PROPOSED OPENGL GPU ARCHITECTURE AND IMPLEMENTATION OF LINE RASTERIZATION ALGORITHM

By

Ahmed Ibrahim Samir Khalil

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfilment of the
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MASTER OF SCIENCE
in
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Under the Supervision of

Prof. Serag E. D. Habib
Professor
Electronics and Communications Engineering Department
Faculty of Engineering, Cairo University

Prof. Hossam A. H. Fahmy
Professor
Electronics and Communications Engineering Department
Faculty of Engineering, Cairo University

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Approved by the Examining Committee:

Prof. Serag E. D. Habib, Thesis Main Advisor

Prof. Hossam A. H. Fahmy, Thesis Advisor

Assoc. Prof. Amr G. Wassal, Internal Examiner

Prof. Hussein Esmail Shaheen, External Examiner
(Faculty of Engineering, Ain-Shams University)

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2015

Engineer's Name:	Ahmed Ibrahim Samir Khalil
Date of Birth:	18/07/1989
Nationality:	Egyptian
E-mail:	a.ibrahim.samir@cu.edu.eg
Phone:	01003988145
Address:	Electronics and Communications Engineering Department, Cairo University, Giza 12613, Egypt
Registration Date:	01/10/2011
Awarding Date:	..../..../....
Degree:	Master of Science
Department:	Electronics and Communications Engineering

Supervisors:

Prof. Serag E. D. Habib
Prof. Hossam A. H. Fahmy

Examiners:

Prof. Serag E. D. Habib	(Thesis Main Advisor)
Prof. Hossam A. H. Fahmy	(Thesis Advisor)
Assoc. Prof. Amr G. Wassal	(Internal Examiner)
Prof. Hussein Esmail Shaheen	(External Examiner) (Faculty of Engineering, Ain-Shams University)

Title of Thesis:

Proposed OpenGL GPU Architecture and Implementation of Line Rasterization Algorithm

Key Words:
GPU; OpenGL; Line Rasterization Algorithm; Line Drawing; Incremental Linear Interpolation

Summary:
The GPU has become an essential block for the embedded system devices. This thesis introduces a CUGPU, the Cairo University GPU, architecture based on the OpenGL ES 1.1 CL profile. CUGPU supports the fixed-function 3D graphics pipeline. Also, two designs of the line rasterization algorithm were implemented using VHDL code and synthesized at the TSMC 65 nm low power technology node. The first design scores a typical clock frequency of 270 MHz and an area of 0.088 mm^2. The second design scores a typical clock frequency of 200 MHz and an area of 0.052 mm^2.

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To my family and all my friends

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