROL AND BRIDGING ARCHITECTURE ENHANCING PERFORMANCE OF REMOVABLE DATA STORAGE SYSTEMS	7620755	11/17/2009	Quantum Corporation
DATA FLOW CONTROL AND BRIDGING ARCHITECTURE ENHANCING PERFORMANCE OF REMOVABLE DATA STORAGE SYSTEMS	7831753	11/9/2010	Quantum Corporation
DATA FLOW CONTROL AND BRIDGING ARCHITECTURE ENHANCING PERFORMANCE OF REMOVABLE DATA STORAGE SYSTEMS	8041862	10/18/2011	Quantum Corporation
DATA FLOW CONTROL AND BRIDGING ARCHITECTURE ENHANCING PERFORMANCE OF REMOVABLE DATA STORAGE SYSTEMS	8281044	10/2/2012	Quantum Corporation
DATA IDENTIFICATION SYSTEM	8640241	1/28/2014	Quantum Corporation
DATA IDENTIFICATION SYSTEM	9223975	12/29/2015	Quantum Corporation
DATA REDUCTION INDEXING	8423519	4/16/2013	Quantum Corporation
DATA REPLICA CONTROL	9558074	1/31/2017	Quantum Corporation
DATA REPLICA CONTROL	(15400265)	(1/6/2017)	Quantum Corporation
DATA STORAGE APPARATUS WITH SELECTIVE ADAPTIVE PREDICTIVE BEHAVIOR	(14728497)	(6/2/2015)	Quantum Corporation
DATA STORAGE DEVICES FOR LARGE SIZE DATA STRUCTURES	7124124	10/17/2006	Quantum Corporation
DATA STORAGE MEDIA ACCESSIBILITY IN A MEDIA LIBRARY	8276168	9/25/2012	Quantum Corporation
DATA STORAGE MEDIA LIBRARY WITH SCALABLE THROUGHPUT RATE FOR DATA ROUTING AND PROTOCOL CONVERSION	6766412	7/20/2004	Quantum Corporation
DATA STORAGE SYSTEM	8046380	10/25/2011	Quantum Corporation
DATA STORAGE SYSTEM	8326884	12/4/2012	Quantum Corporation
DATA STORAGE SYSTEM AND PROCESS	7343460	3/11/2008	Quantum Corporation

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DATA STORAGE SYSTEM FOR STORING DATA IN DIFFERENT TYPES OF DATA STORAGE MEDIA	7487323	2/3/2009	Quantum Corporation
DATA STORAGE SYSTEM FOR STORING DATA IN DIFFERENT TYPES OF DATA STORAGE MEDIA	7793066	9/7/2010	Quantum Corporation
DATA STORAGE SYSTEM INCLUDING UNIQUE BLOCK POOL MANAGER AND APPLICATIONS IN TIERED STORAGE	7831793	11/9/2010	Quantum Corporation
DATA STORAGE UNIT HAVING PLURAL REMOVABLE MAGAZINES	6498771	12/24/2002	Quantum Corporation
DATABASE CONVERSION FROM SINGLE MONOLITHIC FILE MODE TO ONE TABLE PER FILE AND ONE FILE PER TABLE MODE	(14797738)	(7/13/2015)	Quantum Corporation
DE-DUPLICATION INDEXING	8572053	10/29/2013	Quantum Corporation
DE-DUPLICATION REFERENCE TAG RECONCILIATION	8504533	8/6/2013	Quantum Corporation
DEDUPLICATION SEEDING	8892526	11/18/2014	Quantum Corporation
DELTA CHUNKS AND DELTA HASHES	8489611	7/16/2013	Quantum Corporation
DISK DRIVE SLED INSERTION AND REMOVAL SYSTEM	6304439	10/16/2001	Quantum Corporation
DISTRIBUTION AND REPLICATION OF ERASURE CODES	9450617	9/20/2016	Quantum Corporation
DOUBLY DISTRIBUTED ERASURE CODES	9431054	8/30/2016	Quantum Corporation
DYNAMIC ADJUSTMENT OF MULTIPLE SEQUENTIAL BURST DATA TRANSFERS	6571302	5/27/2003	Quantum Corporation
DYNAMICALLY CONFIGURING ERASURE CODE REDUNDANCY AND DISTRIBUTION	9584160	2/28/2017	Quantum Corporation
DYNAMICALLY CONFIGURING ERASURE CODE REDUNDANCY AND DISTRIBUTION	10048864	8/14/2018	Quantum Corporation
DYNAMICALLY CONTROLLING ERASURE CODE DISTRIBUTION IN AN OBJECT STORE	9727437	8/8/2017	Quantum Corporation
DYNAMICALLY CONTROLLING ERASURE CODE DISTRIBUTION IN AN OBJECT STORE	15631486	6/23/2017	Quantum Corporation
DYNAMICALLY RECONFIGURING REBUILD AGENTS FOR ERASURE CODE REBUILD	9356628	5/31/2016	Quantum Corporation
DYNAMICALLY VARIABLE ERROR CORRECTING CODE (ECC) SYSTEM WITH HYBRID RATELESS REED-SOLOMON ECCS	(14722809)	(5/27/2015)	Quantum Corporation
EFFICIENCY OF VIRTUAL MACHINES THAT USE DE-DUPLICATION AS PRIMARY DATA STORAGE	9176676	11/3/2015	Quantum Corporation
EFFICIENT DATA STORAGE ACROSS MULTIPLE STORAGE VOLUMES	(15352475)	(11/15/2016)	Quantum Corporation
EFFICIENT HIGH/LOW ENERGY ZONE SOLID STATE DEVICE DATA STORAGE	9846613	12/19/2017	Quantum Corporation
ELECTRICAL CONNECTOR	D832789	11/6/2018	Quantum Corporation

