COMPUTE EXPRESS LINK (CXL) MEMORY EXPANSION CARD TESTING AND DEBUGGING

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Zoom Link: https://binghamton.zoom.us/j/99576463197

Abstract

Compute Express Link (CXL) is a cutting-edge protocol that allows for high-speed, low-latency communication between the CPU and various devices, primarily improving memory bandwidth and capacity. Among the several varieties of CXL devices, Type 3 devices are identified by their potential to considerably increase memory capacity, making them ideal for high-performance applications requiring large-scale data processing. Despite the promising potential of CXL, particularly Type 3 devices, a thorough analysis of the literature finds a significant lack of defined procedures for testing and debugging these products. The absence of established processes for guaranteeing the reliability and performance of CXL memory extension cards complicates their use in high-volume production.

This study fills a major need by creating a complete setup for testing stations tuned for CXL memory expansion cards. The research details the required hardware and software components, offering an extensive guide to effectively testing these devices. Furthermore, it delves into the debugging process for modules that fail testing, identifying typical failure modes such as soldering issues, connectivity problems, and component malfunctions and outlining the preventive and corrective actions required to rectify these issues. The research concludes with a description of the various kinds of failures observed during the testing process, as well as the fixes performed. The paper closes with recommendations for future research, highlighting the importance of continuously refining testing and debugging procedures as CXL technology progresses and the possibility of expanding these devices to meet the rising demands of next-generation computing systems.