504068571 10/26/2016

PATENT ASSIGNMENT COVER SHEET

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

CONVEYING PARTY DATA

| Name | Execution Date |
|--------------------------|----------------|
| MICHAEL LAWRENCE RIEGER | 03/13/2014 |
| THOMAS CHRISTOPHER CECIL | 03/15/2014 |
| BENJAMIN DAVID PAINTER | 03/10/2014 |

RECEIVING PARTY DATA

| Name: | SYNOPSYS, INC. |
|-----------------|---------------------------|
| Street Address: | 700 East Middlefield Road |
| City: | Mountain View |
| State/Country: | CALIFORNIA |
| Postal Code: | 94043 |

PROPERTY NUMBERS Total: 1

| Property Type | Number |
|---------------------|----------|
| Application Number: | 15289919 |

CORRESPONDENCE DATA

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| ATTORNEY DOCKET NUMBER: | SNP-021C2 | |
|-------------------------|-----------------------------|--|
| NAME OF SUBMITTER: | MICHAEL BATTIG/R DEAN ADAMS | |
| SIGNATURE: | /Michael Battig/ | |
| DATE SIGNED: | 10/26/2016 | |

Total Attachments: 4

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PATENT 504068571 REEL: 040142 FRAME: 0600

ASSIGNMENT

WHEREAS, each of the undersigned inventor(s) ("Inventor(s)") has developed certain inventions ("Inventions") described in a U.S. patent application No. $_{14/213,813}$ filed $_{14\text{-MAR}-2014}$, and entitled:

SUB-RESOLUTION ASSIST FEATURE IMPLEMENTATION USING SHOT OPTIMIZATION

and has full right to convey his or her entire interest, both legal and equitable, in and to said Inventions free from all prior assignments, agreements, licenses, mortgages, security interests, or other encumbrances whatsoever; and

WHEREAS, Synopsys, Inc. ("ASSIGNEE"), an entity organized and existing under the laws of the state of California, and having a place of business at 700 East Middlefield Road, Mountain View, California 94043, is desirous of acquiring the entire right, title, and interest in and to the Inventions and any and all patents to be obtained therefore;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by each Inventor, each Inventor hereby sells, assigns and transfers unto the ASSIGNEE, its successors and assigns, his or her entire right, title and interest in and to the Inventions as described in the above application and all applications resulting therefrom, including any and all conversions, divisions, continuations, continuations-in-part, substitute applications, and reissues or extensions thereof; and all resulting patents in any jurisdiction worldwide; along with all rights to sue for past infringement.

AND each Inventor hereby authorizes and requests the issuing authority to issue any and all patents issuing from any of the forgoing to the ASSIGNEE or its successors and assigns.

AND each Inventor agrees that ASSIGNEE's representative, Adams Intellex, PLC having Patent Office Customer Number 85181, shall hereinafter act on behalf of the ASSIGNEE with respect to the Inventions.

AND, each Inventor further agrees, without any further payment or compensation by the ASSIGNEE or its successors and assigns, to communicate to the ASSIGNEE, its representatives or agents or its successors and assigns, any facts relating to the Inventions including evidence for interference purposes or for other legal proceedings whenever requested; to testify in any interference or other legal proceedings, whenever requested; to execute and deliver, on request, all lawful papers required to make any of the foregoing provisions effective; and to generally do everything possible to aid the ASSIGNEE, its successors or assigns and nominees to secure, obtain and enforce proper patent protection for the Inventions in this or any foreign country.

Page 1 of 2

The Inventor(s) hereby authorize(s) the agents and attorneys associated with Patent Office Customer Number 85181 to insert hereon any further information necessary or desirable for recordation of this document.

| Inventor(s) | Date Signed | |
|--------------------------|-------------|--|
| Michael Lawrence Rieger | 13 Mar 2014 | |
| Thomas Christopher Cecil | | |
| Reniamin David Painter | | |

The Inventories bereby audicorress the agents and attorneys associated with Patent Office Consumer Support AS & to meen bereen any further information necessary or persons for respective of the decorress

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The Inventor(s) hereby authorize(s) the agents and attorneys associated with Patent Office Customer Number 85181 to insert hereon any further information necessary or desirable for recordation of this document.

| Inventor(s) | Date Signed | |
|--------------------------|--------------|--|
| Michael Lawrence Rieger | | |
| Thomas Christopher Cecil | • | |
| Benjamin David Painter | Mar 10, 2014 | |