

**UNITED STATES PATENT AND TRADEMARK OFFICE**

---

**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

---

Samsung Electronics Co., Ltd., and  
Samsung Electronics America, Inc.  
Petitioners

v.

Parthenon Unified Memory Architecture LLC  
Patent Owner

---

*INTER PARTES* REVIEW OF U.S. PATENT NO. 5,812,789  
Case IPR No.: *To Be Assigned*

---

DECLARATION OF HAROLD S. STONE, PH.D., REGARDING  
U.S. PATENT NO. 5,812,789

---

## TABLE OF CONTENTS

I.	INTRODUCTION .....	1
A.	Engagement .....	1
B.	Background and Qualifications .....	1
C.	Compensation and Prior Testimony .....	3
D.	Information Considered.....	5
II.	LEGAL STANDARDS FOR PATENTABILITY .....	6
A.	Anticipation .....	7
B.	Obviousness.....	8
III.	TECHNOLOGY BACKGROUND.....	12
A.	Basics of Computer Architecture & Video Encoding/Decoding .....	12
1.	Tom Shanley and Don Anderson, “PCI System Architecture,” Third Edition, Addison-Wesley Publishing Company, Feb. 1995 (“ <i>Shanley</i> ”) (Ex. 1019).....	12
2.	International Organization for Standardization, “ISO/IEC 11172-2:1993: Information technology—Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s—Part 2: Video,” 1st ed., August 1, 1993 (“ <i>MPEG Standard</i> ”) (Ex. 1004).....	18
B.	The Consolidation of MPEG and Other Multimedia Device’s Memory .....	22
1.	Intel Corporation “Acceleration Graphics Port Interface Specification,” Revision 1.0 (“ <i>AGP</i> ”) (Ex. 1024) .....	22
2.	Video Electronics Standards Association published the “VESA Unified Memory Architecture Hardware Specifications Proposal,” Version 1.0p (“ <i>VUMA</i> ”) (Ex. 1025) .....	23
3.	U.S. Patent No. 5,774,676 to Stearns (“ <i>Stearns</i> ”) (Ex. 1007) .....	24
4.	U.S. Patent No. 5,797,028 to Gulick (“ <i>Gulick 028</i> ”) (Ex. 1023) .....	26
IV.	SUMMARY OF THE ’789 PATENT .....	29
A.	Effective Filing Date of the ’789 Patent .....	29
B.	Overview of the ’789 Patent.....	29
C.	The Prosecution History of the ’789 Patent .....	30
D.	Claim Construction .....	31
V.	LEVEL OF ORDINARY SKILL IN THE ART .....	33
VI.	COMPARISON OF THE PRIOR ART TO THE ’789 PATENT .....	34

A.	Ground A: <i>Lambrecht</i> anticipates, under 35 U.S.C. § 102, claims 1, 3, 5, 11, and 13.....	34
	1. Claim 1 .....	34
	2. Claim 3 .....	51
	3. Claim 5 .....	53
	4. Claim 11 .....	55
	5. Claim 13 .....	56
B.	Ground B: <i>Lambrecht</i> in view of <i>Artieri</i> , renders obvious, under 35 U.S.C. § 103, claim 4 .....	61
	1. Claim 4 .....	61
C.	Ground C: <i>Lambrecht</i> in view of <i>Moore</i> , renders obvious, under 35 U.S.C. § 103, claim 6 .....	64
	1. Claim 6 .....	64
D.	Ground D: <i>Rathnam</i> in view of <i>Lambrecht</i> , renders obvious, under 35 U.S.C. § 103, claims 1, 3, 4, 5, and 11.....	66
	1. Claim 1 .....	66
	2. Claim 3 .....	83
	3. Claim 4 .....	85
	4. Claim 5 .....	86
	5. Claim 11 .....	89
E.	Ground E: <i>Rathnam</i> in view of <i>Lambrecht</i> and <i>Moore</i> , renders obvious, under 35 U.S.C. § 103, claim 6 .....	91
	1. Claim 6 .....	91
F.	Ground F: <i>Rathnam</i> in view of <i>Lambrecht</i> and <i>Slavenburg</i> , renders obvious, under 35 U.S.C. § 103, claim 13 .....	94
	1. Claim 13 .....	94

I, Harold S. Stone, Ph.D., declare as follows:

## **I. INTRODUCTION**

### **A. Engagement**

1. I have been retained by counsel for the Petitioners to submit this declaration in connection with Petitioners' Petition for *Inter Partes* Review of claims 1, 3-6, 11 and 13 of U.S. Patent No. 5,812,789 ("789 patent") (Ex. 1001).

### **B. Background and Qualifications**

2. I was awarded a Ph.D. and Master's Degree in Electrical Engineering from the University of California-Berkeley in 1963 and 1961, respectively. I received a Bachelor of Science degree in Electrical Engineering from Princeton University in 1960.

3. After my graduation from Berkeley in 1963, I served as a Research Engineer at Boeing and SRI International. I then held faculty positions at Stanford University and at the University of Massachusetts, where I served as a professor of computer science and electrical engineering.

4. In 1984, I started working for IBM as a Manager of Advanced Architecture Studies. In 1990, I became a Research Staff Member at IBM. During my time at IBM, I managed and conducted research in the area of memory systems and optical interconnections. I worked at IBM until 1994, when I became a Fellow at the NEC Research Institute, the highest technical position in the company. At NEC, I conducted research in image processing. I am an inventor of a patent to

NEC regarding a technique for decompressing JPEG images in a novel way that permits images to be searched without fully decompressing them. The decompression technique is based on inverse discrete cosine transforms, which are one of the basic elements of MPEG decompression.

5. I have authored, coauthored, or edited 9 books in various technical areas, the most recent of which appeared in 2011. My textbooks have sold over 100,000 copies. My work on the use of the perfect shuffle interconnections for supercomputers is widely recognized, and many supercomputers based on these interconnections were developed and marketed. For this work and my textbook contributions to the field, I was elected an IEEE Fellow and ACM Fellow, and received the IEEE Piore Field Award, the IEEE Computer Society Taylor Booth Award, and the Charles Babbage Award. I am the principal inventor or co-inventor of 27 patents, including seven in the area of computer architecture - U.S. Patent Nos. 4,989,131, 5,065,310, 5,163,149, 5,611,070, 5,742,785, 5,790,823, and 6,311,260.

6. I have served as a consultant to industry while holding my academic positions and have extensive experience in computer design for embedded computers as a consequence, including low-power computers for use in satellites and ultra-reliable computers for use in nuclear submarine navigation systems. In recent years I have been a member of two Division Review Committees at Los

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.