This was the initial meeting to address the general subject of modeling for parallel scsi. The attendees were;

Name	Company	Email Address
Paul Aloisi	Unitrode	aloisi@unitrode.com
Larry Barnes	LSI Logic	larry.barnes@lsil.com
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Presentations

Termination model: Paul Aloisi described a model for an integrated terminator. This particular design has an output impedance that is flat out to 400MHz. Paul also pointed out that there is considerable difference between output impedance versus frequency for other terminator makers. Paul also reviewed a terminator model for a regulator and discrete resistor stacks (power termination).

Cable Model: Tariq Abou-Jeyab Adaptec described a Pspice model that he was developing. Tariq tried to build a lumped model using discrete components to model the lumps and discrete components to model the skin effect. The simulation results did not agree with measurements. The group decided that it is very difficult to model a cable using this method and tools that allow more flexibility in entering measured parameters and calculating loss due to skin effect are probably better suited for lossy cable simulation The modeling of

the skin effect is being examined by Larry Barnes through some elaborate schemes. The skin effect is currently one of the most difficult things to model accurately. It is difficult also to know how much of the measured loss comes from skin effect and how much comes from dielectric losses.

6. Output of the group.

The study group will produce two types of output, 1) reports to the scsi working group, 2) and a committee document containg the technical details. Also a site that will contain simulation models for complete system simulations.

7. SFF Backplane

Bill Ham noted that work was starting on a SFF backplane.

8. Component models.

8.1.1 Cable assemblies
These consist of the media, connectors, and a transition region from the connector terminaiton to the media.

8.1.2 Cable media
Much discussion centered around how to most accurately model the cable. Lossy transmission line models must be used. The following mesured parameters are needed to construct an accurate cable model. L(f), C(f), G(f), R(f) and potentially the scattering (s) parameters. The frequency range is from the fundamental of the datarate to 0.59/trise (20 to 80 percent number presented by Larry). The cable parameters are represented by matrices:

Rm,n(f) is the dc resistance and the skin effect resistance
Gm,n(f) is the dielectric loss.
Lm,n(f) is the mutual inductance and the self inductance
Cm,n(f) is the capacitance both coupling and to ground.

The size of the matrix depends on how many conductors are used in the coupling calculations. The two conductor model was worked out, but there was some disagreement as to how many conductors have to be considered for crosstalk. Larry Barnes took the action item to see what this number is, his first thought was the five closest pairs. When Larry does this calculation he will consider conductors that have a mutual inductance that is within 10% of the self inductance, anything less than this will be ignored.

Jie Fan agreed to present measured numbers for the next meeting that can be used in the simulation model. These numbers will include the frequency effects from 40MHz to 400MHz at 40MHz steps. Jie will provide the measurement methods and the measurements for AWG 30 cable.

Skew will be accounted for in the model by adjusting the cable length in the simulation to give the proper skew numbers between pairs. Only pair to pair skew will be considered, conductor to conductor skew will not. The other method for adding in skew would be to adjust the parametric numbers in the model, but this was decided against.

Verification of the simulation model with measured results should be done by the following:
1) Input step response with TDR measurements, this will give the impedance of the model.
2) Attenuation versus frequency.
3) Crosstalk.

There was some discussion on how to do a simulated TDR and Martin Ogbuokiri will give a presentation on this next time.

8.1.2 Connectors on cable assemblies

Were not discussed due to lack of time.

8.1.3 Transistion region

Not discussed due to lack of time.

8.2 PCB's

8.2.1 Host

There was some discussion as to how many connectors should be considered on the host board, the number agreed to is two wide connectors. Tariq agreed to do a host board model.

8.2.2 Target

Dean agreed to do a target board model.

8.2.3 Interconnect board

Not discussed due to lack of time.

8.3 Connectors

Do good connector models exist? Only models available are for mated connectors. Molex has connector models for the VHDCI and SCA-2.

8.4 Termination

See Paul Aloisi's presentation.

8.5 Transceivers

Question of how to model due to the proprietary nature of the designs.

The rest of the agenda was not covered due to lack of time. The next meeting will be July 29. A more complete document that will be updated after each meeting will be uploaded to the website, the document nubmer is 99-204r0.

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