Comments on Adaptive Filtering for Ultra320 SCSI

Russ Brown
Quantum Corporation

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An adaptive filter provides compensation for variations in environment, such as operating temperature and voltage.

An adaptive filter provides compensation for variations in manufacturing process.

When used with a training pattern, an adaptive filter provides for an inherent closed loop to adjust signal quality for different cable plants and environmental conditions.

An adaptive filter provides for better margin than a system using a fixed filter at the receiver and precompensation at the transmitter over the range of allowable cable plant configurations.

There has been no disagreement that an adaptive filter will be required for Ultra640.
An adaptive filter is implemented using "internal chip design rules", instead of "5 volt tolerant I/O circuit design rules". Thus, the circuitry gets smaller with each succeeding CMOS process generation used to implement Ultra320.

I/O pad circuitry area remains nearly constant from generation to generation because of the high voltage transistor requirements.

Adaptive filter area is away from the pads, and adds no capacitance to the SCSI device capacitance.

Transmitter precomp adds area and capacitance to the I/O cell and necessarily adds junction and gate capacitance measurable at the SCSI connector.

Mandated transmit precomp at any significant percentage adds to the overhead of legacy requirements for future SCSI generations.

Transmit precomp using a "cutback" approach lowers signal amplitude, reducing tolerance to noise. Today's systems use 450 mV minimum amplitude; reducing to 310 mV has significant risks.
An adaptive filter could be easier to implement, since adaption allows for increased process tolerance. The "adaptive" portion of Quantum's adaptive filter design for Ultra320 is only about 10% of the total silicon area required by the filter. The adaptive filter's ability to compensate for process tolerance might even make its implementation smaller than a fixed filter. An adaptive filter allows use of existing drivers; a fixed filter at the receiver and and precompensation at the transmitter requires design changes to both drivers and receivers.