501897818 04/24/2012

PATENT ASSIGNMENT

Electronic Version v1.1 Stylesheet Version v1.1

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|-----------------------|----------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

CONVEYING PARTY DATA

| Name | Execution Date |
|------------------|----------------|
| Yedidya Dotan | 03/29/2012 |
| William M. Duane | 03/28/2012 |
| John Linn | 03/29/2012 |
| Roy Hodgman | 03/28/2012 |
| Derek Lin | 03/28/2012 |

RECEIVING PARTY DATA

| Name: | EMC Corporation |
|-----------------|------------------|
| Street Address: | 176 South Street |
| City: | Hopkinton |
| State/Country: | MASSACHUSETTS |
| Postal Code: | 01748 |

PROPERTY NUMBERS Total: 1

| Property Type | Number |
|---------------------|----------|
| Application Number: | 13434257 |

CORRESPONDENCE DATA

Fax Number: (508)366-4688 Phone: 508-616-2900

Email: Docket@BainwoodHuang.com

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

via US Mail.

Correspondent Name: Bainwood, Huang & Associates, LLC

Address Line 1: 2 Connector Road

Address Line 4: Westborough, MASSACHUSETTS 01581

| ATTORNEY DOCKET NUMBER: | 1048-117 |
|-------------------------|----------------------|
| NAME OF SUBMITTER: | David E. Huang, Esq. |

PATENT REEL: 028094 FRAME: 0149 \$40 00 1343

501897818

Total Attachments: 28 source=1048-117 - Executed Assignment-Inv1 and 4#page1.tif source=1048-117 - Executed Assignment-Inv1 and 4#page2.tif source=1048-117 - Executed Assignment-Inv1 and 4#page3.tif source=1048-117 - Executed Assignment-Inv1 and 4#page4.tif source=1048-117 - Executed Assignment-Inv1 and 4#page5.tif source=1048-117 - Executed Assignment-Inv1 and 4#page6.tif source=1048-117 - Executed Assignment-Inv1 and 4#page7.tif source=1048-117 - Executed Assignment Inv2#page1.tif source=1048-117 - Executed Assignment Inv2#page2.tif source=1048-117 - Executed Assignment Inv2#page3.tif source=1048-117 - Executed Assignment Inv2#page4.tif source=1048-117 - Executed Assignment Inv2#page5.tif source=1048-117 - Executed Assignment Inv2#page6.tif source=1048-117 - Executed Assignment Inv2#page7.tif source=1048-117 - Executed Assignment Inv3#page1.tif source=1048-117 - Executed Assignment Inv3#page2.tif source=1048-117 - Executed Assignment Inv3#page3.tif source=1048-117 - Executed Assignment Inv3#page4.tif source=1048-117 - Executed Assignment Inv3#page5.tif source=1048-117 - Executed Assignment Inv3#page6.tif source=1048-117 - Executed Assignment Inv3#page7.tif source=1048-117 - Executed Assignment Inv5#page1.tif source=1048-117 - Executed Assignment Inv5#page2.tif source=1048-117 - Executed Assignment Inv5#page3.tif source=1048-117 - Executed Assignment Inv5#page4.tif source=1048-117 - Executed Assignment Inv5#page5.tif source=1048-117 - Executed Assignment Inv5#page6.tif source=1048-117 - Executed Assignment Inv5#page7.tif

PATENT REEL: 028094 FRAME: 0150

ASSIGNMENT

WHEREAS, we, Yedidya Dotan, William M. Duane, John Linn, Roy Hodgman, and Derek Lin, have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled AUTHENTICATION INVOLVING AUTHENTICATION OPERATIONS WHICH CROSS REFERENCE AUTHENTICATION FACTORS the specification of which:

| [X] | is being executed on even date herewith and is about to be filed United States Patent Office; | l in the |
|-----|--|----------|
| | was filed on as U.S. Application No; | |
| | was patented under U.S. Patent Noonon | |

WHEREAS, EMC Corporation (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts and having a usual place of business at 176 South Street, Hopkinton, Massachusetts 01748, USA desires to acquire an interest therein in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

> PATENT REEL: 028094 FRAME: 0151

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives:

