



(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0283682 A1**
Odawara et al. (43) **Pub. Date: Dec. 22, 2005**

(54) **METHOD FOR DATA PROTECTION IN DISK ARRAY SYSTEMS**

(52) **U.S. Cl.** 714/42

(75) **Inventors:** Hiroaki Odawara, Sunnyvale, CA (US); Yuichi Yagawa, San Jose, CA (US); Shoji Kodama, San Jose, CA (US)

(57) **ABSTRACT**

Correspondence Address:
TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834 (US)

(73) **Assignee:** Hitachi, Ltd., Tokyo (JP)

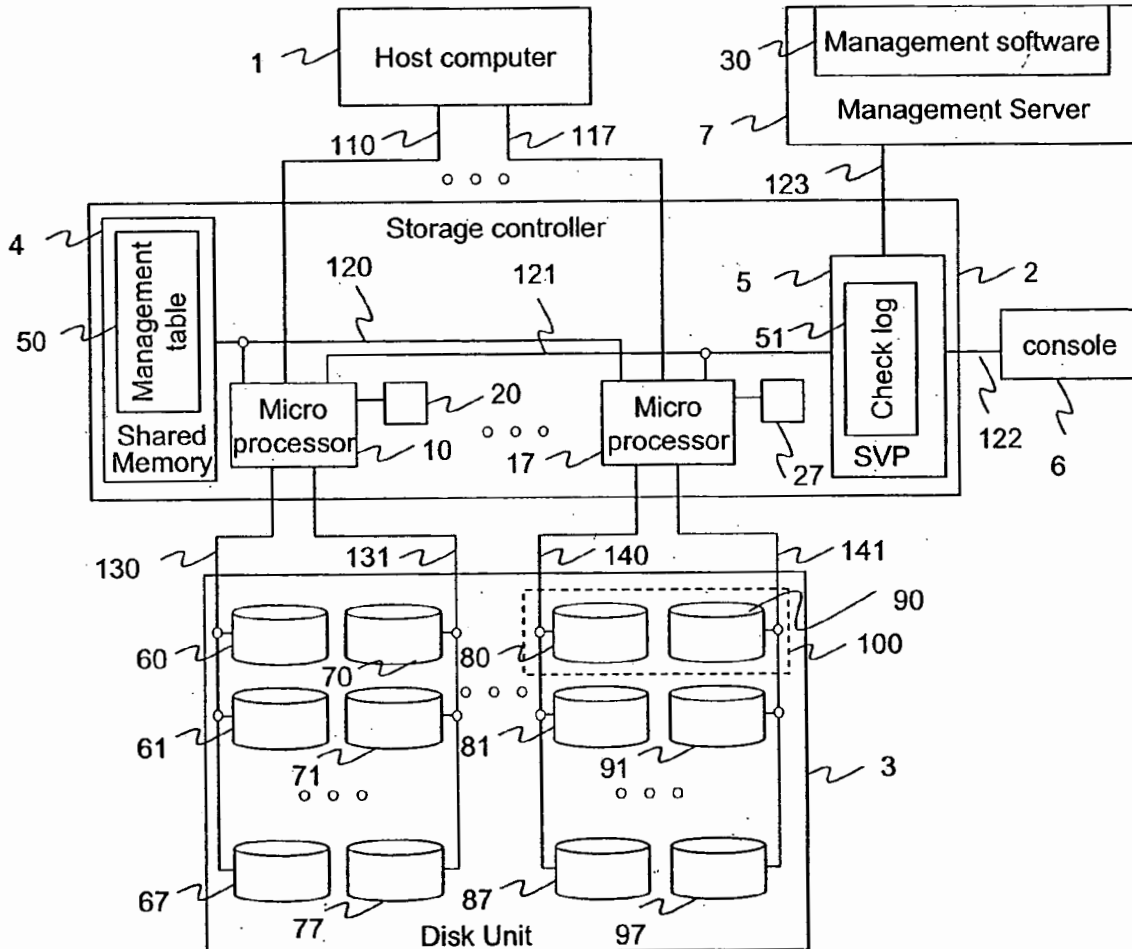
(21) **Appl. No.:** 10/871,128

(22) **Filed:** Jun. 18, 2004

Publication Classification

(51) **Int. Cl.⁷** G06F 11/00

A method and a system for implementing the method are disclosed relating to archival storage of information in large numbers of disk units. The reliability of the stored information is checked periodically using data verification operations whose results are saved. These results establish the veracity of the data and enable compliance with various regulatory requirements. The techniques described enable the use of low cost disk drive technology, yet provide high assurance of data veracity. In a typical system, management information storage is provided in which data entries are associated with each of the disk drives to provide information with respect to the condition of the data on that drive and its last verification. The data verification operations are performed on the data during time periods when I/O accesses are not required.



