

<b>PATENT ASSIGNMENT COVER SHEET</b>
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<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
ADVANCED PHOTONIX, INC.	08/09/2017
PICOMETRIX, LLC	08/09/2017
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	MACOM TECHNOLOGY SOLUTIONS HOLDINGS, INC.
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<b>State/Country:</b>	MASSACHUSETTS
<b>Postal Code:</b>	01851
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	10836878
<b>CORRESPONDENCE DATA</b>	
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<b>NAME OF SUBMITTER:</b>	JOHN A. LINGL
<b>SIGNATURE:</b>	/John A. Lingl/
<b>DATE SIGNED:</b>	01/18/2018
<b>Total Attachments: 10</b>	
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## PATENT ASSIGNMENT

This PATENTASSIGNMENT (the "Assignment") is made as of August 9, 2017 by Advance Photonix, Inc., a Delaware corporation, Picometrix, LLC, a Delaware limited liability company (collectively, the "Assignors") and MACOM Technology Solutions Holdings, Inc., a Delaware corporation ("Assignee").

WHEREAS, pursuant to, and subject to the terms and conditions of the Asset Purchase Agreement (the "Asset Purchase Agreement"), dated as of August 9, 2017, by and among the Assignors, Assignee and, solely with respect to Section 8.14, Luna Innovations Incorporated, a Delaware corporation, the Assignors and Assignee are to enter into this Assignment;

WHEREAS, the Assignors own the patent applications and patents as set forth on Schedule I as well as all patents and patent applications (such as divisional applications, continuation applications, national applications derived from regional applications) generated from any of the applications listed herein (collectively, the "Assigned Patents"); and

WHEREAS, Assignee desires to purchase and acquire all of the Assignors' right, title and interest in and to the Assigned Patents;

NOW, THEREFORE, subject to the terms and conditions of the Asset Purchase Agreement and in consideration thereof, the receipt of which is hereby acknowledged, the parties hereto, intending to be legally bound, agree as follows:

1. The Assignors hereby sell, convey, assign and transfer to Assignee, and Assignee hereby accepts, all right, title and interest in and to the Assigned Patents, including all corresponding applications such as continuation, continuations-in-part, divisionals, provisionals, reissues, reexaminations thereof and the subject matter of any and all claims which may be obtained in every such patent, as well as all corresponding foreign patents, foreign patent applications, free and clear of all Encumbrances; all rights to apply for registration in all countries with full benefit of such priority as may now or hereafter be granted to it by law, treaty or other international convention; and all rights, interests, claims and demands recoverable in law or equity, that the Assignors have or may have in profits and damages for past, present and future infringements of the Assigned Patents, including, without limitation, the right to compromise, sue for and collect such profits and damages; all of the foregoing to be held and enjoyed by Assignee, its successors and assigns or their legal representatives, as fully and entirely as the same would have been held and enjoyed by the Assignors if this Assignment had not been made.

2. From and after the Closing Date, the Assignors shall, without further consideration, execute and deliver such instruments of transfer, conveyance, assignment and assumption, in addition to the Ancillary Agreements, and take such other action as may be necessary to consummate the transactions contemplated by the Asset Purchase Agreement or to give effect to the transactions contemplated by the Ancillary Agreements.

3. Nothing in this Assignment, express or implied, is intended to or shall be construed to modify, expand, supersede or limit in any way the terms, conditions or obligations of the Asset Purchase Agreement. To the extent any provision of this Assignment conflicts with

or is inconsistent with the terms of the Asset Purchase Agreement, the Asset Purchase Agreement shall control and govern.

4. Capitalized terms used herein without definition shall have the meanings set forth in the Asset Purchase Agreement.

5. This Assignment shall be governed by, and construed in accordance with, the laws of the United States, in respect to patent issues and in all other respects including as to validity (except for patent validity issues), interpretation and effect by the laws of the State of Delaware without giving effect to the conflict of laws rules thereof.

6. This Assignment may be executed electronically or otherwise (where permitted in an applicable jurisdiction) in any number of identical counterparts each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same agreement.

*[Signature Page Follows]*

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be duly executed as of the date first written above.

**Assignors**

ADVANCED PHOTONIX, INC.

