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Deitz et al.

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(54) **METHOD AND APPARATUS FOR PROVIDING A RAID CONTROLLER HAVING TRANSPARENT FAILOVER AND FAILBACK**

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(52) U.S. Cl. **714/11**; 714/5
(58) Field of Search 714/6, 7, 8, 11, 714/710, 5; 711/114

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(57) **ABSTRACT**

A method and apparatus for controlling a memory system **100** comprising a plurality of controllers **105** connected by a fibre channel arbitrated loop **145** to provide transparent failover and failback mechanisms for failed controllers. The controllers **105** are adapted to transfer data between a data storage system **120** and at least one host computer **110** in response to instructions therefrom. In the method, a unique identifier is provided to each controller **105**. The operation of the controllers **105** is then monitored and, when a failed controller is detected, a failover procedure is performed on a surviving controller. The failover procedure includes disabling the failed controller and instructing the surviving controller to assume the identity of the failed controller. Thus, the surviving controller is capable of responding to instructions addressed to it and instructions addressed to the failed controller, and the failure of the failed controller is transparent to the host computer **110**. A computer program and a computer program product for implementing the method are also provided.

25 Claims, 4 Drawing Sheets

FIG. 1

FIG. 2

FIG. 3

280

285 — CONTROLLER INITIALIZATION UNIT

315 — REPLACEMENT DETECTION UNIT

290 — FAILURE DETECTION UNIT

320 — FAILBACK UNIT

295 — FAILOVER UNIT

325 — LOOP REINITIALIZATION UNIT

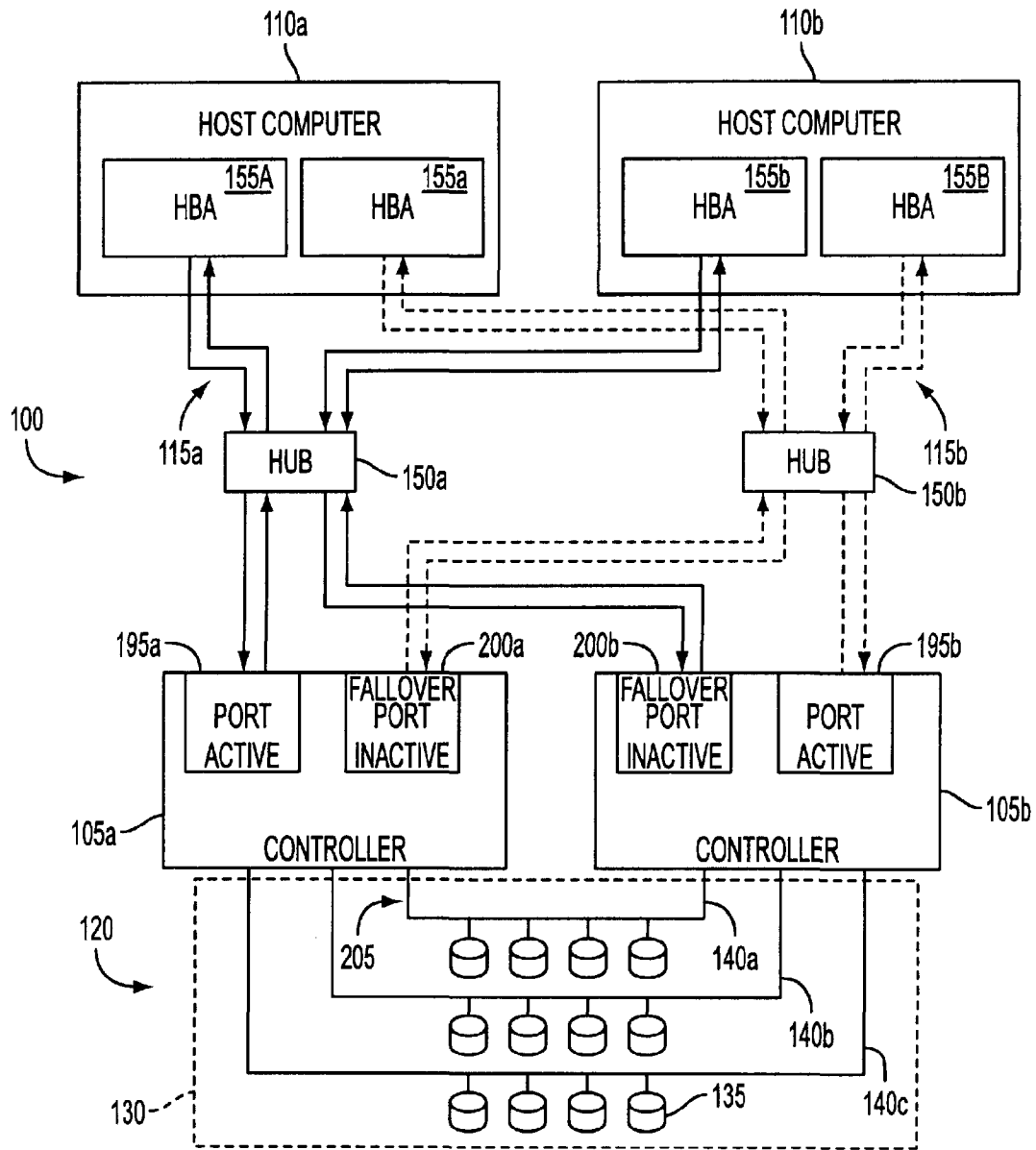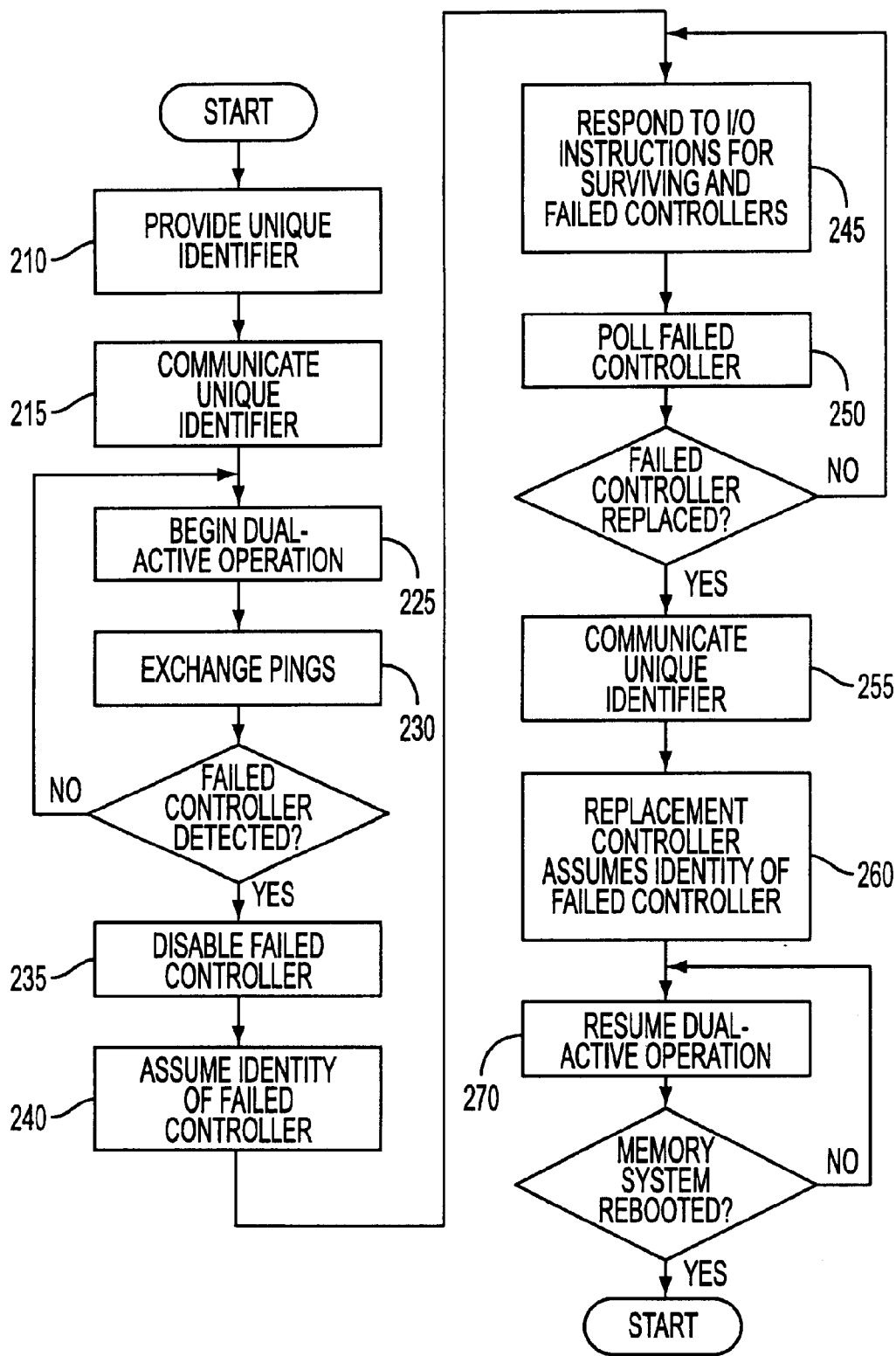300 — DISABLING UNIT

