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Paper 41
Date: July 15, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC., MICRON SEMICONDUCTOR PRODUCTS, INC., MICRON TECHNOLOGY TEXAS LLC, DELL TECHNOLOGIES INC., DELL INC., and HP INC.,
Petitioner,

v.

UNIFICATION TECHNOLOGIES LLC,
Patent Owner.

IPR2021-00345
Patent 9,632,727 B2

Before JUSTIN T. ARBES, TERRENCE W. McMILLIN, and CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.[1]

OGDEN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

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[1] Katherine K. Vidal, Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office, is recused from this proceeding and took no part in this decision. *See* Director's Memorandum, Procedures for Recusal to Avoid Conflicts of Interest and Delegations of Authority (Apr. 20, 2022), https://go.usa.gov/xJjch; Interim Process for Director Review § 20, https://go.usa.gov/xJjce.

I. INTRODUCTION

In response to a Petition (Paper 4, "Pet.") filed by Petitioners Micron Technology, Inc., Micron Semiconductor Products, Inc., Micron Technology Texas LLC, Dell Technologies Inc., Dell Inc., and HP Inc. (collectively, "Petitioner"), the Board instituted an *inter partes* review of claims 1–6 and 12–16 of U.S. Patent No. 9,632,727 B2 (Ex. 1001, "the '727 patent"). (Paper 9, "Dec."). Patent Owner Unification Technologies LLC ("UTL") filed a Patent Owner Response (Paper 21, "PO Resp."), Petitioner filed a Reply to the Patent Owner Response (Paper 28, "Pet. Reply"), and UTL filed a Sur-reply (Paper 33, "PO Sur-reply").

We held an oral hearing on April 13, 2022, and the transcript is entered on the record. Paper 36 ("Tr.").

This is a final written decision under 35 U.S.C. § 318(a) as to whether the claims challenged in the *inter partes* review are unpatentable. For the reasons below, we conclude that Petitioner has shown that all the challenged claims are unpatentable on at least one ground of the Petition.

II. BACKGROUND

A. RELATED PROCEEDINGS

The parties identify the following as related matters: *Unification Technologies LLC v. Dell Technologies, Inc.*, No. 6:20-cv-499-ADA (W.D. Tex. filed June 5, 2020), *Unification Technologies LLC v. Micron Technology, Inc.*, No. 6:20-cv-500-ADA (W.D. Tex. filed June 5, 2020) ("the district court case"), and *Unification Technologies LLC v. HP Inc.*, No. 6:20-cv-501-ADA (W.D. Tex. filed June 5, 2020). Pet. 67; Paper 6, 2–3.

Petitioner also filed petitions challenging claims of patents related to the '727 patent in IPR2021-00343 and IPR2021-00344, for which the Board issued final written decisions on July 8, 2022.

B. THE '727 PATENT (EX. 1001)

The '727 patent discloses a technique "for managing a non-volatile storage medium." Ex. 1001, code (57). According to the patent, at the time of the claimed invention there were at least two known strategies for a file system to delete data in non-volatile storage media when that data is no longer useful. First, it could issue an erase command that "deletes a directory entry in the file system while leaving the data in place in the storage device containing the data." *Id.* at 1:32–35. "Typically, a data storage device is not involved in this type of erase operation." *Id.* at 1:35–36. Thus, according to UTL, this approach has the drawback of "the data storage device being unaware [when] data has become invalid." PO Resp. 2 (citing Ex. 1001, 1:35–36).

In the second strategy, the file system could "write zeros, ones, or some other null data character to the data storage device to actually replace the erased file." Ex. 1001, 1:37–39. But according to the '727 patent, "this is inefficient because valuable bandwidth is used while transmitting" the highly-redundant overwriting data. *Id.* at 1:39–41, 1:51–60. Also, the '727 patent states that the approach is ineffective when used in solid-state storage devices, because such devices typically do not have the ability to overwrite previously stored data to erase it. *Id.* at 1:43–50. For example, flash memory is a solid-state storage device that stores data in "blocks," each block containing smaller "pages" of data. *Id.* at 6:66–7:1, 17:30–33. Such devices

cannot write a page of new data over a page of old data without first erasing the entire block containing the old data. *See* Pet. 3 (citing Ex. 1004 ¶ 73); PO Resp. 13 (citing Ex. 1003, 4:37–38).