By: 

Name: Dale Messick

Title: Chief Executive Officer

PICOMETRIX, LLC

By: 

Name: Dale Messick

Title: Authorized Person

**Assignee**

MACOM TECHNOLOGY SOLUTIONS HOLDINGS, INC.

By: \_\_\_\_\_

Name:

Title:

*[Signature Page to Patent Assignment]*

IN WITNESS WHEREOF, Assignors and Assignee have caused this Assignment to be duly executed as of the date first written above.

**Assignors**

ADVANCED PHOTONIX, INC.

By: \_\_\_\_\_

Name:

Title:

PICOMETRIX, LLC

By: \_\_\_\_\_

Name:

Title:

**Assignee**

MACOM TECHNOLOGY SOLUTIONS HOLDINGS, INC.

By: 

Name: John Croteau

Title: President and Chief Executive Officer

*[Signature Page to Patent Assignment]*

## SCHEDULE I

This Schedule includes and incorporates all patents and applications set forth on the Attachment to this Schedule I, as well as all patents and patent applications (such as divisional applications, continuation applications, national applications derived from regional applications) generated from any of the applications listed herein even if not explicitly listed on the Attachment.

### 1. Patents

Country	Patent Title	Application Number	Filing Date	Patent Number	Issue Date
Japan	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	2000-572949	09/24/1999	4755341	6/3/2011
Israel	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	142195	09/24/1999	142195	4/25/2005
Australia	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	62676/99	09/24/1999	765715	1/8/2004
Canada	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	2345153	09/24/1999	2345153	9/24/1999
South Korea	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	2001-7003783	09/24/1999	660471	12/15/2006
Europe, France, Great Britain, Italy	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	99949900.7	09/24/1999	1116280	10/24/2007
Germany	Highly-Doped P-type contact for high-speed, Front-Side Illuminated Photodiode	99949900.7	09/24/1999	69937406.5	10/24/2007
Canada	Precision Fiber Attachment	2509530	12/10/2003	2509530	7/23/2013
U.S.	Planar Avalanche Photodiode	10/836,878	04/30/2004	7,348,608	3/25/2008
U.S.	Focusing Fiber Optic	10/295,512	11/15/2002	7,039,275	5/2/2006
Europe, France, Italy, Netherlands, Great Britain	Focusing Fiber Optic	02789655.4	11/15/2002	1454173	5/13/2009
Canada	Focusing Fiber Optic	2467400	11/15/2002	2467400	9/20/2011
China	Focusing Fiber Optic	02825106.7	11/15/2002	ZL02825106.7	4/17/2009

South Korea	Focusing Fiber Optic	7007422/2004	11/15/2002	817638	3/21/2008
Hong Kong	Focusing Fiber Optic	06106256.0	05/30/2006	HK1086340	2/12/2010
Germany	Focusing Fiber Optic	02789655.4	11/15/2002	60232362.2	5/13/2009
U.S.	Planar Avalanche Photodiode	10/502,110	02/03/2003	7,348,607	03/28/2008
Canada	Planar Avalanche Photodiode	2474560	02/03/2003	2474560	03/20/2012
Japan	Planar Avalanche Photodiode	2003-564912	02/03/2003	4938221	3/2/2012
South Korea	Planar Avalanche Photodiode	7011857/2004	02/03/2003	811365	02/29/2008
Hong Kong	Planar Avalanche Photodiode	08102803.5	04/30/2004	1113520	3/12/2010
China	Planar Avalanche Photodiode	200480043236.8	04/30/2004	200480043236.8	9/16/2009
U.S.	Enhanced Photo Detector	10/502,109	02/03/2003	7,078,741	7/18/2006
Europe, Austria, France, Germany, Italy, Netherlands, Spain, Great Britain	Enhanced Photo Detector	03708942.2	02/03/2003	1470574	11/30/2016
Canada	Enhanced Photo Detector	2474556	02/03/2003	2474556	10/07/2014
Japan	Enhanced Photo Detector	2003-564910	02/03/2003	5021888	6/22/2012
South Korea	Enhanced Photo Detector	7011856/2004	02/03/2003	766174	10/04/2007
China	Enhanced Photo Detector	03803039.X	02/03/2003	ZL03803039.X	04/01/2009
Hong Kong	Enhanced Photo Detector	06105823.6	05/19/2006	HK1085841	12/18/2009
U.S.	Precision Fiber Attachment	10/538,248	12/10/2003	7,263,266	08/28/2007
China	Precision Fiber Attachment	200380108777.X	12/10/2003	200380108777.X	08/05/2009
Japan	Precision Fiber Attachment	2004-558729	12/10/2003	4436915	01/08/2010
South Korea	Precision Fiber Attachment	7010628/2005	12/10/2003	1034433	05/03/2011
Europe, Austria, Italy, France, Great Britain	Precision Fiber Attachment	03799898.6	12/10/2003	1570306	08/27/2008
Hong Kong	Precision Fiber Attachment	07102889.3	12/10/2003	HK1095637	04/23/2010
Germany	Precision Fiber Attachment	03799898.6	12/10/2003	60323261.2	08/27/2008



