P1890

Submitter Email: jack.cole@ieee.org
Type of Project: New IEEE Standard
PAR Request Date: 15-Mar-2013
PAR Approval Date: 10-May-2013
PAR Expiration Date: 31-Dec-2017
Status: PAR for a New IEEE Standard

1.1 Project Number: P1890
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: Standard for Error Correction Coding of Flash Memory Using Low-Density Parity Check Codes

3.1 Working Group: Error Correction Coding for Non-Volatile Memories_P1890 WG (C/SS/ECC_NVM_P1890 WG)
Contact Information for Working Group Chair
Name: Kiran Gunnam
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None

3.2 Sponsoring Society and Committee: IEEE Computer Society/Storage Systems (C/SS)
Contact Information for Sponsor Chair
Name: John Cole
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Contact Information for Standards Representative
None

4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 11/2013
4.3 Projected Completion Date for Submittal to RevCom: 05/2014

5.1 Approximate number of people expected to be actively involved in the development of this project: 12
5.2 Scope: The standard specifies the advanced error correction coding for flash memories.

5.3 Is the completion of this standard dependent upon the completion of another standard: No
5.4 Purpose: This document will not include a purpose clause.
5.5 Need for the Project: Flash includes extra storage on each page to store Error Correction Coding(ECC) encoded data as well as other information for wear-leveling, logical to physical block mapping, and other software overhead functions. The size of extra storage (spare area) is normally 16 byte per 512 byte sector but other sizes are also used. ECC algorithm correction strength (number of bit errors that can be corrected) depends on the ECC algorithm used to correct the errors (these algorithms may be implemented in either hardware or software). Simple Hamming codes can only correct single bit errors. Reed-Solomon code can correct more errors and is used on many of the current controllers. BCH (Bose, Ray-Chaudhuri, Hocquenghem) codes can also correct multiple bit errors and are frequently used in current flash memories because of their improved efficiency over Reed-Solomon. However with shrinking geometries, flash memories need more powerful error correction mechanism. Currently industry is attempting to use low-density parity-check codes-however there is no standard exists for the definition of encoding matrix H similar to what exits for wireless and other communication applications. The proposed standard defines a set of low-density parity check code matrices that are suitable for flash memory.

5.6 Stakeholders for the Standard: Flash Device makers
Flash controller makers

Intellectual Property
6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: No

8.1 Additional Explanatory Notes (Item Number and Explanation): Please contact the WG chair for questions about the PAR:

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