

**Title:** Agent-AI Assisted Parameter Tuning in Active Electrical Cables for Device Interoperability

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**Suggested Topic Area:**

Artificial Intelligence (AI) in Hardware

**Abstract:**

Active Electrical Cables (AECs) anchor today's scale-out data-center fabrics, with 800 G/1.6 T links on the near horizon to handle the explosive east-west traffic of AI and memory-fabric clusters. In these hyperscale networks, tens of thousands of AEC based links, terminated by heterogeneous switches, accelerators, network interface cards, and co-packaged optics, must establish error free operation on the first attempt and remain stable during hot swap events, airflow transients, and workload driven thermal excursions. Manual or scripted sweeps of Digital Signal Processor (DSP) parameters cannot meet the aggressive operational expenditure and mean time to service requirements at fleet scale. We present a multi-agent AI assisted tuning framework that automates equalization from end to end. The system combines (i) a lightweight prediction engine that estimates link quality in milliseconds, (ii) an on-board adjustment loop that nudges parameters in real time using live bit-error-rate feedback, (iii) a background explorer that evaluates new setting combinations during low-risk windows, and (iv) a rules engine that enforces vendor limits and rollback safeguards. A rack-level controller arbitrates these inputs, programs only validated values into each cable's DSP core, and continuously refines its models. This agent-based approach delivers production-ready DSP optimization without manual intervention, preserves interoperability across heterogeneous devices, and transforms AECs into self-optimizing, plug-and-play interconnects, thus accelerating current deployments and smoothing the path to upcoming 800 G/1.6 T fabrics.

**Consideration for Poster/Demonstration:**

Yes.