

1. PCI Engineering Change Notice – Minimum PCB Characteristic Impedance for Expansion Cards

TITLE:	Minimum PCB Characteristic Impedance for Expansion Cards
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AFFECTED DOCUMENT(S):	PCI Local Bus Specification, Revision 2.2, December 18, 1998
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1.1. Clarification

This ECN changes the minimum PCB characteristic impedance for expansion cards from 60 Ω to 51 Ω for the case in which the device input capacitance is less than or equal to 8 pF.

Since the trace length on expansion cards is short, the primary effect of the lower characteristic impedance is a lower effective capacitance of the line. The new 15% lower minimum characteristic impedance is allowed only in conjunction with a 20% lower maximum device input capacitance. The net effect of this change should be a slight decrease in the effective capacitance of the net, which slightly reduces propagation delay of the signal.

1.2. Benefits

- Revision 1.0 of the PCI-X Addendum to the PCI local Bus Specification uses the lower minimum characteristic impedance and lower maximum input capacitance. Lowering the minimum impedance for conventional PCI expansion cards makes it easier to build expansion cards that meet both conventional PCI and PCI-X specifications.
- Lowering the characteristic impedance reduces crosstalk between signals. Reduced crosstalk allows tighter line spacing and more densely routed boards. Lower characteristic impedance is preferred for high-speed systems today.

1.3. Specification Changes

Chapter 4 "Electrical Specification", Section 4.4.3.3 Impedance, page 152:

Current specification:

The unloaded characteristic impedance (Z_0) of the shared PCI signal traces on the expansion card shall be controlled to be in the 60 Ω -100 Ω range.
The trace velocity must be between 150 ps/inch and 190 ps/inch.

Change to:

The unloaded characteristic impedance (Z_0) of the shared PCI signal traces on the expansion card shall be controlled to be in the 60 Ω -100 Ω range if the device input pin capacitance (C_{in}) exceeds 8pF. If C_{in} is 8 pF or less, the range for Z_0 is 51 Ω -100 Ω . The trace velocity must be between 150 ps/inch and 190 ps/inch.