IEEE 802.3ap
Signaling Ad Hoc

IEEE 802.3ap Task Force
17 Dec'04

intel.

Today's Agenda - Modified from 3 Dec'04

- Need to adhere to discussion time limits
- Remaining signaling spreadsheet parameter updates (1hr)
  - Additions/deletions to parameter list

- Define Remaining link elements (1hr)
  - TP4$\rightarrow$TP5 link element (25min)
    - AC coupling Cap properties
    - Trace properties
  - Package parasitics (25min)
    - S-parameters vs. RLC model

- Define Spreadsheet input parameters (1hr)
  - Tx params (15min)
  - Rx params (15min)
  - CDR params (15min)

… and hopefully we end 15 minutes early!

Signaling ad hoc tasks for Jan'05 mtg

Spreadsheet input deadlines to Signal Ad Hoc

Nov. 30 - Specific parameters for extension to spreadsheet

Dec. 10 - Specific values for all parameters in spreadsheet

Signaling ad hoc Conference Call Topics

Dec. 3 - Define specific parameter changes, TP4 - TP5 link details & packaging effects

Dec. 17 - Define specific simulation parameter values

Dec. 10 - Provide complete test case channel data - all data means through and crosstalk

Jan. 19 - Submit simulation results for entry into spreadsheet

Proposals Needed

- This process is contribution-driven.
  - Without contributions, there is not much to discuss
- Need to make progress on the remaining open work items
- We need specific proposals for simulate-able models for other elements in the link. Specifically:
  1. Transmitter output BW and Impedance model
  2. AC Coupling cap and TP5 link
  3. Receiver input BW and Impedance model

Channel Simulation Model

- Current model with TPs from the channel ad hoc

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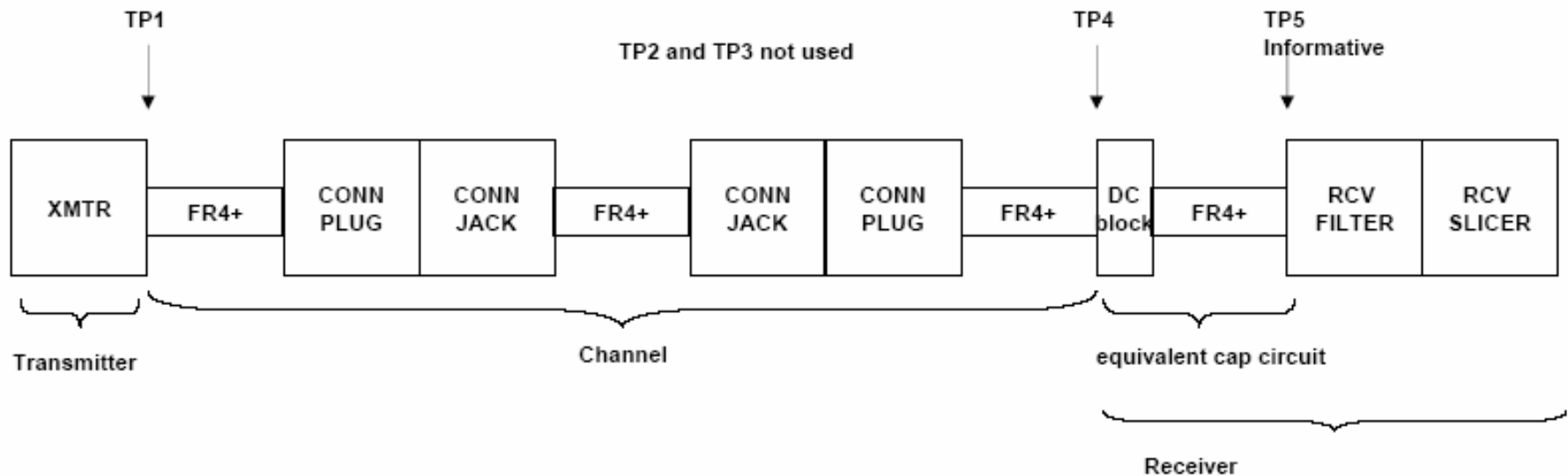
Signaling Spreadsheet Update

- Spreadsheet updated to version 4p1 from 3-Dec discussion
  - Distributed with mtg announcement
  - Will be posted to web-site ASAP

Signaling Spreadsheet Update - Changes

- **Source Data Parameters**
  - **Data Pattern**
    - Currently must report it, but not specified. Should we fix it?
    - Long PRBS sequences require long simulations. What patterns is minimum necessary : PRBS 7/9/15?
    - How many bits do we simulate: 100kb, 1Mb, 10Mb?
    - CID test pattern? How would we interpret the results?
  - Tx Jitter – add random and deterministic jitter?

