

## PATENT ASSIGNMENT COVER SHEET

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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>
FENG WEI KUO	12/15/2015
CHEWN-PU JOU	12/16/2015
HUAN-NENG CHEN	12/15/2015
LAN-CHOU CHO	12/15/2015
WILLIAM WU SHEN	11/04/2016
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.
<b>Street Address:</b>	NO. 8, LI-HSIN RD. VI, HSINCHU SCIENCE PARK
<b>City:</b>	HSINCHU
<b>State/Country:</b>	TAIWAN
<b>Postal Code:</b>	300
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	14969295
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(703)518-5499
<i>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.</i>	
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<b>Correspondent Name:</b>	HAUPTMAN HAM, LLP (TSMC)
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<b>ATTORNEY DOCKET NUMBER:</b>	T5057-1168
<b>NAME OF SUBMITTER:</b>	RANDY A. NORANBROCK
<b>SIGNATURE:</b>	/Randy A. Noranbrock/
<b>DATE SIGNED:</b>	11/04/2016
<b>Total Attachments: 2</b>	

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Docket No. P20150089US00  
T5057-1168

## ASSIGNMENT

In consideration of the premises and other good and valuable consideration in hand paid, the receipt and sufficiency of which is hereby acknowledged, the undersigned,

- |                        |                          |
|------------------------|--------------------------|
| 1) <b>Feng Wei KUO</b> | 3) <b>Huan-Neng CHEN</b> |
| 2) <b>Chewn-Pu JOU</b> | 4) <b>Lan-Chou CHO</b>   |

who has made a certain new and useful invention, hereby sells, assigns and transfers unto TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD., having a place of business at No. 8, Li-Hsin Rd. VI, Hsinchu Science Park, Hsinchu 300, Taiwan R.O.C.

its successors and assigns (hereinafter designated "ASSIGNEE") the entire right, title and interest for the United States of America as defined in 35 U.S.C. 100 in the invention entitled

### PLL WITH CLOCK AND DATA RECOVERY FUNCTION FOR RECEIVER PHASE SYNCHRONIZATION

- (a) for which an application for United States Letters Patent was filed on 2015-12-15, and identified by United States Patent Application No. 14/969,295; or
- (b) for which an application for United States Letters Patent was executed on \_\_\_\_\_,

and the undersigned hereby authorizes and requests the United States Commissioner of Patents and Trademarks to issue any and all United States Letters Patent which may be granted therefore and any and all extensions, divisions, reissues, continuations, or continuations-in-part thereof, and the right to all benefits under the International Convention for the Protection of Industrial Property to the said ASSIGNEE, for its interest as ASSIGNEE, its successors, assigns and legal representatives; the undersigned agrees that the attorneys of record in said application shall hereafter act on behalf of said ASSIGNEE;

AND the undersigned hereby agrees to transfer a like interest, and to render all necessary assistance in making application for and obtaining original, divisional, reissued or extended Letters Patent of the United States, upon request of the said ASSIGNEE, its successors, assigns and legal representatives, and without further remuneration, in and to any improvements, and applications for patent based thereon, growing out of or related to the said invention; and to execute any papers by the said ASSIGNEE, its successors, assigns and legal representatives, deemed essential to ASSIGNEE's full protection and title in and to the invention hereby transferred.

SIGNED on the date indicated aside my signature:

1) Feng Wei Kuo  
Name: Feng Wei KUO

2015. 12. 15  
Date:

2) Chewn-Pu JOU  
Name: Chewn-Pu JOU

2015. 12. 16  
Date:

3) Huan-Neng Chen  
Name: Huan-Neng CHEN

2015. 12. 15  
Date:

4) Lan-Chou Cho  
Name: Lan-Chou CHO

2015. 12. 15  
Date:

## ASSIGNMENT

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- |                 |                    |
|-----------------|--------------------|
| 1) Feng Wei KUO | 3) Huan-Neng CHEN  |
| 2) Chewn-Pu JOU | 4) Lan-Chou CHO    |
|                 | 5) William Wu SHEN |

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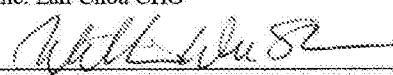
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AND the undersigned hereby agrees to transfer a like interest, and to render all necessary assistance in making application for and obtaining original, divisional, reissued or extended Letters Patent of the United States, upon request of the said ASSIGNEE, its successors, assigns and legal representatives, and without further remuneration, in and to any improvements, and applications for patent based thereon, growing out of or related to the said invention; and to execute any papers by the said ASSIGNEE, its successors, assigns and legal representatives, deemed essential to ASSIGNEE's full protection and title in and to the invention hereby transferred.

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- |   |                |
|---|----------------|
| 1) _____<br>Name: Feng Wei KUO  | _____<br>Date: |
| 2) _____<br>Name: Chewn-Pu JOU  | _____<br>Date: |
| 3) _____<br>Name: Huan-Neng CHEN  | _____<br>Date: |
| 4) _____<br>Name: Lan-Chou CHO  | _____<br>Date: |
| 5) <br>Name: William Wu SHEN | _____<br>Date: |