AND we hereby authorize our attorneys Bainwood Huang & Associates LLC to insert here in parentheses (13/434,257 filed 03/29/2012) the application number and filing date of said Application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals as set forth below:

| Date: 24/3/12 | |
|--|--|
| į. | Inventor's Signature |
| Print full name of first inventor: | Yedidya Dotan |
| Residence: | 1 Barazani Moshe Street |
| | Tel Aviv, 69121 ISRAEL |
| Citizenship: | Israel |
| Mailing Address: | Same as above |
| was personally present and did see Yeard the assignment) who is personally known to | |
| | signature of first witness) |
| Signed at Herzelyo | (location of witness signature) |
| on this day $29\sqrt{3}$ of s | 2012. (date of signature) |
| I Frac Be Ari 5. Hapeles at Klin - Vola was personally present and did see Yeki the assignment) who is personally known to | (name) whose residential address is \[\frac{\mathcal{P}_n \mathcal{P}_n}{\mathcal{P}_n} \] (name of person signing me, execute the above assignment. |
| | signature of second witness) |
| Signed at Herzeliya | (location of witness signature) |
| on this day $\frac{29/3}{2}$ of 2 | 2012. (date of signature) |

| Date: | |
|--|---|
| | Inventor's Signature |
| Print full name of second inventor: | William M. Duane |
| Residence: | 4 Howard Road |
| | Westford, MA 01886 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| | |
| STATE/COMMONWEALTH OF | |
| COUNTY OF | |
| | |
| me the above-named William M. Dua | , 2012, then personally appeared before ne known to me through satisfactory evidence of on card; [] driver's license; [] (other) _ to be the person whose name is subscribed to |
| the foregoing Assignment and acknow free act and deed for the purposes the | ledged that he/she executed the same as his/her |
| | |
| | Notary Public |
| | Print Name: |
| | My Commission expires / / |

| Date: | |
|--|---|
| | Inventor's Signature |
| Print full name of third inventor: | John Linn |
| Residence: | 580 West Street |
| | Carlisle, MA 01741 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| STATE/COMMONWEALTH OF COUNTY OF | |
| me the above-named John Linn kno | , 2012, then personally appeared before own to me through satisfactory evidence of ation card; [] driver's license; [] (other) to be the person whose name is subscribed to |
| the foregoing Assignment and acknown free act and deed for the purposes the purpose the pu | wledged that he/she executed the same as his/her |
| | |
| | Notary Public |
| | Print Name: |
| | My Commission expires// |

| Date: 3/28/2012 | Inventor's Signature |
|---|--|
| Print full name of fourth inventor: | Roy Hodgman |
| Residence: | 5 William Fairfield Drive |
| | Wenham, MA 01984 |
| Citizenship: | US The second se |
| Mailing Address: | Same as above |
| I <u>Gyal Kulman</u> Tel Aviv was personally present and did see | (name) whose residential address is Rey Hodinan (name of person signing in to me, execute the above assignment. |
| the assignment) who is personally know | n to me, execute the above assignment. |
| | (signature of first witness) |
| Signed at <u>Heraliya</u> | |
| on this day $\frac{28}{3}$ | of 2012. (date of signature) |
| | |
| | (name) whose residential address is |
| was personally present and did see $\mathcal{F} \circ$ the assignment) who is personally know | n to me, execute the above assignment. |
| = L | (signature of second witness) |
| Signed at Helzliya | (location of witness signature) |
| on this day <u>2 γ/</u> 3 | of 2012. (date of signature) |

| Date: | |
|---|--|
| | Inventor's Signature |
| Print full name of fifth inventor: | Derek Lin |
| Residence: | 225 Cupertino Way |
| | San Mateo, CA 94403 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| | |
| STATE/COMMONWEALTH OF | |
| COUNTY OF | · · · · · · · · · · · · · · · · · · · |
| | |
| me the above-named Derek Lin know | , 2012, then personally appeared before vn to me through satisfactory evidence of tion card; [] driver's license; [] (other) |
| the foregoing Assignment and acknown free act and deed for the purposes the | to be the person whose name is subscribed to wledged that he/she executed the same as his/her erein contained. |
| | |
| | Notary Public |
| | Print Name: |
| | My Commission expires / / |

ASSIGNMENT

WHEREAS, we, Yedidya Dotan, William M. Duane, John Linn, Roy Hodgman, and Derek Lin, have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled AUTHENTICATION INVOLVING AUTHENTICATION OPERATIONS WHICH CROSS REFERENCE AUTHENTICATION FACTORS the specification of which:

| [X] | is being executed on even date herewith and is about to be filed in the United States Patent Office; | |
|-----|---|--|
| [] | was filed on as U.S. Application No. | |
| [] | was patented under U.S. Patent Noon | |

WHEREAS, EMC Corporation (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts and having a usual place of business at 176 South Street, Hopkinton, Massachusetts 01748, USA desires to acquire an interest therein in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

