

## PATENT ASSIGNMENT

Electronic Version v1.1  
 Stylesheet Version v1.1

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
Jonathan Ryan Wilkerson	04/09/2010
RECEIVING PARTY DATA	
Name:	Physical Devices, LLC
Street Address:	28 Surrey Lane
City:	Durham
State/Country:	NORTH CAROLINA
Postal Code:	27707
PROPERTY NUMBERS Total: 1	
Property Type	Number
Application Number:	13745729
CORRESPONDENCE DATA	
Fax Number:	9194190383
<i>Correspondence will be sent via US Mail when the fax attempt is unsuccessful.</i>	
Phone:	9194938000
Email:	ezayatz@jwth.com
Correspondent Name:	Jay Klinck
Address Line 1:	3100 Tower Blvd
Address Line 2:	University Tower, Suite 1200
Address Line 4:	Durham, NORTH CAROLINA 27707
ATTORNEY DOCKET NUMBER:	1888/2/10 CIP
NAME OF SUBMITTER:	Jay Klinck
Signature:	/Jay Klinck/
Date:	09/17/2013
Total Attachments: 9	

OP \$40.00 13745729

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## ASSET CONTRIBUTION AGREEMENT

THIS ASSET CONTRIBUTION AGREEMENT (the "Agreement") is dated as of the 9<sup>th</sup> day of April 2010, by and among, JONATHAN WILKERSON, a North Carolina resident ("Contributor"), and PHYSICAL DEVICES, LLC, a North Carolina limited liability company ("Recipient").

### RECITAL

**WHEREAS**, in connection with the Contributor's receipt of a membership interest in Recipient, Contributor desires to contribute to Recipient the assets of the Contributor set forth on Exhibit A (the "Contributed Assets"); and

**WHEREAS**, in consideration for the receipt of all the Contributed Assets, Recipient desires to grant to Contributor the right to purchase 250 Units of its membership interests at a price of \$25.00 pursuant to the terms of a Restricted Unit Purchase Agreement in a form mutually agreeable to Recipient and the Contributor;

### AGREEMENTS

**NOW, THEREFORE**, in consideration of the recitals, the mutual covenants and agreements set forth below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows.

#### ARTICLE 1 – ASSETS AND LIABILITIES

1.1 Contribution of Assets. On the terms and subject to the conditions hereinafter set forth, Contributor hereby transfers, assigns, conveys, grants and delivers to Recipient, and Recipient does hereby accept, all Contributor's right, title and interest in and to the Contributed Assets, as set forth herein, and acknowledges that Contributor shall no longer have any right, title or interest in or to the Contributed Assets except for the Contingent License (as defined below) set forth in Article 4.

1.2 No Liabilities. Recipient does not hereby and will not assume or in any way undertake to pay, perform, satisfy or discharge any obligation or liability whatsoever of Contributor relating to the Contributed Assets.

#### ARTICLE 2 – REPRESENTATIONS, WARRANTIES AND COVENANTS OF CONTRIBUTOR

Contributor hereby represents and warrants to Recipient as follows.

2.1 Ownership and Delivery of Contributed Assets. Contributor has the full right, power, and authority to enter into and to perform this Agreement and all other agreements, certificates, and documents executed or delivered, or to be executed or delivered, by it in connection with this Agreement. Contributor has the full right, power, and authority to assign, transfer, and deliver the Contributed Assets and will convey to Recipient good title to the Contributed Assets, free and clear of any and all liens, mortgages, pledges, security interests, options, restrictions, charges, prior assignments, agreements, claims, and encumbrances of any kind whatsoever. This

Agreement has been duly authorized, executed, and delivered by Contributor and contains the legal, valid, and binding obligations of Contributor, enforceable in accordance with its terms.

2.2 Liabilities. All liabilities of the Contributor relating to or arising from his ownership and use of the Contributed Assets have been paid by Contributor prior to the date hereof or Contributor will adequately reserve against such liabilities.

2.3 As is, Where is. Except as expressly set forth herein, Contributor and Recipient agree that the Contributed Assets are being transferred "as is, where is," without warranty of any kind.

2.4 Further Assurances. From time to time hereafter and without further consideration, Contributor shall execute and deliver such additional or further instruments of conveyance, assignment and transfer and take such actions as Recipient may reasonably request in order to more effectively convey and transfer to Recipient the Contributed Assets hereunder or as shall be reasonably necessary or appropriate in connection with the carrying out of the Contributor's obligations hereunder or the purposes of this Agreement. Upon the request of Recipient, Contributor will execute and deliver all documents and do other acts that are or may be necessary to document such transfer or to enable Recipient to file and prosecute applications for and to acquire, maintain, extend and enforce any and all patents, trademark registrations or copyrights under United States or foreign law with respect to the Contributed Assets. In the event Recipient is unable for any reason, after reasonable effort, to secure Contributor's signature on any document needed in connection with the actions specified in this Section, Contributor hereby irrevocably designates and appoints Recipient and its duly authorized officers and agents as Contributor's agent and attorney in fact, which appointment is coupled with an interest, to act for and in Contributor's behalf to execute, verify and file any such documents and to do all other lawfully permitted acts to further the purposes of such section with the same legal force and effect as if executed by Contributor.