U.S.	PIN Photodetector	10/555,144	04/30/2004	7,468,503	12/23/2008
Europe, Austria, France, Italy, Netherlands, Spain, Great Britain	PIN Photodetector	04751056.5	04/30/2004	1620899	3/12/2014
South Korea	PIN Photodetector	7020803/2005	04/30/2004	1131650	03/22/2012
Canada	PIN Photodetector	2528216	04/30/2004	2528216	04/08/2014
China	PIN Photodetector	200480015226.3	04/30/2004	200480015226.3	06/10/2009
Japan	PIN Photodetector	2006-514183	04/30/2004	5022032	06/22/2012
Hong Kong	PIN Photodetector	07104303.7	04/30/2004	HK1097957	03/19/2010
Germany	PIN Photodetector	4751056.5	04/30/2004	602004044587.8	3/12/2014
Hong Kong	PIN Photodetector (Abandoned)	06106658.4	06/09/2006	HK1090282 (Abandoned)	10/6/2010
U.S.	Photoconductive Device	11/718,959	12/07/2005	9,136,419	09/15/2015
Europe, Austria, France, Italy, Netherlands, Spain, Great Britain	High Speed Ingaas Photoconductive Device	05853521.2	12/07/2005	1820219	1/19/2011
Japan	High Speed Ingaas Photoconductive Device	2007-545665	12/07/2005	4980238	4/27/2012
Canada	High Speed Ingaas Photoconductive Device	2586112	12/07/2005	2586112	07/22/2014
South Korea	High Speed Ingaas Photoconductive Device	7012804/2007	12/07/2005	1321280	10/16/2013
China	High Speed Ingaas Photoconductive Device	200580041877.4	12/07/2005	200580041877.4	04/13/2011
Hong Kong	High Speed Ingaas Photoconductive Device	08100313.2	01/10/2008	HK 1106330	05/13/2011
Germany	High Speed Ingaas Photoconductive Device	05853521.2	12/07/2005	602005026049.8	01/19/2011
U.S.	Highly-Doped P-Type Contact for High-Speed Front-Side Illuminated Photodiode	09/161,097	09/25/1998	6,262,465	7/17/2001