> PATENT REEL: 028094 FRAME: 0158

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved:

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

AND we hereby authorize our attorneys Bainwood Huang & Associates LLC to insert here in parentheses (13)434, 257 filed 03/29/2012) the application number and filing date of said Application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals as set forth below:

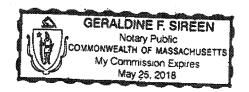
| Date: | |
|--|--|
| | Inventor's Signature |
| Print full name of first inventor: | Yedidya Dotan |
| Residence: | 1 Barazani Moshe Street |
| | Tel Aviv, 69121 ISRAEL |
| Citizenship: | Israel |
| Mailing Address: | Same as above |
| | (name) whose residential address is |
| was personally present and did see the assignment) who is personally know | name of person signing vn to me, execute the above assignment. |
| | (signature of first witness) |
| gned at (location of witness signature) | |
| on this day | _ of 2012. (date of signature) |
| I | (name) whose residential address is |
| was personally present and did see the assignment) who is personally know | (name of person signing n to me, execute the above assignment. |
| | (signature of second witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012. (date of signature) |



Date: Mille Print full name of second inventor: William M. Duane Residence: 4 Howard Road Westford, MA 01886 Citizenship: US Mailing Address: Same as above STATE/COMMONWEALTH OF On this 28 day of Much, 2012, then personally appeared before me the above-named William M. Duane known to me through satisfactory evidence of identification [X] employee identification card; [__] driver's license; [__] (other) to be the person whose name is subscribed to the foregoing Assignment and acknowledged that he/she executed the same as his/her free act and deed for the purposes therein contained. Notary Public

Print Name:

GERHLD, NE F. SIREEN My Commission expires 5 1251 20/8



| Date: | |
|---------------------------------------|--|
| | Inventor's Signature |
| Print full name of third inventor: | John Linn |
| Residence: | 580 West Street |
| · | Carlisle, MA 01741 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| STATE/COMMONWEALTH OF | |
| identification [] employee identifica | , 2012, then personally appeared before own to me through satisfactory evidence of ation card; [] driver's license; [] (other) to be the person whose name is subscribed to wledged that he/she executed the same as his/her terein contained. |
| | Notary Public |
| | Print Name: |
| | My Commission expires// |

| Date: | | |
|--|---|--|
| | Inventor's Signature | |
| Print full name of fourth inventor: | Roy Hodgman | |
| Residence: | 5 William Fairfield Drive | |
| | Wenham, MA 01984 | |
| Citizenship: | US | |
| Mailing Address: | Same as above | |
| | (name) whose residential address is | |
| was personally present and did see the assignment) who is personally know | (name of person signing on to me, execute the above assignment. | |
| | (signature of first witness) | |
| Signed at | (location of witness signature) | |
| on this day | of 2012. (date of signature) | |
| | (name) whose residential address is | |
| was personally present and did see the assignment) who is personally know | n to me, execute the above assignment. | |
| | (signature of second witness) | |
| Signed at | (location of witness signature) | |
| on this day | of 2012. (date of signature) | |

| Date: | |
|--|---|
| | Inventor's Signature |
| Print full name of fifth inventor: | Derek Lin |
| Residence: | 225 Cupertino Way |
| | San Mateo, CA 94403 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| STATE/COMMONWEALTH OF | |
| me the above-named Derek Lin know identification [] employee identifica | , 2012, then personally appeared before wn to me through satisfactory evidence of tion card; [] driver's license; [] (other) to be the person whose name is subscribed to wledged that he/she executed the same as his/her erein contained. |
| | No. |
| | Notary Public |
| | Print Name: |
| | My Commission expires / / |

PATENT/Joint Assignment Attorney Docket No.: <u>1048-117</u> EMC Docket No.: <u>EMC-12-016</u>

ASSIGNMENT

WHEREAS, we, Yedidya Dotan, William M. Duane, John Linn, Roy Hodgman, and Derek Lin, have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled AUTHENTICATION INVOLVING AUTHENTICATION OPERATIONS WHICH CROSS REFERENCE AUTHENTICATION FACTORS the specification of which:

| [X] | is being executed on even date herewith and United States Patent Office; | is about to be filed in the |
|-----|---|-----------------------------|
| [] | was filed on as U.S. Ap | plication No. |
| [] | was patented under U.S. Patent No | on |

WHEREAS, EMC Corporation (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts and having a usual place of business at 176 South Street, Hopkinton, Massachusetts 01748, USA desires to acquire an interest therein in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

