Data Rates and Loss vs. Distance -
Meritec’s Direct Attach 4X and 12X Cable Assemblies

Test 369e
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Samples Tested
Meritec’s direct-attach 4X cable assemblies: 24, 26, 28 and 30 awg.

Test Equipment
Tektronix CSA803C Digital Sampling Oscilloscope with SD24 TDR Sampling Heads
atSpeed’s Oculus™ software for S-parameter extraction from TDT measurements and
Eye Pattern simulations

Summary of Results
Because of Meritec’s low crosstalk direct-attach design, these assemblies can transport
serial data over long distances at Double and Quad data rates. The EPD criteria used
for this testing is based on InfiniBand™ Architecture Specification Volume 2, Release

Basically, without any crosstalk, the output Eye Height at 0.5 UI (unit interval) must be
greater than 316mv and the Jitter less than 0.25 UI when the cable is stimulated with a
1-volt Bit Stream. In the case of the InfiniBand™ specification, they require a CJTPAT
pattern. This test report is based on a PBRS of 2^7-1 which is slightly less stringent
then CJTPAT but representative of many real world applications.

With Near End Crosstalk from 3 neighbors on one side of the lane under test, the output
Eye Height at 0.5 UI must be greater than 196mv. 3 aggressors generate the crosstalk;
each stimulated by a 1.5-volt Bit Stream with pulse risetimes of 0.25UI (20-80%).

The first four plots that follow represent 4 different wire gauges: 30, 28, 26 and 24 awg,
unequalized and equalized assemblies and two Eye Heights, 316 and 196mv. The
InfiniBand™ standard makes the distinction between 316 mv and 196 mv to allow the
crosstalk to subtract 120 mv from the Eye Height. Because Meritec’s assemblies
exhibit very low crosstalk, if one ignores the 316 mv requirement without crosstalk,
much longer cables can be used and still comply with the final 196 mv Eye Height and
meet the 0.25 UI maximum Jitter with Crosstalk.

The fifth plot shows the Loss per Meter of Meritec’s 4X and 12X unequalized cable
assemblies for our three standard wire sizes. This chart is useful for those standards
that specify S21 Attenuation limits at a specific frequency and do not allow for passive
equalization within the cable assembly.
Unequalized Assemblies

Assemblies that comply with 196mv Eye opening with crosstalk.

Equalized Assemblies

Assemblies that comply with 196mv Eye opening with crosstalk.
Assemblies that comply with 316mv Eye opening without crosstalk.

Assemblies that comply with 316mv Eye opening without crosstalk.
Loss per Meter Chart
This graph shows the Loss per Meter of Meritec’s 4X and 12X cable assemblies for our four standard wire sizes. This chart is useful for those standards that specify S21 Attenuation limits at a specific frequency. To calculate the loss for a particular application, select the frequency of interest on the X-axis. Find the corresponding loss per meter on the Y-axis. Multiply the loss per meter times the desired cable length in meters. The result represents the total loss of the assembly at the frequency of interest.