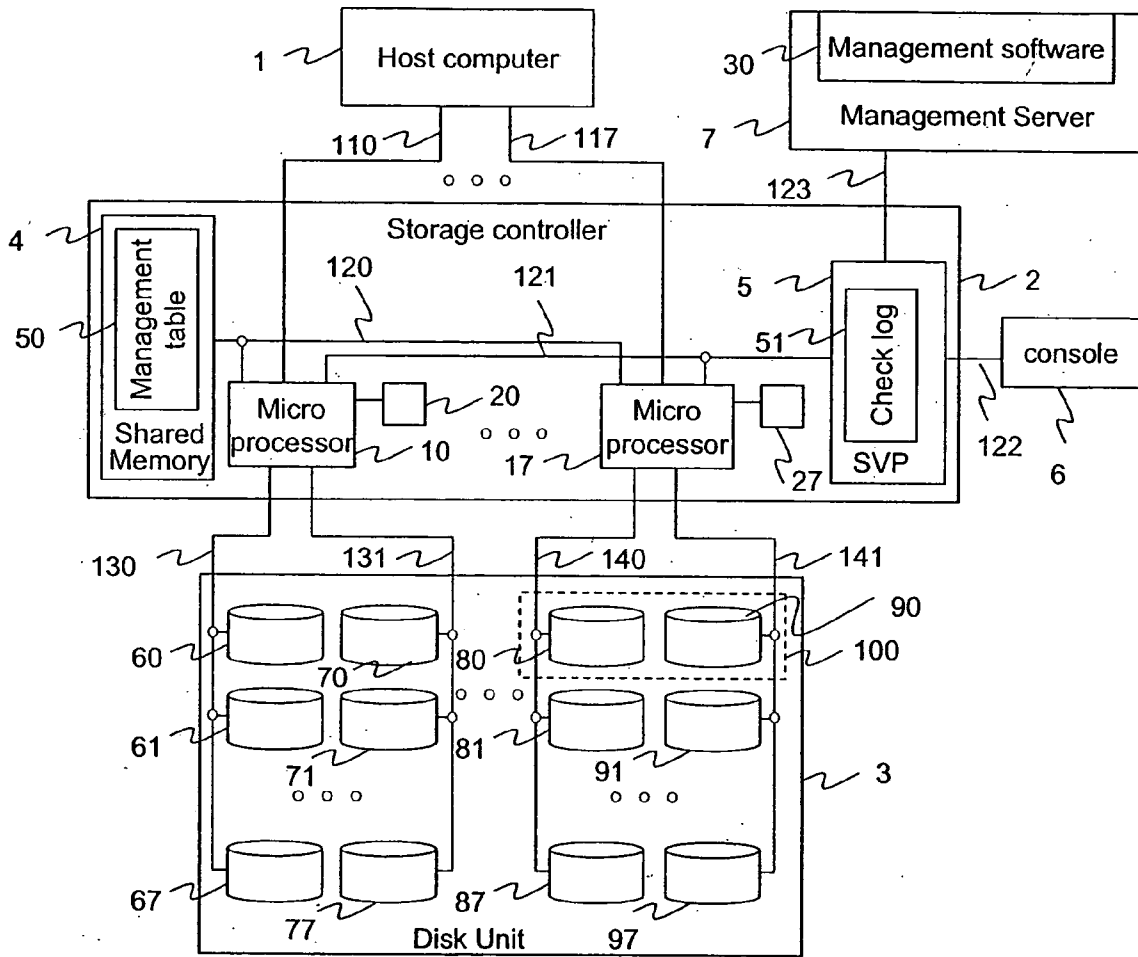
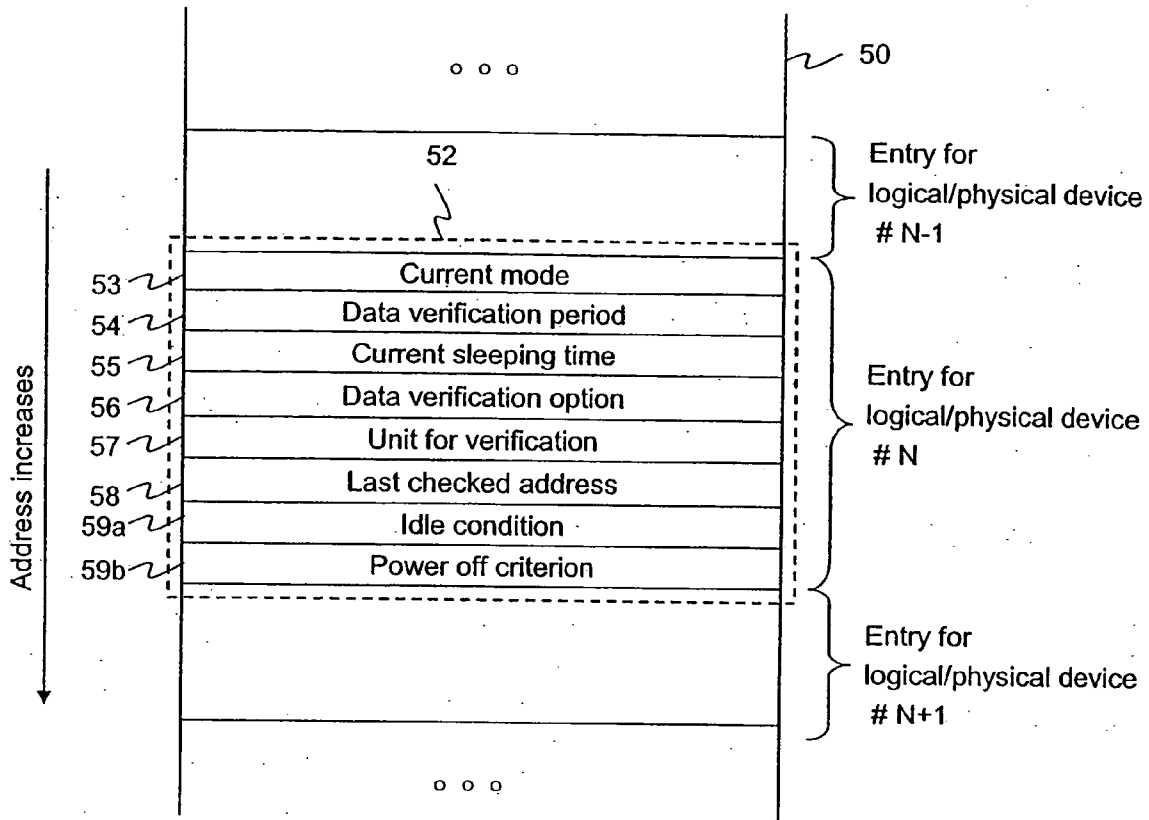


Figure 1



Current mode field :

- 0 = Normal mode (with power saving operation)
& the logical/physical devices are in operation
- 1 = Normal mode (with power saving operation)
& the logical/physical devices are out of operation (being turned off)
- 2 = Normal mode (with power saving operation)
& the logical/physical devices are in data verification mode
- 3 = Full operation mode (no power saving operation)
- 4 = Error handling mode
- 5-15 = reserved