> PATENT REEL: 028094 FRAME: 0165

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

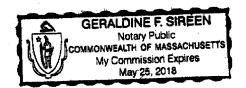
AND we hereby authorize our attorneys Bainwood Huang & Associates LLC to insert here in parentheses (13) 434,357 filed 03(39) 3012 the application number and filing date of said Application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals as set forth below:

| Date: | |
|---|--|
| | Inventor's Signature |
| Print full name of first inventor: | Yedidya Dotan |
| Residence: | 1 Barazani Moshe Street |
| | Tel Aviv, 69121 ISRAEL |
| Citizenship: | Israel |
| Mailing Address: | Same as above |
| 1 | (name) whose residential address is |
| was personally present and did see the assignment) who is personally kno | (name of person signing own to me, execute the above assignment. |
| | (signature of first witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012. (date of signature) |
| | |
| 1 | (name) whose residential address is |
| was personally present and did see the assignment) who is personally kno | own to me, execute the above assignment. |
| | (signature of second witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012. (date of signature) |

Date: Inventor's Signature William M. Duane Print full name of second inventor: 4 Howard Road Residence: Westford, MA 01886 US Citizenship: Same as above Mailing Address: STATE/COMMONWEALTH OF **COUNTY OF** ____, 2012, then personally appeared before On this day of me the above-named William M. Duane known to me through satisfactory evidence of identification [__] employee identification card; [__] driver's license; [__] (other) to be the person whose name is subscribed to the foregoing Assignment and acknowledged that he/she executed the same as his/her free act and deed for the purposes therein contained. **Notary Public** Print Name: My Commission expires ___/ ___/ ____

| Date: 29 May 2012 | 1, (2 | |
|--|--|--|
| · · · · · · · · · · · · · · · · · · · | Inventor's Signature | |
| Print full name of third inventor: | John Linn | |
| Residence: | 580 West Street | |
| | Carlisle, MA 01741 | |
| Citizenship: | US | |
| Mailing Address: | Same as above | |
| ma | | |
| STATE/COMMONWEALTH OF Much COUNTY OF | ssachusells | |
| COUNTY OF <u>Y/U</u> | eldleset | |
| On this 29 day of 70000, 2012, then personally appeared before me the above-named John Linn known to me through satisfactory evidence of identification employee identification card; driver's license; (other) to be the person whose name is subscribed to the foregoing Assignment and acknowledged that he/she executed the same as his/her free act and deed for the purposes therein contained. | | |
| | Sireldine Freier | |
| | Notary Public | |
| | Print Name: <u>GERALDINE F. SIREEN</u> My Commission expires <u>51251</u> 2018 | |
| | My Commission expires 5/25/20/8 | |



| Date: | |
|--|---|
| | Inventor's Signature |
| Print full name of fourth inventor: | Roy Hodgman |
| Residence: | 5 William Fairfield Drive |
| | Wenham, MA 01984 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| I | (name) whose residential address is |
| was personally present and did see the assignment) who is personally know | wn to me, execute the above assignment. |
| | (signature of first witness) |
| Signed at | |
| on this day | of 2012. (date of signature) |
| | |
| 1 | (name) whose residential address is |
| was personally present and did see the assignment) who is personally kno | wn to me, execute the above assignment. |
| | (signature of second witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012. (date of signature) |

| Date: | |
|--|--|
| | Inventor's Signature |
| Print full name of fifth inventor: | Derek Lin |
| Residence: | 225 Cupertino Way |
| | San Mateo, CA 94403 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| | |
| STATE/COMMONWEALTH OF | |
| COUNTY OF | |
| | |
| me the above-named Derek Lin kno | , 2012, then personally appeared before wn to me through satisfactory evidence of ation card; [] driver's license; [] (other) to be the person whose name is subscribed to |
| the foregoing Assignment and acknowledge act and deed for the purposes the | wledged that he/she executed the same as his/her |
| | Notary Public |
| | Print Name: |
| | My Commission expires// |

ASSIGNMENT

WHEREAS, we, Yedidya Dotan, William M. Duane, John Linn, Roy Hodgman, and Derek Lin, have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled AUTHENTICATION INVOLVING AUTHENTICATION OPERATIONS WHICH CROSS REFERENCE AUTHENTICATION FACTORS the specification of which:

| [X] | is being executed on even date hunited States Patent Office; | nerewith and is about to be filed in the | ; |
|-----|--|--|----------|
| [] | was filed on; | _ as U.S. Application No. | |
| [] | was patented under U.S. Patent | Noon | |

