

US011495315B1

(12) United States Patent

Zou et al.

(10) Patent No.: US 11,495,315 B1

(45) **Date of Patent:** Nov. 8, 2022

(54) CONFIGURABLE BUILT-IN SELF-REPAIR CHAIN FOR FAST REPAIR DATA LOADING

(71) Applicant: Siemens Industry Software Inc.,

Plano, TX (US)

(72) Inventors: Wei Zou, Lake Oswego, OR (US);

Benoit Nadeau-Dostie, Gatineau (CA)

(73) Assignee: Siemens Industry Software Inc.,

Plano, TX (US)

(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 17/399,104

(22) Filed: Aug. 11, 2021

(51) Int. Cl. *G11C 29*

G11C 29/00 (2006.01) G11C 29/10 (2006.01) G11C 29/32 (2006.01) G11C 29/12 (2006.01) G11C 29/44 (2006.01)

(52) **U.S. Cl.**

CPC *G11C 29/10* (2013.01); *G11C 29/12015* (2013.01); *G11C 29/32* (2013.01); *G11C 29/4401* (2013.01); *G11C 29/789* (2013.01)

(58) Field of Classification Search

CPC ... G11C 29/10; G11C 29/12015; G11C 29/32; G11C 29/4401; G11C 29/789

See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

2	2008/0288838	A1*	11/2008	Anzou	G11C 29/32 714/726
	2015/0012786			Varadarajan et al. Varadarajan et al.	
	2016/0284426			Busi	G11C 29/12
2	2019/0228829	A1*	7/2019	Hiraga	H01L 21/822
*	oited by eye	minar			

^{*} cited by examiner

Primary Examiner — Christine T. Tu

(57) ABSTRACT

A scan network configured to transport repair information between memories and a controller for a non-volatile storage device comprises: repair registers coupled in parallel to repair information generation circuitry for one of the memories and segment selection devices that divide the repair registers into repair register segments. Each of the segment selection devices comprises: a storage element configured to store a segment selection bit and segment selection bit generation circuitry configured to generate the segment selection bit based on the repair information. Each of the segment selection devices is configurable to include or not include the corresponding repair register segment in a scan path of the scan network in a shift operation based on the segment selection bit.

24 Claims, 14 Drawing Sheets



