

JS005457658A

# United States Patent [19]

Niijima et al.

[11] Patent Number:

5,457,658

[45] Date of Patent:

Oct. 10, 1995

[54] NONVOLATILE MEMORY WITH
CLUSTER-ERASE FLASH CAPABILITY AND
SOLID STATE FILE APPARATUS USING
THE SAME

[75] Inventors: Hideto Niijima, Tokyo; Hideo Asano,

Machida; Yoshinori Sakaue, Tokyo; Takashi Toyooka, Kawasaki, all of

Japan

[73] Assignee: International Business Machines

Corporation, Armonk, N.Y.

[21] Appl. No.: 200,343

[22] Filed: Feb. 23, 1994

[30] Foreign Application Priority Data

Feb. 24, 1993 [JP] Japan ...... 5-035228

[51] Int. Cl.<sup>6</sup> ...... G11C 13/00

[56] References Cited

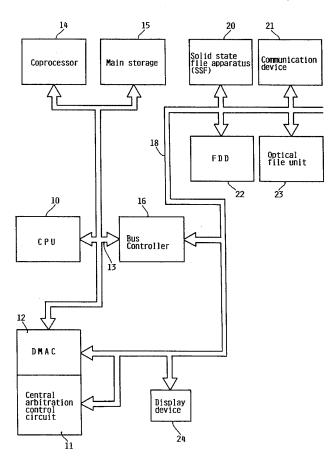
U.S. PATENT DOCUMENTS

Primary Examiner—Terrell W. Fears
Attorney, Agent, or Firm—Matthew J. Bussan

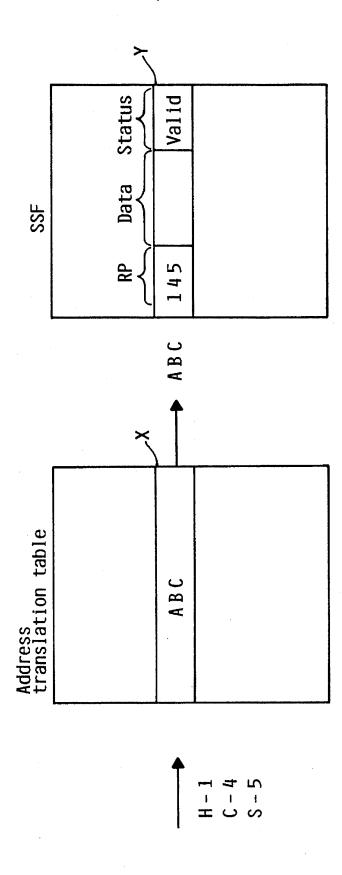
### [57] ABSTRACT

A nonvolatile memory with cluster-erase flash capability. A cluster information sector is included in each of N clusters, the cluster information sector of each cluster being written with the sequence number assigned to the cluster so that no two clusters have the same sequence number. When erasing a given sector, a controller saves its sequence number prior to erasure. Then, when initializing a given erased sector, the controller sets its sequence number to a value greater than the current maximum sequence number. The controller writes user data to sectors other than the cluster information sector for the cluster thus initialized according to their address sequence. Accordingly, an invalid sector can be distinguished from a valid sector without using an overwrite approach.

### 17 Claims, 12 Drawing Sheets







# FIG. I (PRIOR ART)

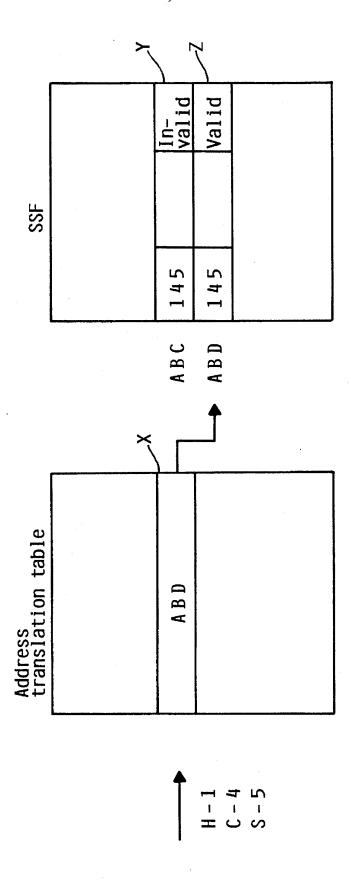


FIG. 2 (PRIOR ART)

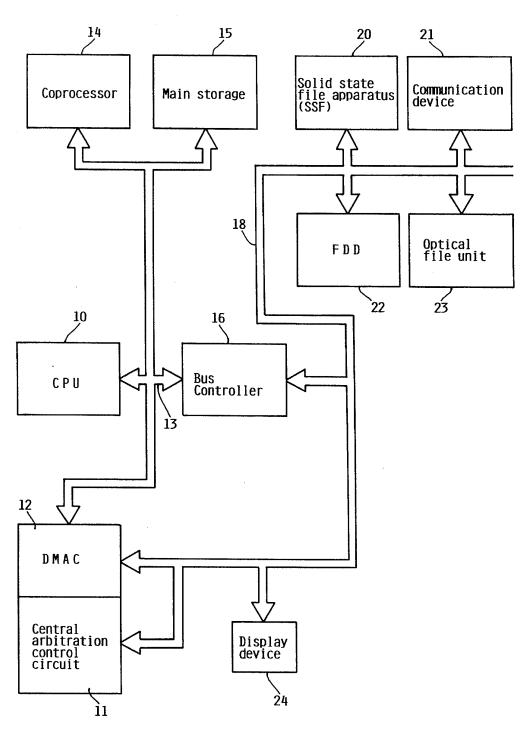


FIG. 3

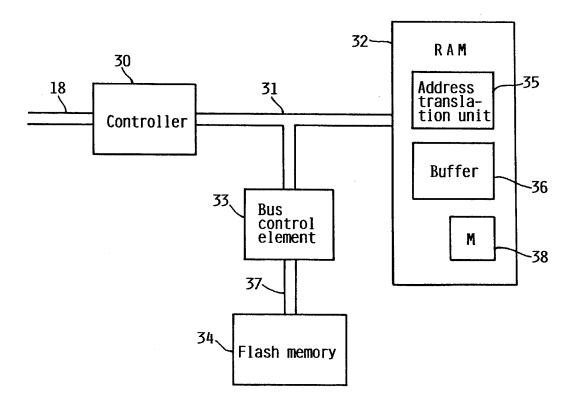


FIG. 4

# DOCKET

# 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.