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ELECTROMAGNETIC VOID-SENSING PROBES AND POSITION CONTROL SYSTEMS	7085095	8/1/2006	Quantum Corporation
EMULATED BACKUP TAPE DRIVE USING DATA COMPRESSION	7349930	3/25/2008	Quantum Corporation
ENCODING APPARATUS FOR RAID-6 SYSTEM AND TAPE DRIVES	6148430	11/14/2000	Quantum Corporation
ERASURE CODE PRIORITIZATION	9501353	11/22/2016	Quantum Corporation
ERASURE CORRECTION FOR ECC ENTITIES	6772390	8/3/2004	Quantum Corporation
ERROR CHECKING TECHNIQUE FOR USE IN MASS STORAGE SYSTEMS	6269464	7/31/2001	Quantum Corporation
ERROR CORRECTION ALGORITHM USING INTERLEAVED PARITY CHECK AND REED-SOLOMON CODE	7694208	4/6/2010	Quantum Corporation
ERROR CORRECTION CODES	7076723	7/11/2006	Quantum Corporation
ERROR CORRECTION DECODER USING CELLS WITH PARTIAL SYNDROME GENERATION	7228490	6/5/2007	Quantum Corporation
ESTABLISHING PARSE SCOPE	8195629	6/5/2012	Quantum Corporation
ESTABLISHING PARSE SCOPE	8799244	8/5/2014	Quantum Corporation
EXTENDED ERROR CORRECTION CODES	7162678	1/9/2007	Quantum Corporation
EXTERNAL DESKTOP DOCK FOR A CARTRIDGE-BASED DATA STORAGE UNIT	7386868	6/10/2008	Quantum Corporation
FILE LEVEL RECOVERY USING VIRTUAL MACHINE IMAGE LEVEL BACKUP WITH SELECTIVE COMPRESSION	9563520	2/7/2017	Quantum Corporation
FILE LEVEL RECOVERY USING VIRTUAL MACHINE IMAGE LEVEL BACKUP WITH SELECTIVE COMPRESSION	(15421583)	(2/1/2017)	Quantum Corporation
FILE REPAIR	8463757	6/11/2013	Quantum Corporation
FILE SYSTEM BASED EXCHANGE BETWEEN DISK-BASED NETWORK ATTACHED STORAGE AND TAPE	8886606	11/11/2014	Quantum Corporation
FILE SYSTEM METADATA CAPTURE AND RESTORE	9361187	6/7/2016	Quantum Corporation
FILE SYSTEM WITH MULTI-CLASS STORAGE AND IN SITU TIERED ARCHIVING	(14795463)	(7/9/2015)	Quantum Corporation
FILTER FILE SYSTEM WITH INODE NUMBER AS PRIMARY DATABASE KEY	(15007267)	(1/27/2016)	Quantum Corporation
FINGERPRINT ANALYSIS FOR ANTI-VIRUS SCAN	8893277	11/18/2014	Quantum Corporation
FINGERPRINT ANALYSIS FOR ANTI-VIRUS SCAN	9449174	9/20/2016	Quantum Corporation
FORCED AIR COOLING FAN HAVING PIVOTAL FAN BLADES FOR UNIDIRECTIONAL AIR FLOW	6699013	3/2/2004	Quantum Corporation
FREQUENCY, EFFICIENCY AND MIGRATION BASED REPARSING	8775759	7/8/2014	Quantum Corporation

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FRONT END INTELLIGENCE FOR MONITORING BACK END STATE	8977590	3/10/2015	Quantum Corporation
GARBAGE COLLECTION AND DEFRAGMENTATION FOR SOLID STATE DRIVES (SSD) AND SHINGLED MAGNETIC RECORDING (SMR) DRIVES	9734051	8/15/2017	Quantum Corporation
GARBAGE COLLECTION FOR VIRTUAL ENVIRONMENTS	10095616	10/9/2018	Quantum Corporation
GENERATING UNIQUE ALIASES FOR KEYS USED WITH TAPE LIBRARIES	8320569	11/27/2012	Quantum Corporation
GLOBAL ACCESS TO REMOVABLE STORAGE MEDIA ITEMS	(15453043)	(3/8/2017)	Quantum Corporation
GLOBAL STORAGE SOLUTION WITH LOGICAL CYLINDERS AND CAPSULES	(14723005)	(5/27/2015)	Quantum Corporation
HEAD ROTATOR ASSEMBLY FOR TAPE DRIVE	8599519	12/3/2013	Quantum Corporation
HEAD ROTATOR ASSEMBLY FOR TAPE DRIVE	8867163	10/21/2014	Quantum Corporation
HEAD ROTATOR ASSEMBLY FOR TAPE DRIVE	8902541	12/2/2014	Quantum Corporation
HEURISTIC JOURNAL RESERVATIONS	9483356	11/1/2016	Quantum Corporation
HEURISTIC JOURNAL RESERVATIONS	(15339024)	(10/31/2016)	Quantum Corporation
HEURISTIC JOURNAL RESERVATIONS	(15383532)	(12/19/2016)	Quantum Corporation
HIGH DENSITY VARIABLE ACCESS STORAGE LIBRARY	8186929	5/29/2012	Quantum Corporation
HIGH RELIABILITY ERASURE CODE DISTRIBUTION	9465692	10/11/2016	Quantum Corporation
HIGH SPEED REEL	6062500	5/16/2000	Quantum Corporation
HIGH/LOW ENERGY ZONE DATA STORAGE	10114692	10/30/2018	Quantum Corporation
IDENTIFYING APPLICATION METADATA IN A BACKUP STREAM	8620845	12/31/2013	Quantum Corporation
IMMEDIATE RECOVERY OF VIRTUAL MACHINE USING DEDUPLICATION DEVICE AND SNAPSHOTS	9535915	1/3/2017	Quantum Corporation
IMPLEMENTING POWER SAVINGS IN AN AUTOMATED STORAGE SYSTEM	7817369	10/19/2010	Quantum Corporation
GARBAGE COLLECTION AND DEFRAGMENTATION FOR SOLID STATE DRIVES (SSD) AND SHINGLED MAGNETIC RECORDING (SMR) DRIVES	(15618723)	(6/9/2017)	Quantum Corporation
IMPROVING SPATIAL LOCALITY OF FILE SYSTEM BLOCK ALLOCATIONS FOR RELATED ITEMS	8271760	9/18/2012	Quantum Corporation
INDEPENDENT DOUBLE HUB TAKE-UP REEL ARRANGEMENT FOR USE WITH A SINGLE REEL CARTRIDGE TAPE DRIVE	6082652	7/4/2000	Quantum Corporation
INDEX ENTRY EVICTION	8397028	3/12/2013	Quantum Corporation
IN-SITU DATA VERIFICATION FOR THE CLOUD	(15632584)	(6/26/2017)	Quantum Corporation

