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(12) United States Patent Gorobets et al.

(54) NON-VOLATILE MEMORY AND METHOD

WITH MULTI-STREAM UPDATE TRACKING

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(US)

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(52) U.S. Cl. 711/103

See application file for complete search history.

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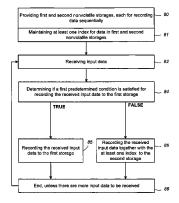
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(57) ABSTRACT

Update data to a non-volatile memory may be recorded in at least two interleaving streams such as either into an update block or a scratch pad block depending on a predetermined condition. The scratch pad block is used to buffered update data that are ultimately destined for the update block. Synchronization information about the order recording of updates among the streams is saved with at least one of the streams. This will allow the most recently written version of data that may exist on multiple memory blocks to be identified. In one embodiment, the synchronization information is saved in a first block and is a write pointer that points to the next recording location in a second block. In another embodiment, the synchronization information is a time stamp.

41 Claims, 43 Drawing Sheets

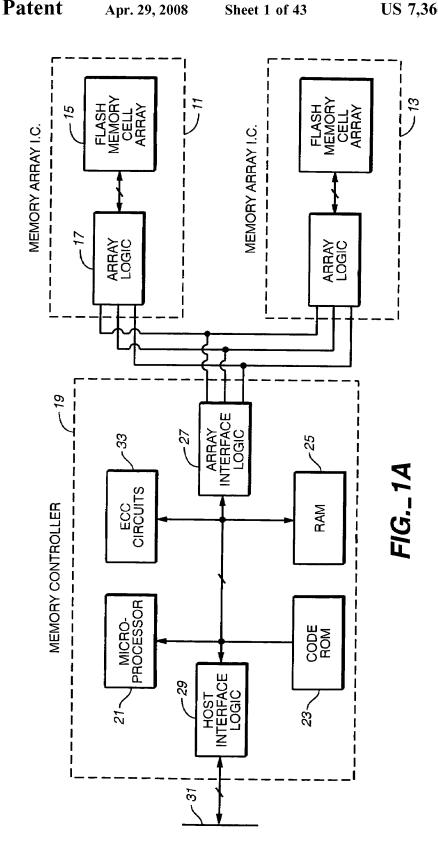


Updating Using Two Streams With Index Stored In One Stream



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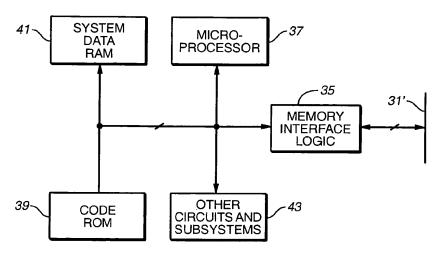
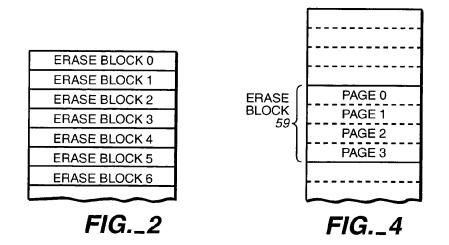
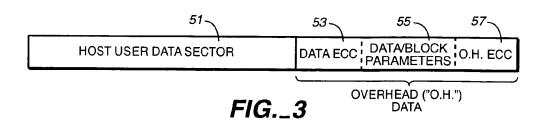
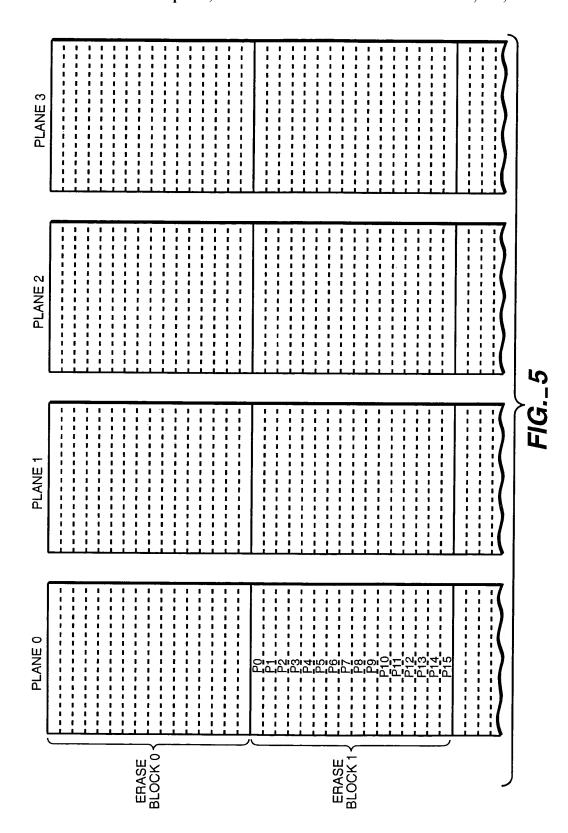


FIG._1B







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