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Improving Signal Integrity of the Yamaichi AMC and Zone 3 Connectors

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In order to address the bandwidth requirements for state-of-the-art protocols, signal integrity investigations and improvements have been carried out.

AMC Connector:
To address the potential discontinuation of the widely used Harting/ITB/Rompa AMC connector, alternative options have been investigated. One option is the Yamaichi CN084 connector. A test board was built to characterize its performance. Since the connector no longer uses through-hole pins, a significant improvement in signal integrity was anticipated. However, measurements revealed that the eye diagrams were equivalent to, but not superior to those of the existing connector.
An analysis of the recommended footprint for the connector identified several areas for improvement. Based on this analysis, an improved test board was designed, which demonstrated a significant enhancement in signal integrity.

Zone 3 Connector:
The ERNI/TE ERmetZD Zone 3 connector is rated for "5 Gbps or higher" per lane, which limits its compatibility with modern protocols that often require higher link speeds, such as 8 Gbps, 10 Gbps, or 12.5 Gbps. Ensuring reliable link performance was a key challenge in the design of the DRTM-8SFP+ board. The goal was to implement an 8-channel SFP+ fan-out RTM with 10 Gbps links. This task was demanding, since signals needed routing over very long traces to the FPGA, especially on the AMC.
To overcome this limitation, we used an analog equalizer chip, fine-tuned its parameters, optimized the PCB layout and carefully adjusted the FPGA transceiver settings. These efforts resulted in clean, wide-open eye diagrams at the target speeds.

The AMC connector layout improvements, their impact on performance and the Zone 3 equalizer approach will be presented in this talk.

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