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INTELLIGENT TAPE DRIVE ASSEMBLY THAT DIAGNOSES AND REPAIRS ITS OWN TAPE DRIVE	7583463	9/1/2009	Quantum Corporation
INTERFACES FOR AN OPEN SYSTEMS SERVER PROVIDING TAPE DRIVE EMULATION	7127388	10/24/2006	Quantum Corporation
JOINT DE-DUPLICATION-ERASURE CODED DISTRIBUTED STORAGE	(15211208)	(7/15/2016)	Quantum Corporation
LIBRARY FOR STORING DATA-STORAGE MEDIA AND HAVING A REMOVABLE INTERFACE MODULE	6542787	4/1/2003	Quantum Corporation
LIBRARY OF HARD DISK DRIVES WITH TRANSPARENT EMULATING INTERFACE	6754768	6/22/2004	Quantum Corporation
LOCKABLE EJECTION SYSTEM AND METHOD	7536701	5/19/2009	Quantum Corporation
LOG STRUCTURED BLOCK DEVICE	9851926	12/26/2017	Quantum Corporation
LOG STRUCTURED BLOCK DEVICE FOR HARD DISK DRIVE	(15804238)	(11/6/2017)	Quantum Corporation
LOGIC LIBRARY ARCHITECTURE FOR DATA STORAGE APPLICATIONS AND METHODS OF USE	7680979	3/16/2010	Quantum Corporation
LOGICAL LIBRARY ARCHITECTURE FOR DATA STORAGE APPLICATIONS AND METHODS OF USE	7263596	8/28/2007	Quantum Corporation
MAGNETIC HEAD WITH MINI-OUTRIGGERS AND METHOD OF MANUFACTURE	7271983	9/18/2007	Quantum Corporation
METHOD FOR MANUFACTURING A MAGNETIC HEAD WITH MINI-OUTRIGGERS	8223456	7/17/2012	Quantum Corporation
MAGNETIC MEDIA ACCESS HEAD WITH METAL COATING	8934197	1/13/2015	Quantum Corporation
MAGNETIC MEDIA ACCESS HEAD WITH METAL COATING	9153259	10/6/2015	Quantum Corporation
MAGNETIC MEDIA ACCESS HEAD WITH METAL COATING	9595272	3/14/2017	Quantum Corporation
MAGNETIC RECORDING HEADS WITH BEARING SURFACE PROTECTIONS AND METHODS OF MANUFACTURING	7751154	7/6/2010	Quantum Corporation
MAGNETIC TAPE	6103365	8/15/2000	Quantum Corporation
MAGNETIC TAPE CARTRIDGE FOR HOUSING A REEL	6760192	7/6/2004	Quantum Corporation
MAGNETIC TAPE HEADS	8873192	10/28/2014	Quantum Corporation
MANIPULATING THE ACTUAL OR EFFECTIVE WINDOW SIZE IN A DATA-DEPENDANT VARIABLE-LENGTH SUB-BLOCK PARSER	8572042	10/29/2013	Quantum Corporation
MANIPULATING THE ACTUAL OR EFFECTIVE WINDOW SIZE IN A DATA-DEPENDANT VARIABLE-LENGTH SUB-BLOCK PARSER	8984024	3/17/2015	Quantum Corporation

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MASS STORAGE DEVICE WITH NETWORK INTERFACE	6622164	9/16/2003	Quantum Corporation
MASTER CALIBRATION CHANNEL FOR A MULTICHANNEL TAPE DRIVE	7961415	6/14/2011	Quantum Corporation
MECHANISM AND METHOD FOR LOADING A TAPE FROM A CARTRIDGE TO A TAKE-UP REEL	6034839	3/7/2000	Quantum Corporation
MEDIA CARTRIDGE HAVING REEL SUSPENSION SYSTEM AND METHOD OF MANUFACTURE	7204444	4/17/2007	Quantum Corporation
MEDIA CARTRIDGE PROTECTIVE CASE	D569103	5/20/2008	Quantum Corporation
MEDIA DRIVE MODULE AND STORAGE LIBRARY SYSTEM	6965811	11/15/2005	Quantum Corporation
MEDIA DRIVE SYSTEM WITH IMPROVED FUNCTIONALITY	(15496421)	(4/25/2017)	Quantum Corporation
MEDIA HANDLING SYSTEM AND METHOD	6138909	10/31/2000	Quantum Corporation
MEDIA LIBRARY ASSEMBLY HAVING FIRST DATA TRANSFER ASSEMBLY THAT RECEIVES FIRST COMMAND SIGNAL AND TRANSMITS SECOND COMMAND SIGNAL TO SECOND DATA TRANSFER ASSEMBLY TO DECREASE TIME-TO-DATA	7515987	4/7/2009	Quantum Corporation
MEDIA LIBRARY INCLUDING STORAGE MEDIA RETRIEVAL ASSEMBLY	9601149	3/21/2017	Quantum Corporation
MEDIA LIBRARY INCLUDING STORAGE MEDIA RETRIEVAL ASSEMBLY	9601150	3/21/2017	Quantum Corporation
MEDIA LIBRARY SYSTEM AND METHOD FOR MONITORING CHANGES IN INVENTORY OF MEDIA CARTRIDGES	9343100	5/17/2016	Quantum Corporation
MEDIA LIBRARY WITH FAIL OVER CAPABILITY	6725394	4/20/2004	Quantum Corporation
MEDIA-FOLLOWING ENCRYPTION POLICY CONTROL	8850224	9/30/2014	Quantum Corporation
MERGING DATA VOLUMES AND DERIVATIVE VERSIONS OF THE DATA VOLUMES	8990526	3/24/2015	Quantum Corporation
MERGING DATA VOLUMES AND DERIVATIVE VERSIONS OF THE DATA VOLUMES	9164678	10/20/2015	Quantum Corporation
MERGING DATA VOLUMES AND DERIVATIVE VERSIONS OF THE DATA VOLUMES	9411871	8/9/2016	Quantum Corporation
MESSAGING POLICY CONTROLLED EMAIL DE-DUPLICATION	8898240	11/25/2014	Quantum Corporation
MESSAGING POLICY CONTROLLED EMAIL DE-DUPLICATION	9876746	1/23/2018	Quantum Corporation
METADATA PEERING WITH IMPROVED INODES	(14593022)	(1/9/2015)	Quantum Corporation
METADATA STORAGE IN UNUSED PORTIONS OF A VIRTUAL DISK FILE	8683111	3/25/2014	Quantum Corporation

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METADATA STORAGE IN UNUSED PORTIONS OF A VIRTUAL DISK FILE	9524122	12/20/2016	Quantum Corporation
METADATA STORAGE IN UNUSED PORTIONS OF A VIRTUAL DISK FILE	(15360774)	(11/23/2016)	Quantum Corporation
METADUMP SPATIAL DATABASE SYSTEM	10133761	11/20/2018	Quantum Corporation
METHOD AND APPARATUS FOR ATTACHING MORE THAN TWO DISK DEVICES TO AN IDE BUS	7146492	12/5/2006	Quantum Corporation
METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF SUBBLOCKS IN A REDUCED-REDUNDANCY STORAGE SYSTEM	8051252	11/1/2011	Quantum Corporation
METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF SUBBLOCKS IN A REDUCED-REDUNDANCY STORAGE SYSTEM	8214607	7/3/2012	Quantum Corporation
METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF SUBBLOCKS IN A REDUCED REDUNDANCY STORING SYSTEM	8650368	2/11/2014	Quantum Corporation
METHOD AND APPARATUS FOR FACILITATING CONTROL INTERFACE FAILOVER IN A REMOVABLE MEDIA STORAGE DEVICE	8381020	2/19/2013	Quantum Corporation
METHOD AND APPARATUS FOR IMPLEMENTING ERROR CORRECTION CODING IN A RANDOM ACCESS MEMORY	7676730	3/9/2010	Quantum Corporation
METHOD AND APPARATUS FOR NON-REDUNDANT ENCRYPTED STORAGE	8572409	10/29/2013	Quantum Corporation
METHOD AND APPARATUS FOR OBTAINING COEFFICIENTS OF A FRACTIONALLY-SPACED EQUALIZER	8433965	4/30/2013	Quantum Corporation
METHOD AND APPARATUS FOR READ-AFTER-WRITE VERIFICATION WITH ERROR TOLERANCE	6512644	1/28/2003	Quantum Corporation
METHOD AND APPARATUS FOR STORAGE APPLICATION PROGRAMMING INTERFACE FOR DIGITAL MASS STORAGE AND RETREIVAL BASED UPON DATA OBJECT TYPE OR SIZE AND CHARACTERISTICS OF THE DATA STORAGE DEVICE	6128717	10/3/2000	Quantum Corporation
METHOD AND APPARATUS FOR TAPE DRIVE DATA LOGGING	8112557	2/7/2012	Quantum Corporation
METHOD AND SYSTEM FOR ADAPTIVE TIMING RECOVERY	7961818	6/14/2011	Quantum Corporation
METHOD AND SYSTEM FOR TRACKING MAGNETIC MEDIA WITH EMBEDDED OPTICAL SERVO TRACKS	7187515	3/6/2007	Quantum Corporation
METHOD AND SYSTEMS FOR A HIGHLY ERROR TOLERANT TAPE FORMAT	7440212	10/21/2008	Quantum Corporation

