

The Impact of Contact Resistance on High Speed Digital Signal Transmission

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Abstract

Data rates and frequency content of digital signals are provided as background on how these parameters might effect the performance of electrical contacts in signal transmission applications. It is shown how a contact interface can be treated as a circuit element consisting of a contact resistance in parallel with an effective contact capacitance. The resistance and capacitance of typical multi-point contact interfaces are used to assess the impact on high frequency signal integrity. Moreover, the results reveal that the impedance of degraded contact interfaces can effect high frequency signals. However, it was concluded that the impact of contact degradation is primarily the result of short-term discontinuities. The latter was found to produce the largest effects through uncontrolled capacitive coupling. It is believed that further refinement of the techniques used in this study, will help quantify high frequency effects from the impedance of multi-point contact interfaces.