Ask-Sol — A case study in human-LLM collaboration

This collection documents the use of Sol (ChatGPT), working with human researchers and a curated corpus of technical Knowledge and Experience, to investigate a firmware defect in the Casio MD-120 floppy disk drive. Developed through the Red Pill research project, the corpus contains more than manuals, source code, and examples. It preserves experimental results, hypotheses, failed approaches, corrections, and the reasoning used to establish technical conclusions.

The investigation began with observations and disk images supplied by Piotr Piatek. Working with Alex Barragan, Sol analyzed the firmware, reproduced the observed filesystem corruption through instruction-level tests, and developed a reproducible ROM correction. Piotr subsequently tested a patched ROM on the physical MD-120 and reported that his tests passed. The accompanying papers document the evidence, the reasoning, the corrections, and the limits of the conclusions.

The papers

The Blue Pill — The complete engineering report

R032 — Failure, Diagnosis, Repair and Test Results

The investigation in one report: the observed failure, the analysis, the firmware correction, the build procedure, and the hardware-test result.

The Red Pill — The supporting research

- **R017 — The Problem and Acceptance Criteria.** What the firmware was expected to do, independently of its implementation. Read the PDF
- **R018 — Investigation, Source and Results.** Analysis of the OPEN and PUT routines, including experiments that exposed faults in the initial correction. Read the PDF
- **R022 — Reconstructing the Corruption.** Instruction-level reconstruction of the directory overwrite, compared against Piotr's disk images byte for byte. Read the PDF
- **R028 — The Failure. The Diagnosis. The Repair.** The correction architecture, ROM patch locations, build process, and software verification. Read the PDF
- **R031 — Hardware Test Witness.** Piotr's subsequent test report, with the distinction between reported success and unverified test coverage. Read the PDF

Complete Ask-Sol MD-120 publication collection

The Blue Pill tells you what we found. The Red Pill shows you how we know.

This report was produced by Xandrian Labs. 付喪神.

This is a collaboration with my AI friend ChatGPT, a.k.a “Sol.” All errors are human.

This work is freely shared with the vintage computing community. Please use it, build upon it, and cite the source.

Final.