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METHOD FOR ACCELERATION OF STORAGE DEVICES BY RETURNING SLIGHTLY EARLY WRITE STATUS	6757767	6/29/2004	Quantum Corporation
METHOD FOR ASSOCIATING PHYSICAL ADDRESS WITH LOGICAL COMMUNICATION ADDRESS IN A MEDIA LIBRARY ASSEMBLY	8868818	10/21/2014	Quantum Corporation
METHOD FOR CALIBRATING A TAPE MEDIA USING STAGGERED CALIBRATION TRACKS	6801383	10/5/2004	Quantum Corporation
METHOD FOR INDEXING IN A REDUCED-REDUNDANCY STORAGE SYSTEM	8356021	1/15/2013	Quantum Corporation
METHOD FOR MEDIA ALLOCATION IN A PARTITIONED REMOVABLE MEDIA STORAGE LIBRARY	9311147	4/12/2016	Quantum Corporation
METHOD FOR MOVER TRANSITION IN AN AUTOMATED MEDIA LIBRARY	8825195	9/2/2014	Quantum Corporation
METHOD FOR RELIABLE AND EFFICIENT FILESYSTEM METADATA CONVERSION	9684677	6/20/2017	Quantum Corporation
METHOD FOR RELIABLE AND EFFICIENT FILESYSTEM METADATA CONVERSION	(15592179)	(5/10/2017)	Quantum Corporation
METHOD FOR STORING DATA WITH A REDUCED REDUNDANCY USING DATA CLUSTERS	7814129	10/12/2010	Quantum Corporation
METHOD FOR STORING DATA WITH A REDUCED REDUNDANCY USING DATA CLUSTERS	8255434	8/28/2012	Quantum Corporation
METHOD FOR VERIFYING FUNCTIONAL INTEGRITY OF COMPUTER HARDWARE, PARTICULARLY DATA STORAGE DEVICES	6938188	8/30/2005	Quantum Corporation
METHOD OF GENERATING CONTROL COMMANDS IN A DISTRIBUTED MASS DATA STORAGE LIBRARY NETWORK	7146244	12/5/2006	Quantum Corporation
METHOD OF PRODUCING FLUX GUIDES IN MAGNETIC RECORDING HEADS	7170721	1/30/2007	Quantum Corporation
METHOD OF READING OF RECORDING INFORMATION FROM A MAGNETIC TAPE THAT COMPENSATES FOR TRACK PITCH CHANGES	6141174	10/31/2000	Quantum Corporation
METHOD TO DIRECT DATA TO A SPECIFIC ONE OF SEVERAL REPOSITORIES	8209334	6/26/2012	Quantum Corporation
METHODOLOGY AND APPARATUS FOR SOFT-INFORMATION DETECTION AND LDPC DECODING ON AN ISI CHANNEL	8117515	2/14/2012	Quantum Corporation
METHODS AND APPARATUS FOR CALIBRATION OF A ROTATING SCANNER TO A PLURALITY OF DATA TRACK GROUPS RECORDED ON A TAPE	6101061	8/8/2000	Quantum Corporation
METHODS AND SYSTEMS FOR IMPROVED THROUGHPUT PERFORMANCE IN A DISTRIBUTED DATA DE-DUPLICATION ENVIRONMENT	8751561	6/10/2014	Quantum Corporation

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METHODS AND SYSTEMS FOR IMPROVING READ PERFORMANCE IN DATA DE-DUPLICATION STORAGE	7962706	6/14/2011	Quantum Corporation
METHODS AND SYSTEMS FOR IMPROVING READ PERFORMANCE IN DATA DE-DUPLICATION STORAGE	8209508	6/26/2012	Quantum Corporation
METHODS AND SYSTEMS FOR PROVIDING PREDICTIVE MAINTENANCE, PREVENTATIVE MAINTENANCE, AND/OR FAILURE ISOLATION IN A TAPE STORAGE SUBSYSTEM	7277246	10/2/2007	Quantum Corporation
METHODS AND SYSTEMS FOR SPACE MANAGEMENT IN DATA DE-DUPLICATION	8650228	2/11/2014	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DE-DUPLICATION	9047305	6/2/2015	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DE-DUPLICATION	9875271	1/23/2018	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DE-DUPLICATION	9886470	2/6/2018	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DE-DUPLICATION	9990390	6/5/2018	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DE-DUPLICATION	(15968716)	(5/1/2018)	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DUPLICATION	7979670	7/12/2011	Quantum Corporation
METHODS AND SYSTEMS FOR VECTORED DATA DUPLICATION	8332616	12/11/2012	Quantum Corporation
METHODS FOR CONTROLLING THE USE OF A CLEANING CARTRIDGE FOR TAPE DRIVES	7099103	8/29/2006	Quantum Corporation
METHODS OF MANUFACTURING MAGNETIC HEADS WITH REFERENCE AND MONITORING DEVICES	7290325	11/6/2007	Quantum Corporation
METHODS, SYSTEMS AND APPARATUS FOR REDUCING THE EFFECTS OF TAPE DIMENSIONAL STABILITY	7738212	6/15/2010	Quantum Corporation
METHODS, SYSTEMS AND APPARATUS FOR REDUCING THE EFFECTS OF TAPE DIMENSIONAL STABILITY	8213107	7/3/2012	Quantum Corporation
METHODS, SYSTEMS AND APPARATUS FOR REDUCING THE EFFECTS OF TAPE DIMENSIONAL STABILITY	8705199	4/22/2014	Quantum Corporation
MINIMIZE DAMAGE CAUSED BY CORRUPTION OF DE-DUPLICATED DATA	8645334	2/4/2014	Quantum Corporation

