

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case IPR2017-00701
Patent No. 7,421,032

**PATENT OWNER'S RESPONSE
PURSUANT TO 37 C.F.R. § 42.120**

TABLE OF CONTENTS

I. STATEMENT OF PRECISE RELIEF REQUESTED 1

II. INTRODUCTION AND OVERVIEW OF ARGUMENT 1

III. OVERVIEW OF THE ART AND CITED REFERENCES 4

 A. MacKay (EX1102)..... 6

 B. Ping (EX1103)..... 7

 C. Divsalar (EX1117)..... 9

IV. WEIGHT TO BE GIVEN RESPECTIVE EXPERT TESTIMONY 10

 A. Dr. Davis’s testimony includes basic errors demonstrating a lack of credibility 10

 B. Dr. Davis’s testimony is not independent..... 12

 C. Dr. Davis’s evasiveness during his deposition undermines his credibility..... 12

V. CLAIM CONSTRUCTION 14

 A. “irregular” 14

VI. GROUND 1: PING IN VIEW OF MACKAY IN FURTHER VIEW OF DIVSALAR AND LUBY 97 DOES NOT RENDER CLAIMS 1 AND 4-10 OBVIOUS..... 15

 A. Legal Principles 16

 B. Petitioner fails to establish that either Ping or MacKay discloses irregular repetition 18

 C. Petitioner fails to establish that Ping discloses a low-density generator matrix as required by claim 6 22

 D. Petitioner fails to explain how Ping could be modified to be a non-systematic code as required by claim 9 22

 E. A POSA would not be motivated to modify Ping in view of MacKay 24

 1. Ping is already irregular as defined by MacKay..... 24

 2. The proposed modification would eliminate Ping’s stated improvement 29

 3. Petitioner’s additional arguments regarding motivation to combine fail 32

4. Dr. Davis’s claim that MacKay’s irregularity is ill-defined indicates a lack of motivation to combine	36
F. Petitioner inadequately defines its proposed modification.....	38
G. Modifying Ping in view of MacKay would not be expected to succeed.	42
H. Petitioner fails to Provide a Rationale to Further Modify Ping and MacKay in view of Divsalar.....	47
VII. OBJECTIVE INDICIA OF NON-OBVIOUSNESS.....	51
A. Nexus between the Objective Evidence and the Claims	52
B. Long-felt need and failure of others	55
C. Industry Praise	57
D. Unexpected Results.....	59
E. Commercial Success	60
VIII. CONCLUSION	62
IX. APPENDIX	65

I. STATEMENT OF PRECISE RELIEF REQUESTED

Apple, Inc. (“Petitioner”) filed a petition for *inter partes* review of various claims of U.S. Patent No. 7,421,032 (the “’032 patent”, EX1101). The patent owner (“Caltech”) hereby requests that the Board now issue a final written decision rejecting confirming that claims 1 and 4-10 are not unpatentable.

II. INTRODUCTION AND OVERVIEW OF ARGUMENT

The ’032 patent is one of four Caltech patents that resulted from research performed by the inventors, Dr. Jin, Dr. Khandekar, and Dr. McEliece, in 1999-2000. The patents claim inventions directed to a revolutionary class of error-correction codes, dubbed “irregular repeat and accumulate codes,” or “IRA codes,” which surpassed the performance of the best known codes at that time. One of the features that made IRA codes superior to other known codes, however, was their capability of being encoded *and* decoded with linear complexity, a critical requirement for most practical applications. No other code known at the time could boast linear encoding, linear decoding, and performance near the theoretical Shannon limit.

In arguing that the instituted claims are unpatentable, Petitioner relies chiefly on three prior art references: the MacKay reference, which discloses randomly generated parity-check matrices (which are “irregular” in the sense that 11 of 12 columns are weight 3 and 1 of 12 columns are weight 9), the Ping reference, which

describes a method of improving random parity-check matrices of the type described by MacKay by imposing certain structural constraints to the matrix, and the Divsalar reference, which describes an altogether different kind of code: a simple “turbo-like” code created for the purpose of proving a mathematical conjecture.

Petitioner’s obviousness challenges are lacking in many respects. In ascribing motivation to combine the asserted references, Petitioner attempts to take MacKay’s teachings about nonuniform column weights in a *full* parity-check matrix and apply it to only a *part* of Ping’s parity-check matrix. Yet nothing in MacKay teaches the propriety of applying a general aspect of a full matrix to merely a part of a matrix in a different code. Indeed, Ping’s parity-check matrix as a whole is already “irregular” (in fact, more “irregular”) according to MacKay’s teachings, and neither reference provides any motivation to add *more* irregularity to *part* of the matrix, as Petition proposes. To the contrary, Petitioner’s proposed combination ignores and destroys fundamental constraints of Ping’s codes imposed explicitly for performance reasons. Ping’s code is presented as an improvement over random parity-check matrices like those in MacKay, and modifying it in light of MacKay would have been viewed as a step backwards. There would simply be no motivation to modify Ping in light of the fact it already achieves what MacKay

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.