2.5 Power of Attorney. Contributor hereby constitutes and appoints Recipient its true and lawful attorney, with full power of substitution, for Contributor in Contributor's name, place and stead, but on behalf and for the benefit of Recipient, (a) to demand, receive and collect from time to time any and all monies, credits, claims, rights due or to become due relating to the Contributed Assets and to give receipts and releases for and in respect to the same or any part thereof; (b) to institute and prosecute in the name of Contributor or Recipient, for the benefit of Recipient, any and all proceedings at law, in equity or otherwise that Recipient may deem proper and that relate to the Contributed Assets; (c) to collect, assert, or enforce any claim, right, title, debt, account or interest of any kind in or to any of the Contributed Assets and to defend, compromise, settle and release any and all claims, actions, suits or proceedings in relation thereto; and (d) to do all such other acts and things in relation thereto as Recipient shall deem desirable. Contributor hereby declares that the appointment made and the powers herein granted are coupled with an interest and are and shall be irrevocable by it and shall extend to the Corporation's successors and assigns.

### ARTICLE 3 - REPRESENTATIONS AND WARRANTIES OF RECIPIENT

3.1 Authority. Recipient has the full right, power, and authority to enter into and to perform this Agreement and all other agreements, certificates, and documents executed or delivered, or to be executed or delivered, by it in connection with this Agreement.

3.2 Organization, Good Standing, Authority. Recipient is duly organized, validly existing, and in good standing under the laws of the State of North Carolina and has full power and authority to own and lease its respective assets and properties and to conduct its business as it is now being conducted.

### ARTICLE 4 - CONTINGENT LICENSE TO CONTRIBUTOR

Subject to the terms of this Article 4, Recipient hereby grants to Contributor a perpetual (subject to the last two sentences of this Article 4), nonexclusive, nontransferable, royalty-free license (the "Contingent License") to use and practice any inventions disclosed in the Contributed Assets, solely to the extent in existence on the date hereof and excluding any inventions, improvements or derivative works made by Recipient after the date hereof, and solely for noncommercial research purposes by Contributor. This license shall be exercisable by Contributor only if (a) Recipient ceases business operations on or prior to July 1, 2011, or (b) Contributor's employment relationship with Recipient is terminated involuntarily on or prior to July 1, 2011. If Recipient remains in existence and conducting business through July 1, 2011, then this Article 4 shall thereupon cease to have any further force and effect.

### ARTICLE 5 - MISCELLANEOUS

5.1 Notices. Any notice required to be given hereunder shall be in writing, shall refer specifically to this Agreement, and shall be sent by courier service (with proof of service), by hand delivery or by certified or registered mail (return receipt requested and first-class postage prepaid), addressed as follows, or to such other addressee as shall be properly designated in accordance with these notice provisions:

**If to RECIPIENT:** Physical Devices, LLC  
28 Surrey Lane  
Durham, North Carolina 27707

**If to CONTRIBUTOR:** Jonathan Wilkerson  
2440 Camus Shore Drive  
Unit 101  
Raleigh, North Carolina 27606

5.2 Entire Agreement. This Agreement, including the exhibits attached hereto, together constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements, negotiations and understandings, whether oral or written, and may not be amended, supplemented, or waived, except by performance or by an instrument in writing signed by the party or parties to be bound.

5.3 Limited Assignment; Binding Effect. Neither this Agreement nor any right, remedy, obligation or liability arising under this Agreement or by reason hereof shall be assignable by either party to another person or entity, without the prior written consent of the other party; however, each party may assign this Agreement to an affiliate or to a successor to substantially all of its business. This Agreement shall be binding upon and shall inure to the benefit of the parties and their respective successors and permitted assigns.

5.4 Further Assurances. Each party shall take all reasonable actions as may be necessary or requested by the other party to carry out and consummate the transactions contemplated by this Agreement.

5.5 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of North Carolina, without giving effect to conflict-of-laws provisions.

5.6 Waiver. Nothing in this Agreement shall be construed as a representation or warranty by either party as to the value of the Assets or the value of any other assets of Contributor transferred to Recipient under this Agreement. Each party expressly disclaims, and hereby waives, releases and renounces, any warranty, express or implied, with respect to any assets acquired or relinquished under this Agreement.

5.7 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute but one and the same instrument. This Agreement may be executed and delivered in counterpart signature pages executed and delivered via e-mail or facsimile transmission, and any such counterpart executed and delivered via e-mail or facsimile transmission shall be deemed an original for all intents and purposes.