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MITIGATING THE IMPACT OF A SINGLE POINT OF FAILURE IN AN OBJECT STORE	9569307	2/14/2017	Quantum Corporation
MOBILE DEVICE AGENT FOR PERSONAL DEDUPLICATION	10013448	7/3/2018	Quantum Corporation
MODULATION ENCODERS AND DECODERS	6236340	5/22/2001	Quantum Corporation
MOTOR/ENCODER ASSEMBLY FOR TAPE DRIVES	7145272	12/5/2006	Quantum Corporation
MOVING DATA FROM LINEAR TAPE FILE SYSTEM STORAGE TO CLOUD STORAGE	(14666561)	(3/24/2015)	Quantum Corporation
MULTI-CHANNEL TIMING RECOVERY SYSTEM	7860190	12/28/2010	Quantum Corporation
MULTI-DEDUPLICATION	9342525	5/17/2016	Quantum Corporation
MULTI-DRIVE, MULTI-MAGAZINE MASS STORAGE AND RETRIEVAL UNIT FOR TAPE CARTRIDGES	6097566	8/1/2000	Quantum Corporation
MULTIPLE LUN SUPPORT FOR SATA DEVICES	7600059	10/6/2009	Quantum Corporation
MULTI-RATE TRACKING WITH A MULTI-ACTUATOR SERVO CONTROL	7684144	3/23/2010	Quantum Corporation
MULTI-THREADED MESSAGE PASSING JOURNAL	9069790	6/30/2015	Quantum Corporation
MULTI-TIER BANDWIDTH-CENTRIC DEDUPLICATION	9071584	6/30/2015	Quantum Corporation
NETWORK ATTACHED DEVICE FOR ACCESSING REMOVABLE STORAGE MEDIA	(15487776)	(4/14/2017)	Quantum Corporation
NETWORK-ATTACHABLE, FILE-ACCESSIBLE STORAGE DRIVE	8223600	7/17/2012	Quantum Corporation
NO TOUCH SYNTHETIC FULL BACKUP	8442945	5/14/2013	Quantum Corporation
NOISE TOLERANT PHASE LOCKED LOOP	7489203	2/10/2009	Quantum Corporation
N-WAY INODE TRANSLATION	9594763	3/14/2017	Quantum Corporation
OBJECT SYNTHESIS	9633032	4/25/2017	Quantum Corporation
OBJECT SYNTHESIS	(15468405)	(3/24/2017)	Quantum Corporation
OPTICAL APPARATUS FOR TRACKING A MAGNETIC TAPE	6246535	6/12/2001	Quantum Corporation
OPTICAL APPARATUS FOR TRACKING A MAGNETIC TAPE	7149049	12/12/2006	Quantum Corporation
OPTICAL RECORDING ARTICLE	7161894	1/9/2007	Quantum Corporation
PASSWORD-BASED MEDIA CARTRIDGE AUTHENTICATION	7779220	8/17/2010	Quantum Corporation
PATH LOOKUP IN A HIERARCHICAL FILE SYSTEM	10019451	7/10/2018	Quantum Corporation
PIVOTING LEVER CAM GUIDE TAPE HEAD POSITIONER	6075678	6/13/2000	Quantum Corporation
POINT-TO-POINT PROTOCOL	7023876	4/4/2006	Quantum Corporation
POLICY BASED DATA RETRIEVAL PERFORMANCE FOR DEDUPLICATED DATA	8244992	8/14/2012	Quantum Corporation

