MemTest86 and Memtest86+

Christian Külker

2023-03-10

Contents

1 Introduction

There are many ways to test a computer's memory. Naively, memory can be thought of as a binary object. While in binary systems, such as today's computers, the state of a given memory cell should be binary; it is not true that the overall state of the device (the memory module) is OK or Not OK (NG), so it can **not** be considered binary. There are many states between OK and Not OK. While in many circumstances memory appears OK and is considered to be working, it can be seen, not only in supercomputing, that memory as an instance of physics is not binary and there are several levels of OK, depending on usage and user acceptance. For some unknown reason, ECC memory is not considered

a mainstream object of use. Therefore, some errors are not detected and therefore accepted by the user, even though the user may not admit it. In supercomputers, memory that throws errors is less welcome. Usually ECC is used where possible, but even then the memory must be validated. Unfortunately, testing and evaluating memory is a difficult and time-consuming business. The reason is that certain value streams written to memory can cause an error while others do not. For example, `11->00->11` might be an error-free pattern, while `11->01->10->11` might not. This is because in certain memory modules, for example, cross-talk between memory lanes is possible, or some other kind of local phenomena.

In an ideal world, a memory test must take into account the physical structure of the memory being tested. While some supercomputers with custom-designed memory spend years evaluating and qualifying memory tests, consumer electronics such as the `i386` and successor architectures are typically not tested down to the design level. A more general brute force approach is to write many different patterns to memory and read them back. Doing this structurally and/or randomly over a long period of time will not guarantee error-free memory, but the probability of undetected errors decreases as the error-free time of a test increases.

2   Memtest86+ and MemTest86

Memtest86+ and MemTest86 are two well known memory tests for the x86 architecture.

Test	URL	Arch	Active	License
Memtest86+	https://www.memtest.org/	x86, x86-64	1994-2022	GPL v2.0
MemTest86	https://www.memtest86.com/	x86, x86-64	2013-2022	Proprietary

3   Memtest86+

3.1   History

Date	Name	Author
2022	Memtest86+ V6	M Whitaker, S. Demeulemeester
2020-2022	PCMemTest	Martin Whitaker
2004-2020	Memtest86+ V1-V5	Sam Demeulemeester
2004	Memtest86 V3	Eric Biedermann

Date	Name	Author
1994-2002	MemTest-86	Chris Brady

3.2 Links

- [Wikipedia English](#)
- [Wikipedia German](#)
- [Repository](#)

4 MemTest86

[Wikpedia](#) claims, the original Memtest86 was sold to PassMark in February 2013. There-fore this section is kept short.

4.1 License

The [license](#) of MemTest86 appears to be proprietary. A written form of the license was not found on the web site (2022-10-25). When it comes to the license, it was sometimes referred to for older versions as `Free` and/or `GPL`, while the license of the newer version labeled as `Pro` or `Site` was not provided, nor its usage restrictions.

4.2 History

Date	Version	License
	MemTest86 V10 Site	
	MemTest86 V10 Pro	
	MemTest86 V10 Free	
2015-02-13	MemTest86 V6	
2013-12-03	MemTest86 V5	
2013-02	MemTest86 v4	(until 4.3.7 GPL)

4.3 Links

- [Wikipedia English](#)
- [Wikipedia German](#)

5   History

Version	Date	Notes
0.1.1	2023-03-10	Improve writing, change tables, typos
0.1.0	2022-10-25	Initial release

6   Disclaimer of Warranty

THERE IS NO WARRANTY FOR THIS INFORMATION, DOCUMENTS AND PROGRAMS, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE INFORMATION, DOCUMENT OR THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE INFORMATION, DOCUMENTS AND PROGRAMS IS WITH YOU. SHOULD THE INFORMATION, DOCUMENTS OR PROGRAMS PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

7   Limitation of Liability

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS THE INFORMATION, DOCUMENTS OR PROGRAMS AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE INFORMATION, DOCUMENTS OR PROGRAMS (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE INFORMATION, DOCUMENTS OR PROGRAMS TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.