Figure 2

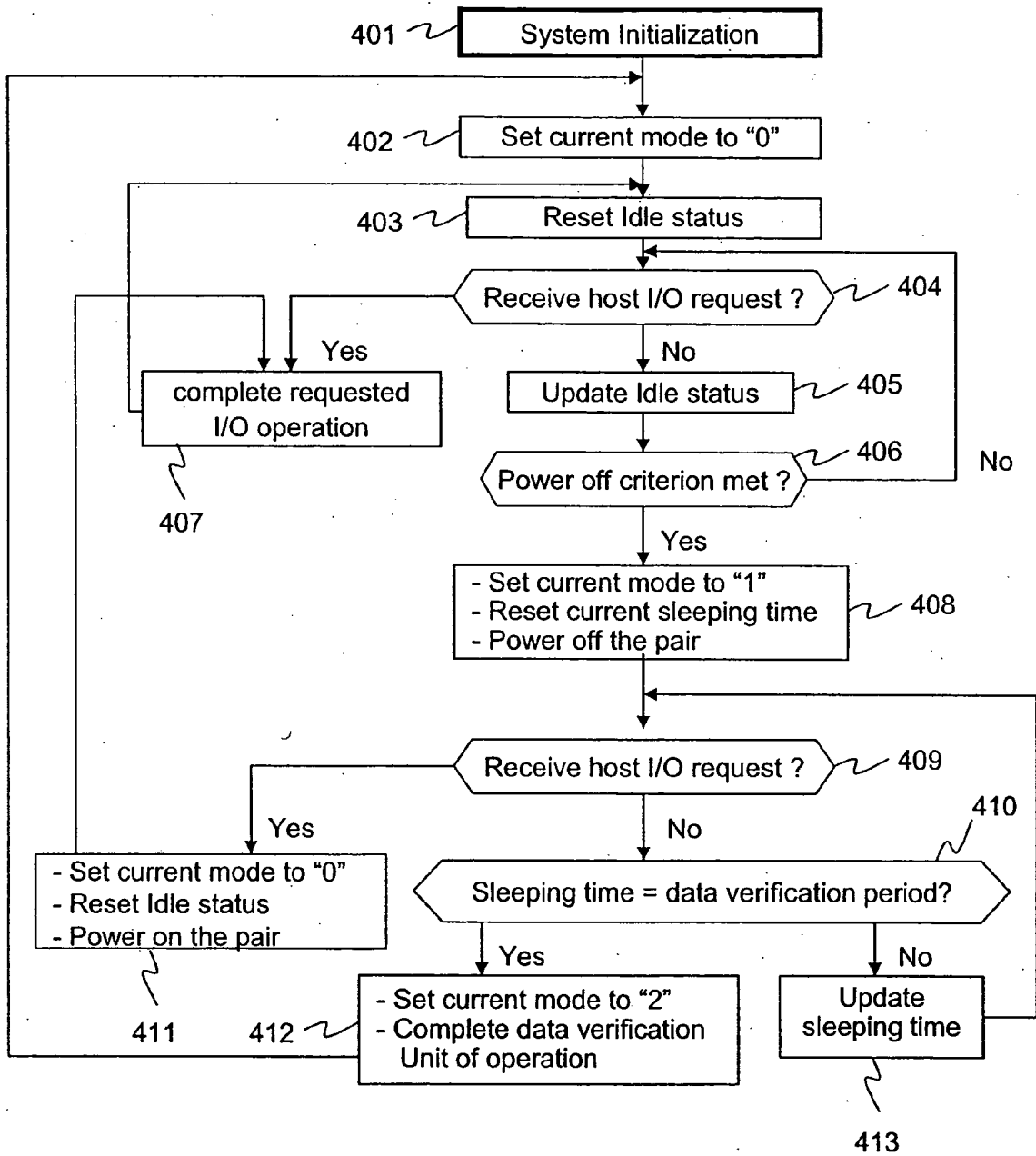


Figure 3

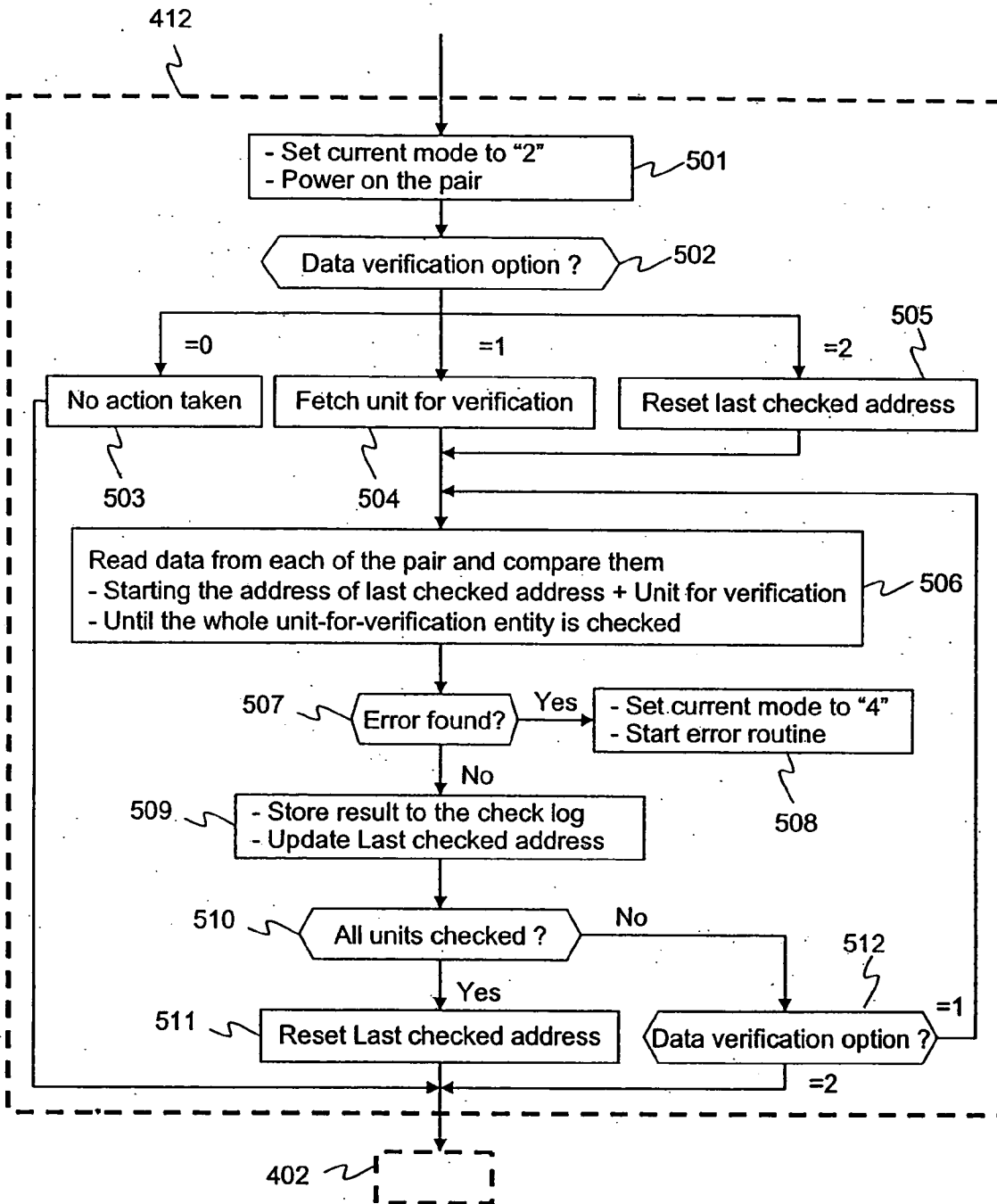


Figure 4

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.