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POSITIVE ENGAGEMENT BUCKLE FOR A TAPE DRIVE AND CARTRIDGE	5971310	10/26/1999	Quantum Corporation
POWER SAVINGS IN COLD STORAGE	9965351	5/8/2018	Quantum Corporation
POWER SAVINGS IN COLD STORAGE	(15942686)	(4/2/2018)	Quantum Corporation
PRESENTING A FILE SYSTEM FOR A FILE CONTAINING ITEMS	8473531	6/25/2013	Quantum Corporation
PRESENTING A FILE SYSTEM FOR A FILE CONTAINING ITEMS	9146813	9/29/2015	Quantum Corporation
PRESENTING A FILE SYSTEM FOR A FILE CONTAINING ITEMS	9697085	7/4/2017	Quantum Corporation
SYSTEMS AND METHODS FOR PROVIDING A FILE SYSTEM VIEW OF A STORAGE ENVIRONMENT	9959131	5/1/2018	Quantum Corporation
PREVENTING READ WHILE WRITING OCCURENCES	8650357	2/11/2014	Quantum Corporation
PRIORITIZATING DATA DEDUPLICATION	8886613	11/11/2014	Quantum Corporation
PRML BASED MAGNETIC SERVO POSITION DEMODULATOR	7362525	4/22/2008	Quantum Corporation
PRODUCING A MASS STORAGE BACKUP USING A LOG OF WRITE COMMANDS AND TIME INFORMATION	7334098	2/19/2008	Quantum Corporation
PROTECTING DE-DUPLICATION REPOSITORIES AGAINST A MALICIOUS ATTACK	9094195	7/28/2015	Quantum Corporation
QUICK RELEASE FASTENING SYSTEM FOR STORAGE DEVICES	6618255	9/9/2003	Quantum Corporation
RATE 321/33 (D=0, K=6) RUN LENGTH LIMITED MODULATION CODE HAVING OPTIMIZED ERROR PROPAGATION	6184806	2/6/2001	Quantum Corporation
RECOVERY OF DATA ON A PRIMARY DATA VOLUME	7778958	8/17/2010	Quantum Corporation
RECURSIVE MULTI-THREADED FILE SYSTEM SCANNER FOR SERIALIZING FILE SYSTEM METADATA EXOSKELETON	(14922432)	(10/26/2015)	Quantum Corporation
REDUCING MESSAGING IN A CLIENT-SERVER SYSTEM	8190736	5/29/2012	Quantum Corporation
REDUCING MESSAGING IN A CLIENT-SERVER SYSTEM	8554909	10/8/2013	Quantum Corporation
METHOD AND APPARATUS FOR REDUCING MESSAGING IN A CLIENT_SERVER SYSTEM BY SELECTIVELY TRANSITIONING STATE MODE	9456041	9/27/2016	Quantum Corporation
REDUCING METADATA CONTROLLER COMMUNICATION VOLUME	9342568	5/17/2016	Quantum Corporation
REDUCING READ STARVATION	9069702	6/30/2015	Quantum Corporation
REDUCTION OF DEGRADATION OF MAGNETIC TAPE APPARATUS	8737007	5/27/2014	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
REEL LOCK AND COUPLING ENGAGEMENT MECHANISMS FOR A CARTRIDGE	6113020	9/5/2000	Quantum Corporation
REEL LOCK AND COUPLING ENGAGEMENT MECHANISMS FOR A CARTRIDGE	6234416	5/22/2001	Quantum Corporation
REEL LOCK AND COUPLING ENGAGEMENT MECHANISMS FOR A CARTRIDGE	6318657	11/20/2001	Quantum Corporation
REMOVABLE MEDIA BASED OBJECT STORE	(15340691)	(11/1/2016)	Quantum Corporation
REPAIR OF A CORRUPT DATA SEGMENT USED BY A DE-DUPLICATION ENGINE	7913114	3/22/2011	Quantum Corporation
ROLLER-INSERTER FOR USE WITH CARTRIDGE STYLE INFORMATION STORAGE MEDIA	6120230	9/19/2000	Quantum Corporation
SAMPLING BASED ON DATA DE-DUPLICATION	8442956	5/14/2013	Quantum Corporation
SATISFYING A REQUEST FOR A PHYSICAL IMPORT/EXPORT SLOT WITH A SLOT THAT IS NOT A PHYSICAL IMPORT/EXPORT SLOT	8886353	11/11/2014	Quantum Corporation
SELF-CENTERING TAPE REEL FOR SINGLE REEL TAPE CARTRIDGES	7100858	9/5/2006	Quantum Corporation
SEQUENTIAL ACCESS STORAGE AND DATA DE-DUPLICATION	9569134	2/14/2017	Quantum Corporation
SEQUENTIAL ACCESS STORAGE AND DATA DE-DUPLICATION	(15385023)	(12/20/2016)	Quantum Corporation
SERVO ERROR DETECTION AND COMPENSATION UTILIZING VIRTUAL DATA TRACKING SERVO METHODS	7826169	11/2/2010	Quantum Corporation
SERVO METHODS AND SYSTEMS USING EXISTING DATA STRUCTURES AND OPTICAL MASKS	7139152	11/21/2006	Quantum Corporation
SERVO METHODS AND SYSTEMS USING MASKED MEDIUM EDGE POSITION SENSORS	7136255	11/14/2006	Quantum Corporation
SERVO TRACK FORMAT THAT PROVIDED A UNIQUE MEDIA ID FOR ENCRYPTION	8339726	12/25/2012	Quantum Corporation
SERVO TRACK HAVING PERIODIC FRAMES OF TONE FIELD AND EMBEDDED SYNCHRONIZATION MARKS	7522371	4/21/2009	Quantum Corporation
SHARED COMMUNITY STORAGE NETWORK	7869383	1/11/2011	Quantum Corporation
SHARED COMMUNITY STORAGE NETWORK	8462665	6/11/2013	Quantum Corporation
SHARED COMMUNITY STORAGE NETWORK	9344378	5/17/2016	Quantum Corporation
SHIPPING TRAY FOR MULTIPLE CARTRIDGES	D523338	6/20/2006	Quantum Corporation
SHOCK MOUNT FOR A DEVICE PACKAGED IN A PORTABLE CARTRIDGE	6545865	4/8/2003	Quantum Corporation
SINGLE PASS FILE SYSTEM REPAIR WITH COPY ON WRITE	9898468	2/20/2018	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
SINGLE TAPE CARTRIDGE INTERFACE HAVING A CARTRIDGE REINSERTION PREVENTING MECHANISM IN AN AUTOMATED AUTOLOADER/LIBRARY SYSTEM	6606218	8/12/2003	Quantum Corporation
SNAPSHOT CREATION FROM BLOCK LISTS	8738883	5/27/2014	Quantum Corporation
SOFTWARE, SYSTEMS, AND METHODS FOR ENHANCED REPLICATION WITHIN VIRTUAL MACHINE ENVIRONMENTS	9665582	5/30/2017	Quantum Corporation
STORAGE CONDITIONING WITH INTELLIGENT REBUILD	(14944251)	(11/18/2015)	Quantum Corporation
STORAGE DEVICE FOR USE IN A SHARED COMMUNITY STORAGE NETWORK	8108502	1/31/2012	Quantum Corporation
STORAGE MEDIUM CARTRIDGE HAVING AN INTEGRAL KEY	6175470	1/16/2001	Quantum Corporation
STRENGTHENING PARITY CHECK BIT PROTECTION FOR ARRAY-LIKE LDPC CODES	7949932	5/24/2011	Quantum Corporation
SUPPORTING INTERNAL CONSISTENCY CHECKING WITH CONSISTENCY CODED JOURNAL FILE ENTRIES	8572048	10/29/2013	Quantum Corporation
SYNTHETIC VIEW	9020996	4/28/2015	Quantum Corporation
SYSTEM AND METHOD FOR DETECTING AND INHIBITING CYCLE SLIP FOR MULTI-CHANNEL MEDIA DRIVE	8922927	12/30/2014	Quantum Corporation
SYSTEM AND METHOD FOR ELECTRICAL CABLE MANAGMENT IN LIMITED ROTATION APPLICATIONS	8262009	9/11/2012	Quantum Corporation
SYSTEM AND METHOD FOR TAPE LAYOUT OPTIMIZATION	10014025	7/3/2018	Quantum Corporation
SYSTEMS AND METHOD FOR FORMING A SERVO PATTERN ON A MAGNETIC TAPE	7153366	12/26/2006	Quantum Corporation
SYSTEMS AND METHODS FOR COLLAPSING A DERIVATIVE VERSION OF A PRIMARY STORAGE VOLUME	8732427	5/20/2014	Quantum Corporation
SYSTEMS AND METHODS FOR INCREASING DATA VOLUME SPARSENESS	8825936	9/2/2014	Quantum Corporation
TAPE CARTRIDGE	D491564	6/15/2004	Quantum Corporation
TAPE CARTRIDGE	6271991	8/7/2001	Quantum Corporation
TAPE CARTRIDGE FOR TESTING AND REPAIRING A TAPE HEAD OF A TAPE DRIVE	7395983	7/8/2008	Quantum Corporation
TAPE CARTRIDGE PICKER FOR AN AUTOMATED TAPE CARTRIDGE AUTOLOADER/LIBRARY SYSTEM	6816331	11/9/2004	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
TAPE DRIVE DATA STORAGE DEVICE HAVING PERPENDICULARLY ADJUSTED TAPE GUIDES	6141184	10/31/2000	Quantum Corporation
TAPE DRIVE EMULATION SYSTEM INCLUDING TAPE LIBRARY INTERACE	6324497	11/27/2001	Quantum Corporation
TAPE GUIDING REEL	7073742	7/11/2006	Quantum Corporation
TAPE HEAD WITH THIN SUPPORT SURFACE AND METHOD OF MANUFACTURE	6937435	8/30/2005	Quantum Corporation
TAPE LIBRARY INITIATED ACTION	8743501	6/3/2014	Quantum Corporation
TAPE STORAGE DEVICE HAVING AT LEAST ONE REDUNDANT READ DATA ELEMENT	9792928	10/17/2017	Quantum Corporation
THERMAL COOLING SYSTEM FOR DENSELY PACKED STORAGE DEVICES	6618249	9/9/2003	Quantum Corporation
THIN FILM RECORDING HEAD WITH A LOCALIZED COATING TO PROTECT AGAINST CORROSION AND ELECTROSTATIC DISCHARGE	6879470	4/12/2005	Quantum Corporation
TIMER BOUNDED ARBITRATION PROTOCOL FOR RESOURCE CONTROL	8332684	12/11/2012	Quantum Corporation
FOUR CHANNEL AZIMUTH AND TWO CHANNEL NON-AZIMUTH READ-AFTER-WRITE LONGITUDINAL MAGNETIC HEAD	6130804	10/10/2000	Quantum Corporation
TWO-PART TAPE CARTRIDGE REEL LOCKING MECHANISM	6034850	3/7/2000	Quantum Corporation
TWO-TONE MAGNETIC TAPE CARTRIDGE	D496368	9/21/2004	Quantum Corporation
ULTRA HIGH TRACK DENSITY ADAPTIVE HEAD CORE TRACK PITCH CONTROL	7486464	2/3/2009	Quantum Corporation
ULTRA HIGH TRACK DENSITY ADAPTIVE HEAD CORE TRACK PITCH CONTROL	7859786	12/28/2010	Quantum Corporation
UNIFIED DATA PROTECTION AND DATA DE-DUPLICATION IN A STORAGE SYSTEM	8392791	3/5/2013	Quantum Corporation
UNSUCCESSFUL STORAGE MEDIA MOVEMENT HANDLING IN AUTOMATED REMOVABLE STORAGE MEDIA ENVIRONMENTS	10032474	7/24/2018	Quantum Corporation
VIRTUAL MAGNETIC TAPE DRIVE LIBRARY SYSTEM	6067481	5/23/2000	Quantum Corporation
WAVEFORM INTERPOLATOR ARCHITECTURE FOR ACCURATE TIMING RECOVERY BASED ON UP-SAMPLING TECHNIQUE	8594254	11/26/2013	Quantum Corporation
WIDE TAPE CARTRIDGE	6267313	7/31/2001	Quantum Corporation
WINDOWED LEVEL DETECTOR FOR PARTIAL RESPONSE CHANNELS	7852965	12/14/2010	Quantum Corporation
A METHOD FOR AUTOMATICALLY RELEASING STORAGE SPACE BY COPY TIER BASED ON TIME SINCE LAST ACCESS	(15787073)	10/18/2017	Quantum Corporation