The '727 patent attempts to overcome these drawbacks. *See* Ex. 1001, 1:64–2:6. In the claimed invention, data are represented by two types of addresses: physical addresses that indicate the physical location of the data on the storage medium, and logical addresses that identify data logically while internally mapping the data to associated physical addresses. *See id.* at 2:32–34. When a computer system deletes data corresponding to a particular logical address, it sends a message to a storage controller for the medium. *Id.*, code (57). This "message may comprise a hint, directive, or other indication that the data [associated with the logical address] has been erased and/or deleted." *Id.* In response to this message, "the storage controller records an indication that the contents of a . . . physical address associated with the logical [address] do not need to be preserved on the non-volatile storage medium." *Id.*

Figure 1A of the '727 patent, which we reproduce below, is a schematic block diagram of the claimed invention. Ex. 1001, 4:35–38, 6:56–59.

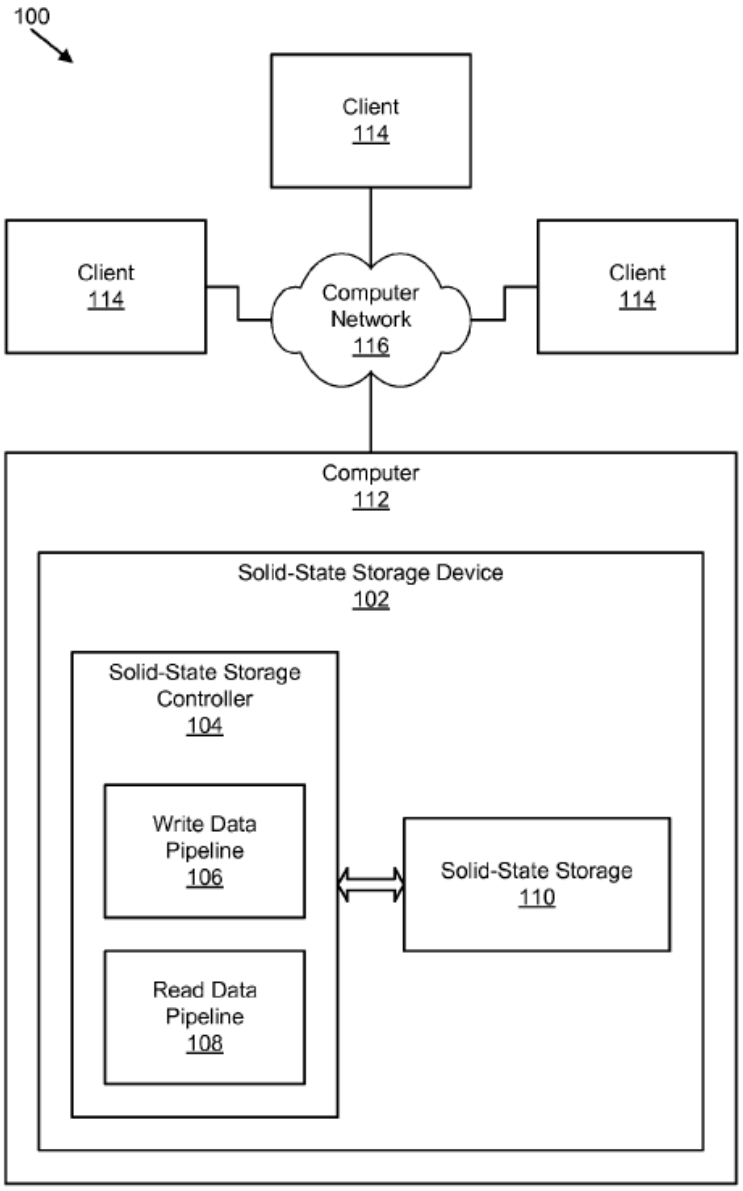

FIG. 1A

As shown above, overall system 100 includes clients 114, which communicate over computer network 116 with computer 112 having solid-state storage device 102. Ex. 1001, 6:56–63, 7:5:7. Solid-state storage device 102 includes one or more solid-state storage devices 110 (e.g., flash

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