310 — LOOP INITIALIZATION UNIT
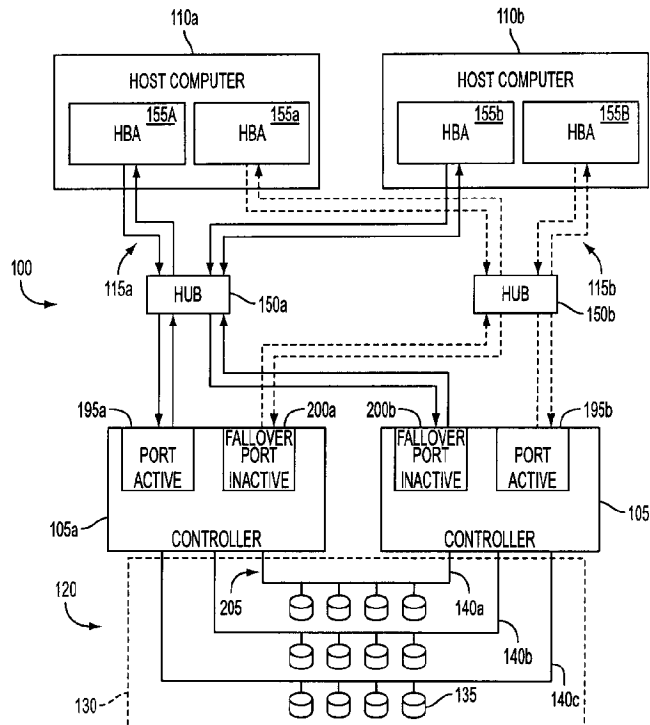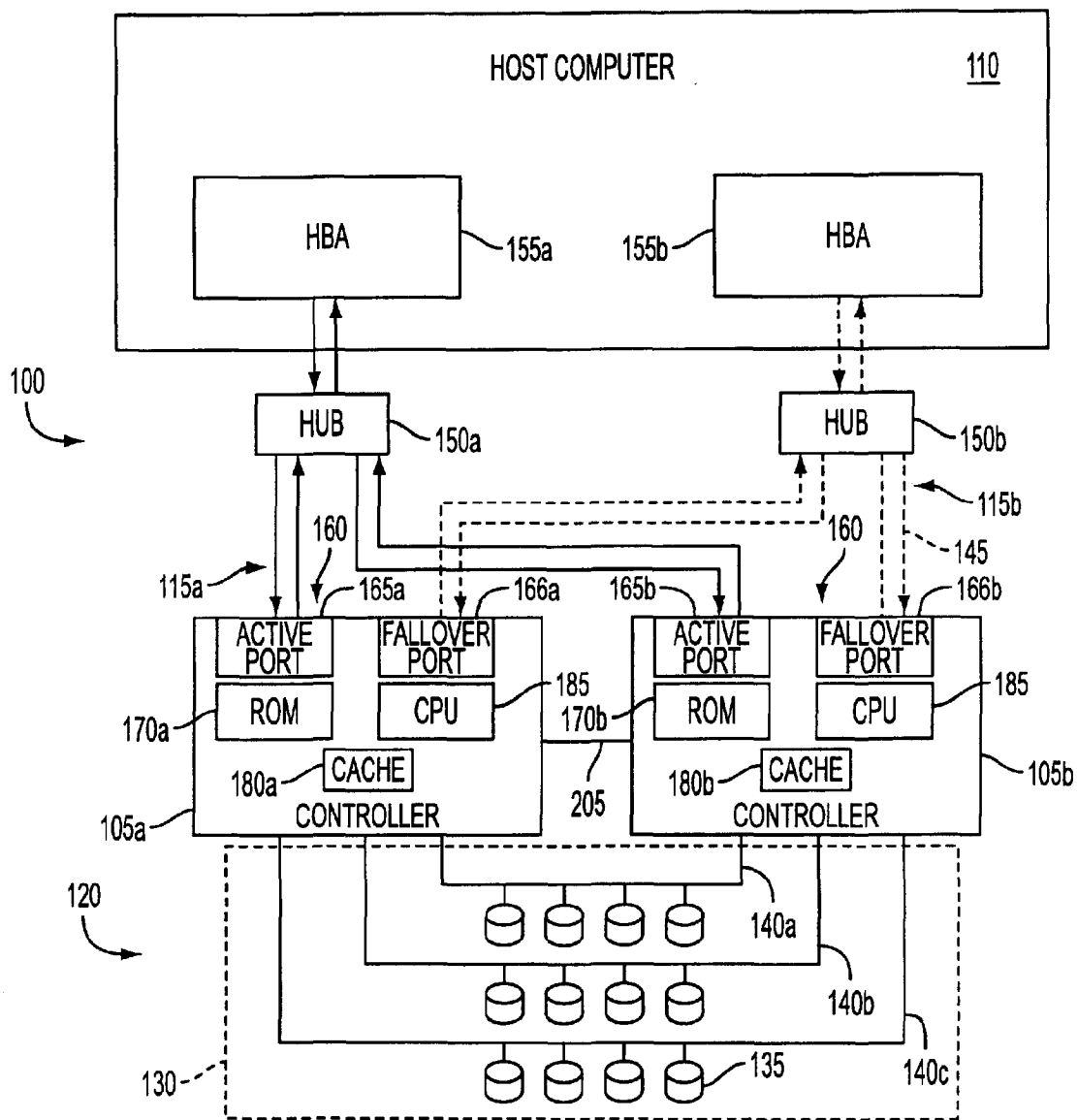
FIG. 4