PATENT	(SERIAL NO.) PATENT NO.	(FILING DATE) REGIS. DATE	HOLDER
ADAPTIVE PREFETCH	(62626892)	(2/6/2018)	Quantum Corporation
DATA PROTECTION OF CONTAINER PERSISTENT STORAGE WITH CHANGED BLOCK TRACKING	(16146358)	(9/28/2018)	Quantum Corporation
DATA REDIRECTOR FOR SCALE OUT	(16203897)	(11/29/2018)	Quantum Corporation
DATA REDIRECTOR FOR SCALE OUT	(62592039)	(11/29/2017)	Quantum Corporation
DATA STORAGE ACROSS SIMPLIFIED HDD AND SSD STORAGE DEVICES	(62745883)	(10/15/2018)	Quantum Corporation
DIAGNOSTIC TAPE CARTRIDGE PATTERNED WITH PREDETERMINED HEAD-MEDIA SPACINGS FOR TESTING A TAPE HEAD OF A TAPE DRIVE	62617540	1/15/2018	Quantum Corporation
ERASURE CODED TAPES WITH ADAPTIVE PARITY PROTECTION FEEDBACK FROM MEDIA FOR CAPACITY OPTIMIZED GEOGRAPHIC DISTRIBUTION	(62675979)	(5/24/2018)	Quantum Corporation
FLEXIBLE SYNCHRONOUS FILE SYSTEM REPLICATION	(16043693)	(7/24/2018)	Quantum Corporation
SYSTEM AND METHOD FOR TAPE LAYOUT OPTIMIZATION	(15993069)	(5/30/2018)	Quantum Corporation

Schedule 2
to
Amended and Restated Intellectual Property Security Agreement

Trademarks and Trademark Applications

TRADEMARK	APPL. DATE	APPL. NO.	REG. DATE	REG. NO.	OWNER
ADIC*	10/25/1996	75187710	12/23/1997	2123355	Quantum Corporation
AMASS*	12/08/1989	74009022	08/21/1990	1610492	Quantum Corporation
ARTICO*	03/12/2015	86562171	03/12/2015	5324222	Quantum Corporation
BE CERTAIN (& Q Bracket Design) *	05/14/2012	85980820	02/10/2015	4685455	Quantum Corporation
CERTANCE*	02/12/2003	78214246	02/15/2005	2926907	Quantum Corporation
DLT (& Design)	11/03/2004	78510625	03/18/2008	3399422	Quantum Corporation
DLT	02/06/2003	76487967	07/20/2004	2864338	Quantum Corporation
DLT SUPER TAPE	10/14/1999	75823333	12/11/2001	2518368	Quantum Corporation
DLT TAPE (& Design) *	12/03/1997	75399623	08/01/2000	2373379	Quantum Corporation
DLTTAPE*	02/06/2003	76487968	07/20/2004	2864339	Quantum Corporation
DXI	10/22/2007	77309905	07/14/2009	3655418	Quantum Corporation
DXI ACCENT	04/25/2011	85303443	07/10/2012	4172746	Quantum Corporation
DXI VI000	01/31/2012	85529431	01/27/2015	4679234	Quantum Corporation
DXI-SERIES*	11/18/2011	85476473	07/17/2012	4175224	Quantum Corporation
DX-SERIES	11/18/2011	85476480	08/02/2016	5010401	Quantum Corporation
FASTSTOR	08/11/1997	75339045	11/23/1999	2294666	Quantum Corporation
FILESERV	11/13/1992	74330814	12/15/1998	2211317	Quantum Corporation
FLEXTIER	10/19/2018	88162338			Quantum Corporation
LATTUS	06/18/2012	85654404	08/26/2014	4590993	Quantum Corporation
NDX*	08/26/2011	85408266	03/19/2013	4306048	Quantum Corporation
O Logo	01/16/2013	85825026	08/20/2013	4388069	Quantum Corporation
O Logo	01/16/2013	85825043	08/20/2013	4388070	Quantum Corporation
O Logo	01/16/2013	85825053	08/20/2013	4388073	Quantum Corporation
PATHLIGHT	11/15/2001	78093622	12/31/2002	2669251	Quantum Corporation
PRESERVING THE WORLD'S MOST IMPORTANT DATA. YOURS	07/11/2012	85674041	02/10/2015	4685094	Quantum Corporation
Q-CLOUD	02/01/2012	85981969	08/05/2014	4581554	Quantum Corporation
QUANTUM	02/01/1996	75052261	07/01/1997	2075239	Quantum Corporation
QUANTUM	05/23/1977	73127739	04/18/1978	1089619	Quantum Corporation
QUANTUM	12/07/1998	75608837	03/13/2001	2434568	Quantum Corporation
QUANTUM	05/20/1969	72327773	12/28/1971	926161	Quantum Corporation
QUANTUM	12/07/1998	75604153	10/10/2000	2392749	Quantum Corporation

