

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS, INC.,
Petitioner

v.

ATI TECHNOLOGIES ULC,
Patent Owner

Case IPR2015-00325
Patent 7,742,053

**DECLARATION OF INVENTOR LAURENT LEFEBVRE
REGARDING THE INVENTION DATE OF U.S. PATENT NO. 7,742,053**

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Table of Contents

| | | |
|------|--|----|
| I. | BACKGROUND | 1 |
| II. | CONCEPTION | 3 |
| | A. R400 Architecture Proposal | 4 |
| | B. R400 Top Level Specification..... | 4 |
| | C. R400 Shader Processor..... | 6 |
| | D. R400 Sequencer Specification | 6 |
| | 1. R400 Sequencer Specification (Version 0.4): August 24, 2001..... | 7 |
| | 2. R400 Sequencer Specification (Version 2.0): April 19, 2002..... | 17 |
| III. | DILIGENCE | 19 |
| | A. I Periodically Updated the R400 Sequencer Specification | 20 |
| | B. My Colleagues and I Continuously Developed and Debugged Emulation Code and RTL Code for the R400 | 21 |
| IV. | TESTING SHOWED THAT THE RTL IMPLEMENTATION WORKED FOR ITS INTENDED PURPOSE..... | 26 |
| V. | DILIGENCE CALENDAR..... | 31 |
| VI. | EXHIBITS..... | 57 |

I, Laurent Lefebvre, declare as follows:

I. BACKGROUND

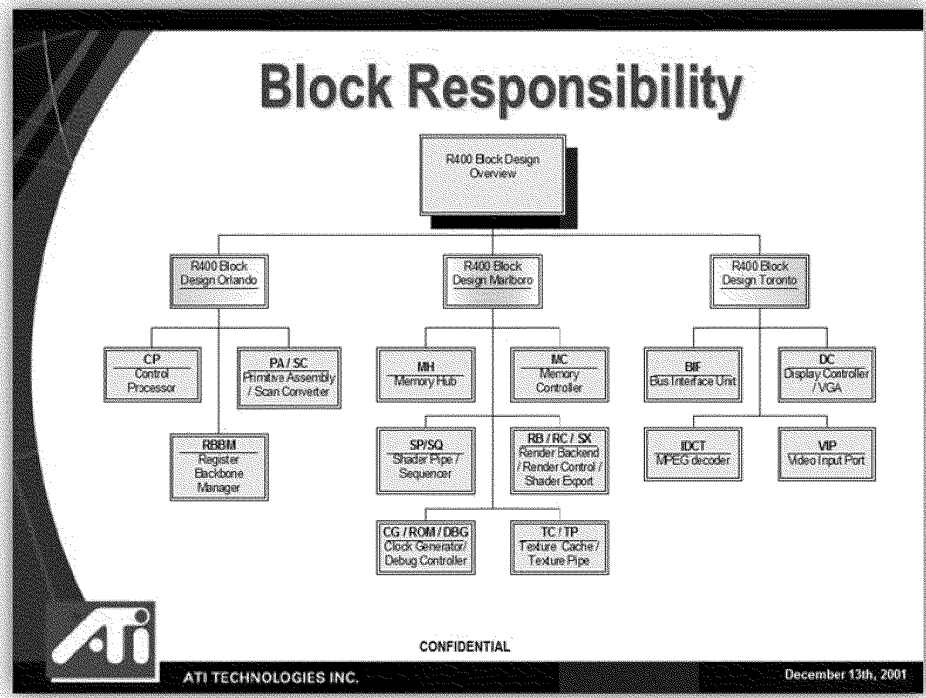
1. I am a computer-graphics hardware architect at AMD Inc. I have been designing computer-graphics processors for the past fifteen years. I specialize in sequencers, shaders, 3D-computer graphics, and integrated-circuit design.

2. From September 2000 to November 2006, I worked as an engineer and hardware architect for ATI Technologies Inc. (“ATI”). It is my understanding that ATI hired me to develop technologies for the R400, which is a graphics processor.

3. Unlike conventional graphics processors at the time, the R400 used a unified shader for both pixel commands and vertex commands—two types of commands required to produce an image. Conventional graphics processors had separate shaders for pixel commands and vertex commands. But a unified shader, like the R400’s unified shader, enhances functionality and efficiency by allowing the same shader complex to be used for both pixel commands and vertex commands.

4. The R400 includes many different functional blocks (e.g., the sequencer, shader pipe, primitive assembly, texture cache, texture pipe, raster engine, display, etc.). *See, e.g.*, Ex. 2053, p. 6. The PowerPoint slide titled Block

Responsibility (reproduced below) shows the ATI office responsible for designing each block.



Id.

5. For the R400 project, I was responsible for the sequencer block, which is the block that manages the execution of pixel commands and vertex commands for the unified shader. In particular, I drafted the high-level specification that describes the sequencer block's functionality, and I wrote emulator code for the sequencer block. In addition, I was also co-responsible for emulating the shader pipe block and the export block.

[REDACTED]

6. I am one of the named inventors of U.S. Patent No. 7,742,053 (“the ’053 patent”). The other named inventors are Steve Morein and Andy Gruber. We collectively conceived of the graphics-processing system claimed in the ’053 patent no later than August 24, 2001, while working on the R400. *See infra* Part II. A team of my colleagues and I, which totaled about one hundred engineers, worked on the R400 nearly every business day from at least August 24, 2001 to September 29, 2003. *See infra* Parts III, V. No later than the third quarter of 2002, we made a GPU in register-transfer-language (“RTL”) code that worked to process a first triangle. *See infra* Part IV.

II. CONCEPTION

7. No later than August 24, 2001, Steve Morein, Andy Gruber, and I collectively conceived of the graphics-processing system in the ’053 patent. We each contributed different aspects to this system. Steve Morein came up with the idea for a unified shader. This is shown, for example, in documents titled “R400 Architecture Proposal” and “R400 Top Level Specification.” Ex. 2040, p. 1; Ex. 2041, p. 1. Andy Gruber was the lead for the shader processor. This is shown, for example, in a document titled “Shader Processor.” Ex. 2042, p. 1. And I was the lead for the sequencer block. This is shown, for example, in a document titled “R400 Sequencer Specification.” *E.g.*, Ex. 2007, p. 1. I explain each of these documents in turn below.

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