DOCKET ALARM
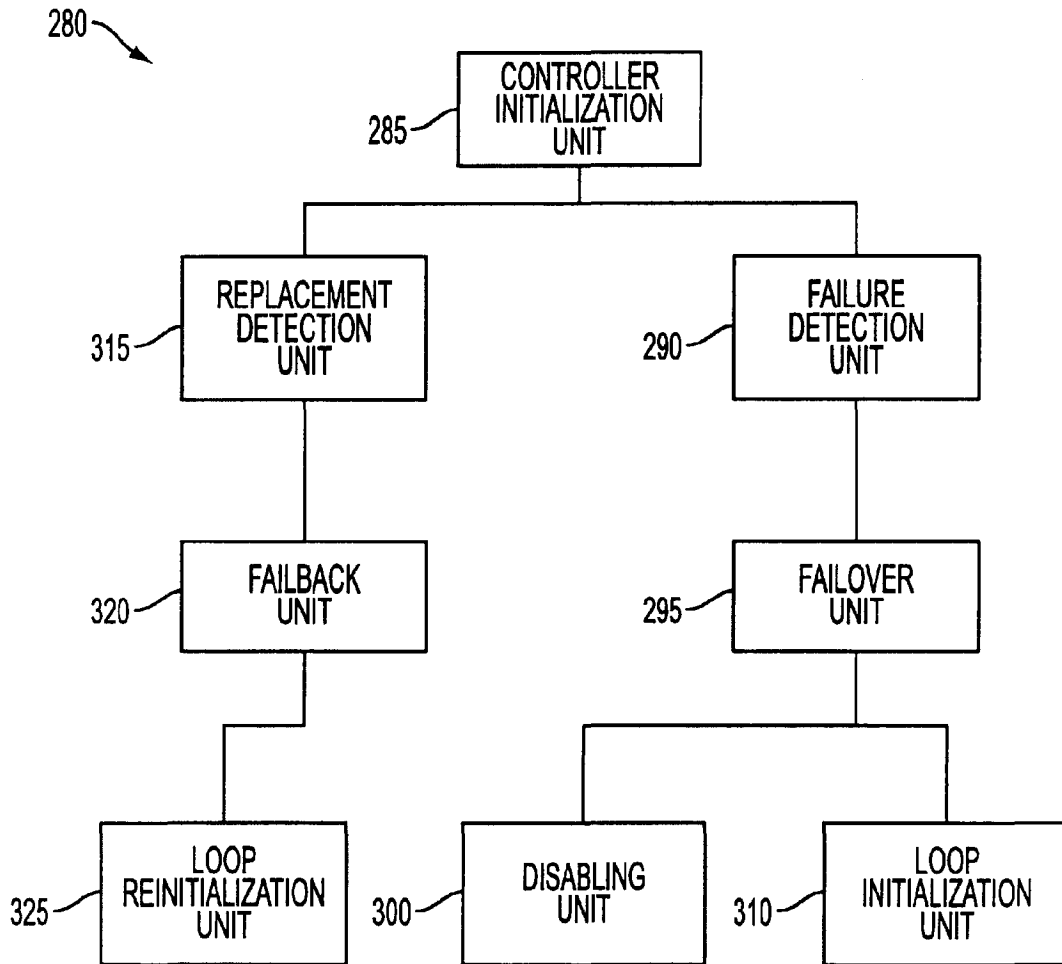
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