TRADEMARK	APPL. DATE	APPL. NO.	REG. DATE	REG. NO.	OWNER
QUANTUM	09/17/2013	86066721	08/12/2014	4583134	Quantum Corporation
QUANTUM	12/07/1998	75601999	12/12/2000	2411810	Quantum Corporation
QUANTUM (Stylized)	02/03/1992	74242149	02/02/1993	1749927	Quantum Corporation
QUANTUM (Stylized)	11/10/1997	75387699	09/19/2000	2386775	Quantum Corporation
QUANTUM CERTIFIED	06/17/2016	87075198	12/26/2017	5365782	Quantum Corporation
QUANTUM CLOUD	10/19/2018	88162345			Quantum Corporation
QUANTUM DXI-SERIES*	11/22/2011	85478509	07/17/2012	4175381	Quantum Corporation
QUANTUM DX-SERIES	11/18/2011	85476482	08/02/2016	5010402	Quantum Corporation
QUANTUM EXPERIENCE	05/09/2016	87029719			Quantum Corporation
QUANTUM VISION	07/24/2008	77530641	12/29/2009	3732299	Quantum Corporation
SCALAR	04/25/2002	78124228	09/07/2004	2881314	Quantum Corporation
SCALAR	12/01/1994	74605165	01/14/1997	2030788	Quantum Corporation
SDLTTAPE	09/30/2004	76613992	04/11/2006	3078209	Quantum Corporation
STORAGECARE	05/12/2003	76518536	11/29/2005	3018998	Quantum Corporation
STORNEXT	09/15/1999	75799829	07/10/2001	2468420	Quantum Corporation
SUPERLOADER	10/15/2001	76325313	08/23/2005	2987717	Quantum Corporation
SYMFORM (Stylized & Design) *	01/16/2013	85824995	08/20/2013	4388065	Quantum Corporation
SYMFORM (Stylized & Design) *	01/16/2013	85825004	08/20/2013	4388066	Quantum Corporation
SYMFORM (Stylized & Design) *	01/16/2013	85825020	08/20/2013	4388068	Quantum Corporation
TAPESTOR*	08/25/1993	74429328	12/27/1994	1869317	Quantum Corporation
VIPER*	04/14/1987	73655202	11/10/1987	1464451	Quantum Corporation
XCELLIS	09/09/2015	86751489	05/30/2017	5214652	Quantum Corporation
JEWELRY MASTER	07 /30/1999	75745215	10/24/2000	2397488	Quantum International Corporation

Schedule 3
to
Amended and Restated Intellectual Property Security Agreement

Copyrights and Copyright Applications

GRANTOR	TITLE	REG. NO.	DATE
Quantum Corporation	Control program for 8049 microprocessor.	TX0000979601	1981
Quantum Corporation	Control program for Intel 8051 control microprocessor in rotating disk data storage device.	TX0001307338	1983
Quantum Corporation	Prodrive control program software.	TX0002323157	1988
Quantum Corporation	RF71 V102	TXu000446027	12/26/90
Quantum Corporation	RF71 V103	TXu000446028	12/26/90
Quantum Corporation	RF71 V104	TXu000446030	12/26/90
Quantum Corporation	RF71 V105	TXu000446031	12/26/90
Quantum Corporation	RF30 V102	TXu000446025	12/26/90
Quantum Corporation	RF30 V103	TXu000446024	12/26/90
Quantum Corporation	RF30 V104	TXu000446026	12/26/90
Quantum Corporation	RF30 V105	TXu000446029	12/26/90

EXHIBIT A

SUPPLEMENT TO INTELLECTUAL PROPERTY SECURITY AGREEMENT

THIS SUPPLEMENT TO INTELLECTUAL PROPERTY SECURITY AGREEMENT (the "Supplement") made as of this ___ day of _____, 201__, QUANTUM CORPORATION, a Delaware corporation ("Quantum", and any other Person that may hereafter become a party to this Agreement as a grantor of liens under the Intellectual Property Security Agreement described below, collectively, "Grantors" and each a "Grantor"), in favor of PNC BANK, NATIONAL ASSOCIATION, a national banking association, in its capacity as "Agent" under the Credit Agreement referenced below (in such capacity, together with its successors and permitted assigns, the "Agent");

W I T N E S S E T H

WHEREAS, Grantors and Agent are parties to a certain Amended and Restated Intellectual Property Security Agreement, dated as of December 27, 2018 (as amended, modified, supplemented, renewed, restated or replaced from time to time, the "IP Security Agreement"). Capitalized terms used herein but not otherwise defined herein shall have the meanings given to such terms in the IP Security Agreement;

WHEREAS, pursuant to the IP Security Agreement, to secure the prompt payment and performance of all Obligations to Agent and each other Secured Party, Grantors have assigned, pledged and granted to Agent, for its benefit and for the ratable benefit of the other Secured Parties, a continuing security interest in and to and lien upon all of such Grantor's right, title and interest in, to and under the Intellectual Property Collateral of each Grantor, all whether now owned or hereafter created, arising and/or acquired; and

WHEREAS, pursuant to the IP Security Agreement, Grantors have agreed that upon the acquisition by any Grantor of any new Intellectual Property Collateral, Grantors shall deliver to Agent a Supplement to the IP Security Agreement in the form of Exhibit A thereto pursuant to which Grantors shall reconfirm the grant by them of a security interest in and lien upon all such newly acquired Intellectual Property Collateral, which such Supplement is intended by the parties to be filed with the United States Patent and Trademark Office and/or United States Copyright Office, as applicable,

NOW, THEREFORE, in consideration of the premises set forth herein and for other good and valuable consideration, receipt and sufficiency of which are hereby acknowledged by each party hereto, and intending to be legally bound, and with the foregoing background and recitals incorporated by reference, Grantors agree as follows:

1. Grant and Reaffirmation of Grant of Security Interests. Without limiting any other grant of any security interest or lien by any Grantor in and upon any Collateral under the Credit Agreement or any of the Other Documents, to secure the prompt payment and performance of all Obligations to Agent and the other Secured Parties, each Grantor hereby assigns, pledges and grants to Agent, for its benefit and for the ratable benefit of the other Secured Parties, a continuing security interest in and to and lien upon all of such Grantor's right,

title and interest in, to and under the following Collateral of such Grantor, all whether now owned or hereafter created, arising and/or acquired: the newly acquired Intellectual Property Collateral listed on Schedule 1 to this Supplement (together with all reissues, reexaminations, continuations, continuations-in-part, divisionals, renewals and extensions of the foregoing). Grantors agree that all such newly acquired Intellectual Property Collateral described above shall be included in and be part of the Intellectual Property Collateral under and subject to all of the terms and provisions of the IP Security Agreement. Grantors hereby authorize Agent to file and record a copy of this Supplement with the United States Patent and Trademark Office and/or United States Copyright Office, as applicable.

2. Incorporation of the IP Security Agreement. The terms and provisions of the IP Security Agreement are hereby incorporated by reference and this Supplement shall be considered an amendment and supplement to and part of the IP Security Agreement; all of the provisions of which IP Security Agreement are and remain in full force and effect as supplemented by this Supplement.

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IN WITNESS WHEREOF, Grantors have duly executed this Supplement to the IP Security Agreement as of the date first written above.

GRANTORS:

QUANTUM CORPORATION

By: _____
Name:
Title:

ACCEPTED AND AGREED
as of the date first above written:

PNC BANK, NATIONAL ASSOCIATION,
as Agent

By: _____
Name:
Title:

SCHEDULE I

TO SUPPLEMENT TO INTELLECTUAL PROPERTY SECURITY AGREEMENT

DATED _____