## 2. Patent Applications

Country	Patent Title	Application Number	Filing Date	Patent Number	Issue Date
PCT	Highly-Doped P-Type Contact for High-Speed Front-Side Illuminated Photodiode	PCT/US1999/022339	9/24/1999	N/A	N/A
U.S.	Lensed Optical Fiber for Right-Angle Focusing Application	60/336,302	11/15/2001	N/A	N/A
PCT	Focusing Fiber Optic	PCT/US2002/036584	11/15/2002	N/A	N/A
PCT	Enhanced Photodetector	PCT/US2003/003181	02/03/2003	N/A	N/A
U.S.	High Speed Enhanced Responsivity Photo Detector	60/353,849	02/01/2002	N/A	N/A
U.S.	Avalanche Photodiodes with Ultra-Thin Carbon-Doped Chargecontrol Layer	60/353,418	02/01/2002	N/A	N/A
PCT	Charge Controlled Avalanche Photodiode and Method of Making the Same	PCT/US2003/003203	02/03/2003	N/A	N/A
U.S.	Pin Photodetector	60/467,399	05/02/20003	N/A	N/A
PCT	Pin Photodetector	PCT/US2004/013464	4/30/2004	N/A	N/A
U.S.	Precision Fiber Attachment	60/432,332	12/10/2002	N/A	N/A
PCT	Precision Fiber Attachment	PCT/US2003/039553	12/10/2003	N/A	N/A
U.S.	High-Speed InGaAs Photoconductive Device	60/633,862	12/07/2004	N/A	N/A
PCT	High-Speed InGaAs Photoconductive Device	PCT/US2005/044620	12/07/2005	N/A	N/A
PCT	Planar Avalanche Photodiode	PCT/US2004/013584	04/30/2004	N/A	N/A
PCT	Planar Avalanche Photodiode	PCT/US2013/041536	05/17/2013	N/A	N/A
Europe	Planar Avalanche Photodiode	03710845.3	02/03/2003	N/A	N/A
Europe	Planar Avalanche Photodiode	04822037.0	04/30/2004	N/A	N/A
Hong Kong	Planar Avalanche Photodiode	07105539	05/25/2007	N/A	N/A
U.S.	Planar Avalanche Photodiode	14/400,478	11/11/2014	N/A	N/A
U.S.	Planar Avalanche Photodiode	60/353,765	02/01/2002	N/A	N/A
PCT	Planar Avalanche Photodiode	PCT/US2003/003323	02/03/2003	N/A	N/A
Canada	Planar Avalanche Photodiode	2873841	11/14/2014	N/A	N/A
China P.R.	Planar Avalanche Photodiode	201380025871.2	11/17/2014	N/A	N/A
EPC	Planar Avalanche Photodiode	13793205.9	11/13/2014	N/A	N/A
Japan	Planar Avalanche Photodiode	2015-514068	11/14/2014	N/A	N/A
South	Planar Avalanche Photodiode	7035498/2014	12/17/2014	N/A	N/A

Korea					
U.S.	Mini-Mesa Avalanche Photodiodes	60/353,530	02/01/2002	N/A	N/A
U.S.	Photodiode	61/648,401	5/17/2012	N/A	N/A
China	Planar Avalanche Photodiode (Abandoned)	3803038.1 (Abandoned)	02/03/2003	N/A	N/A
Japan	Planar Avalanche Photodiode (Abandoned)	2010-229902 (Abandoned)	08/01/2010	N/A	N/A
South Korea	Planar Avalanche Photodiode (Abandoned)	7025099/2006 (Abandoned)	04/30/2004	N/A	N/A
Canada	Planar Avalanche Photodiode (Abandoned)	2564218 (Abandoned)	04/30/2004	N/A	N/A
Japan	Planar Avalanche Photodiode (Abandoned)	2007-510676 (Abandoned)	04/30/2004	N/A	N/A
Norway	Highly-Doped P-Type Contact for High-Speed Front-Side Illuminated Photodiode (Abandoned)	20011497 (Abandoned)	09/24/1999	N/A	N/A
Japan	Focusing Fiber Optic (Abandoned)	2003-546142 (Abandoned)	11/15/2002	N/A	N/A
Japan	Focusing Fiber Optic (Abandoned)	2009-143970 (Abandoned)	06/17/2009	N/A	N/A
U.S.	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	10/502,111 (Abandoned)	07/21/2004	N/A	N/A
Japan	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	2003-564911 (Abandoned)	02/03/2003	N/A	N/A
South Korea	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	7011855/2004 (Abandoned)	07/30/2004	N/A	N/A
China	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	3803050 (Abandoned)	02/03/2003	N/A	N/A
Hong Kong	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	5112002.6 (Abandoned)	12/28/2005	N/A	N/A
Europe	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	3706052.2 (Abandoned)	02/03/2003	N/A	N/A
Canada	Charge Controlled Avalanche Photodiode and Method of Making the Same (Abandoned)	2473223 (Abandoned)	02/03/2003	N/A	N/A

U.S.	Low-Temperature-Grown Dilute Nitrides Lattice-Matched	61/051,189 (Abandoned)	05/07/2008	N/A	N/A
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