WHEREAS, EMC Corporation (hereinafter "ASSIGNEE"), a corporation organized and existing under the laws of the Commonwealth of Massachusetts and having a usual place of business at 176 South Street, Hopkinton, Massachusetts 01748, USA desires to acquire an interest therein in accordance with agreements duly entered into with us;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, we have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by us had this assignment and sale not been made; we hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. We hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

> PATENT REEL: 028094 FRAME: 0172

AND, we hereby further agree for ourselves and our executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, we do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

AND we hereby authorize our attorneys Bainwood Huang & Associates LLC to insert here in parentheses (13 434, 267 filed 03/29/2012) the application number and filing date of said Application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals as set forth below:

| Date: | |
|------------------------------------|---|
| | Inventor's Signature |
| Print full name of first inventor: | Yedidya Dotan |
| Residence: | 1 Barazani Moshe Street |
| | Tel Aviv, 69121 ISRAEL |
| Citizenship: | Israel |
| Mailing Address: | Same as above |
| | |
| J | (name) whose residential address is |
| | (name of person signing wn to me, execute the above assignment. |
| | (signature of first witness) |
| Signed at | (location of witness signature) |
| on this day | _ of 2012. (date of signature) |
| | |
| I | (name) whose residential address is |
| | (name of person signing wn to me, execute the above assignment. |
| | (signature of second witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012 (date of signature) |

| Date: | |
|--|--|
| | Inventor's Signature |
| Print full name of second inventor: | William M. Duane |
| Residence: | 4 Howard Road |
| | Westford, MA 01886 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| | |
| STATE/COMMONWEALTH OF | |
| me the above-named William M. Duai | , 2012, then personally appeared before ne known to me through satisfactory evidence of on card; [] driver's license; [] (other) _ to be the person whose name is subscribed to |
| the foregoing Assignment and acknow free act and deed for the purposes the | ledged that he/she executed the same as his/her |
| | |
| | Notary Public |
| | Print Name: |
| | My Commission expires / / |

| Date: | |
|---|--|
| | Inventor's Signature |
| Print full name of third inventor: | John Linn |
| Residence: | 580 West Street |
| | Carlisle, MA 01741 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| | |
| STATE/COMMONWEALTH OF COUNTY OF | : |
| me the above-named John Linn kno identification [] employee identifica | , 2012, then personally appeared before who to me through satisfactory evidence of tion card; [] driver's license; [] (other) to be the person whose name is subscribed to |
| the foregoing Assignment and ackno free act and deed for the purposes the | wledged that he/she executed the same as his/her perein contained. |
| | |
| | Notary Public |
| | Print Name: |
| | My Commission expires// |

PATENT/Joint Assignment Attorney Docket No.: <u>1048-117</u> EMC Docket No.: <u>EMC-12-016</u>

| Date: | |
|--|--|
| | Inventor's Signature |
| Print full name of fourth inventor: | Roy Hodgman |
| Residence: | 5 William Fairfield Drive |
| | Wenham, MA 01984 |
| Citizenship: | US |
| Mailing Address: | Same as above |
| | |
| I | (name) whose residential address is |
| was personally present and did see the assignment) who is personally kno | (name of person signing own to me, execute the above assignment. |
| ····· | (signature of first witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012. (date of signature) |
| | |
| | (name) whose residential address is |
| | (name of person signing own to me, execute the above assignment. |
| · | (signature of second witness) |
| Signed at | (location of witness signature) |
| on this day | of 2012 (date of signature) |

| Date: 3/28/2012 | Dukoli | |
|---|--|--|
| | Inventor's Signature | |
| Print full name of fifth inventor: | Derek Lin | |
| Residence: | 225 Cupertino Way | |
| | San Mateo, CA 94403 | |
| Citizenship: | US | |
| Mailing Address: | Same as above | |
| STATE/COMMONWEALTH OF Call COUNTY OF Sam | lisolnia Mateo | |
| On this <u>28</u> day of <u>Much</u> , 2012, then personally appeared before me the above-named Derek Lin known to me through satisfactory evidence of identification [_] employee identification card; [x] driver's license; [_] (other) to be the person whose name is subscribed to | | |
| the foregoing Assignment and acknowled free act and deed for the purposes therein | ged that he/she executed the same as his/her | |
| THAHER A. SHEHADEM NOTARY PUBLIC - CALIFORNIA COMMISSION # 1933208 E SAN MATEO COUNTY My Comm. Exp. May 17, 2015 | Notary Public THAHER A. SHEHADEH Print Name: | |
| | My Commission expires <u>03</u> / <u>28</u> / <u>/ 2</u> | |