



COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering, Cairo

Graduation Project Description Form

Project Title:

Design of an Optical Lithography System for Educational VLSI IC Fabrication

Project Supervisor(s):

Dr. Amr Bayoumi (EC. Dept., College of Eng., AAST, Cairo)

Dr. Nazmy Azzam (EC. Dept., College of Eng., AAST, Cairo)

Duration from mo/year: 2/2103 till mo/year: 2/2014

Product Category

Algorithm Hardware Software

Standards:

Safety: UL, CE IEEE FCC Other

Practical Realization Form

PCB Firmware Embedded CPU Kit (ARM, ..etc):

PC Software Ready-made Package DSP Kit FPGA Kit

VLSI Schematics VLSI Layout VLSI Silicon (ASIC)

Electronics Assembly: Control & Automation: Mechanical Assembly:

Language

VHDL/Verilog Matlab C/C++/Java

Productization:

Finished Product Form: Possible Commercialization

Amount of funds needed for buying components:

IEEE GOLD Made-In-Egypt/Engineering Day:

ITAC (ITIDA) or NTRA Funding Application:

Testing:

Functional Simulation Parameters Final Hardware Other:

Lab Test Setup

EMC Environmental Microwave Analog Lab Other:

CAD Tools (*No unauthentic software is allowed*): Numerical Simulation Package for Optics & Lens Design

Elective Classes Recommended: VLSI Fabrication (EC536)



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Abstract

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Optical lithography is one of the most important steps used in VLSI integrated Circuit (IC) fabrication. It is used to pattern the transistor dimensions, as well as its metal interconnects and contact holes.

The pattern is generated from VLSI layout tools. The system is made from a single wavelength source such as a laser, followed by system of lenses. It projects the IC layout on the silicon wafer. Position control of the wafer is automated using a system of motors and optical interferometer, as well as digital camera for alignment

In this project, a simple lithography system for educational purposes is designed and simulated using optical simulation software. Simple test procedure is outlined.

The students should become familiar with lasers, lens optical system design, and calculation of image transfer through multiple optical media. The project includes simple computer automation and instrumentation features, as well as motion controls and sensors. They will also be exposed to basic VLSI fabrication steps.

A typical system can be found at the following link:

<http://www.oainet.com/oai-200pp.html>

<http://spie.org/x85679.xml>

<http://www.oainet.com/oai-dilase250-pp.html>

References and Links

<http://en.wikipedia.org/wiki/Photolithography>

<http://en.wikipedia.org/wiki/Photomask>