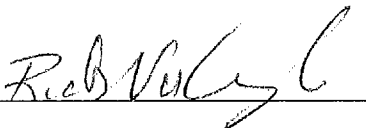
5.8. Amendment. No amendment, supplement, modification, waiver or termination of this Assignment and Assumption Agreement or any provision hereof shall be binding unless executed in writing by each party, or in the case of a waiver, by the party against whom the waiver is to be effective.

[Signature Page Follows.]

IN WITNESS WHEREOF, each party has caused its duly authorized representative to execute this Agreement as of the date first above written.

**RECIPIENT:**

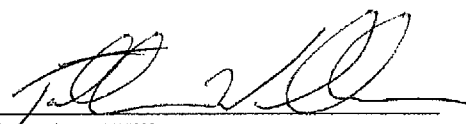
PHYSICAL DEVICES, LLC

By: 

Name: Rick Vosburgh

Title: CEO

**CONTRIBUTOR:**

  
Jonathan Wilkerson

*[Signature Page to the Asset Contribution Agreement.]*

**Exhibit A**

**Contributed Assets**

Those inventions, ideas, methods, experiments, designs and disclosures of Contributor described within and/or contemplated by the attached disclosure statement.

*[attach Jonathan Wilkerson's invention disclosures]*



## **Intellectual Property Asset Contribution**

### **Wideband Tunable Filter**

Description: A bandpass filter can be constructed from the combination of a minimum of three altered versions of an original signal. Two of the signal paths are combined together with different group delay, resulting in destructive interference at the signal combination point with a bandwidth determined by the longer group delay of the two paths. The third signal path is combined with the summation of the first two paths, resulting in destructive interference with the signal outside of the destructive interference bandwidth of the first two paths. The part of the third signal path which is within the destructive interference bandwidth of the original two paths is passed through the system, yielding a bandpass characteristic. The filter bandwidth is determined by group delay matching in the system while the filter rejection is determined by the phase matching between the paths. The filter is periodic, requiring a separate filter to be applied to remove periodic out of band responses. The filter is provided using an oscillating frequency response in one of the three paths.

Relation to NC State: None. Unrelated to research, conceived independently. Closest prior art public domain.

### **Noisy Signal Extraction**

Description: A signal of power less than the noise power in a channel can be extracted by applying a probe signal with power greater than the noise power in the channel which is phase modulated. The signal below the noise floor will modulate the probe signal amplitude at the frequency of the phase modulation. The modulation can be used to directly extract the signal with power less than that of the channel noise power.

Relation to NC State: None. Unrelated to research, conceived independently.

### **Nonlinear Vector Network Analyzer**

Description: A method to determine the phase and amplitude of nonlinear signals using interference patterns of measured signals and stimulus signals.

Relation to NC State: An extension of Feed-Forward linearization published in MTT and RWS, public domain now.

### **Feed-Forward Linearization**

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Description: A method to determine the phase and amplitude necessary at a reference plane to provide complete destructive interference of a signal before application to a receiver.

Relation to NC State: Developed at NCSU and published in MTT and RWS, public domain.

### **Co-Site Suppression**

Description: Symmetric antenna design and active phase control to provide electric and magnetic field destructive interference in a localized region around an antenna for suppression of co-site coupling.

Relation to NC State: Not published or considered to be NCSU IP (after conferencing with advisor), unrelated to research. Symmetric antenna design previously published, public domain.

### **Anti-Jamming**

Description: Two spatially separated antennas receive a communications and jammer signal, but at different signal to noise ratios due to their directionally and spatial separation. The signal from the first antenna can be re-broadcast anti-phase, nulling the jamming fields alone around the second antenna.

Relation to NC State: None. Conceived independently, closest prior art public domain.

### **Microwave Tissue Knife**

Description: A volume of tissue can be heated by an amplitude modulated signal in the frequency regions of water resonant microwave energy absorption. Heating is significantly increased at a focal point of multiple microwave signals, allowing tissue at a focal point to be denatured without denaturing tissue in surrounding regions. The heated tissue volume periodically expands and contracts, producing a periodic pressure (acoustic) wave which is ranged and used for navigation during non-invasive procedures.

Relation to NC State: Not published or previously pursued at NCSU due to scope of application area.

### **RF System Remote Identification**

Description: An RF system is identified remotely through a combination of its antenna and filter response, both resonant and non-resonant, and the nonlinear response of subsequent electric circuit elements.

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Relation to NC State: Public Domain.

**Acoustic Remote Identification**

Description: An object is identified remotely through a combination of its resonant and non-resonant linear response as well as the object's nonlinear material response both in air, ground, and water. Direct probing or evanescent wave modes can be used.

Relation to NC State: Public Domain and independent development.

**Intellectual Property Ownership Statement:**

This document represents the intellectual property contribution of Jonathan Ryan Wilkerson to Physical Devices, LLC.

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