- **Receiver Parameters**
  - Rx input jitter – These come from channel & Tx parameters. Can we delete them?
  - Input offsets
    - Much discussion on the reflector
    - Common data slicer and adaption threshold offsets?
    - How do we compare solutions with different input offsets?
  - Input noise
    - Environmental noise – can we agree on a number?
    - Random noise – use value from Oct-04 conf call ($4*365mV_{RMS} = 1.46mV_{RMS}$)
  - CDR Jitter – Random component sufficient?

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Signaling Spreadsheet Update - Changes

- Eye measurement
  - Voltage margin
    - Should be measured at predetermined placement in eye
    - Could be centre or other?
  - Timing margin
    - Should be measured at pre-determined levels relative to slicer thresholds
    - Could be ideal center?
  - Suggested to normalized the eye to the Tx amplitude for level comparison – Needed? How do we limit this?
- Power and complexity Comparisons
  - Equalizer taps
    - Do we include settled values?
  - Power reporting
    - Requested to report best/worst/typical WRT the channels
    - Do we need to separate Tx & Rx power?

- **Other parameters required for accurate simulation comparisons?**

Signaling Spreadsheet Update – Straw Polls

1. Should we fix a required data pattern?
   - Yes
   - No
2. What forward channel data pattern should we simulate with as a common data pattern?
   - PRBS7
   - PRBS9
   - PRBS15
   - other
3. Do we want to use the same data pattern for Crosstalk patterns
   - Yes
   - No
4. Should we add RJ, DJ and DCD parameters for the Tx output?
   - Yes
   - No
5. Should we require a minimum input-referred Rx offset ?
   - Yes
   - No
6. Should we require input-referred environmental noise?
   - Yes
   - No
7. **Should we require a minimum amount of CDR jitter ?**
   - Yes
   - No
8. **Should we fix the voltage margin sampling threshold at the horizontal center of the eye ?**
   - Yes
   - No

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Signaling Spreadsheet Update – Straw Polls

9. Should we fix the timing margin sampling threshold at the vertical center of the eye ?
   - Yes
   - No

10. Should we normalize overall path gain so the Rx eye is measured relative to the Tx level ?
    - Yes
    - No

11. Do we report settled equalizer tap values ?
    - Yes
    - No

12. Do we report best/typical/and worst power for all simulated channels ?
    - Yes
    - No

13. Do we report settled equalizer tap values ?
    - Yes
    - No

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Link Elements

- TP4→TP5 link
  - DC blocking cap plus indeterminate link
  - Only proposal so far has been for a modeled real cap
  - Simpler possibility is to use a ideal cap model
  - Is there real loss of precision for our purposes here?
- Package model
  - No package models submitted for discussion to date
  - Need a solution here. Either:
    - We ignore the effects of packaging
    - We need package model proposals

Link Elements – Straw polls

- **TP4-TP5 link straw polls**
  1. TP4-TP5 link model. Should we use:
     - s-parameter model
     - Simple cap model
  2. What capacitance value should be used?
     - 100nF (f_0=15.9kHz)
     - 1nF (f_0=1.59MHz)
     - 10pF (f_0=159MHz)
- **Package model straw polls**
  - We need some proposals here!

Spreadsheet Parameter Values

- What values need to be set
  - Tx Jitter
    - Suggest we use simple values – ex. 0.05/0.1/0.25 UI$_{p-p}$
    - Parameters needed:
      - Tx Dj
      - Tx DCD
      - Tx Rx
  - Rx Parameters
    - Environmental noise – This is a true approximation. Should approach it as such & use approx values 10mV, 25mV, etc.
    - CDR Jitter parameters:
      - CDR Rj
      - CDR Dj

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Spreadsheet Parameter Values – Straw Polls

1. **What values should we use for Tx Rj?**
   - $0.005UI_{RMS}$
   - $0.01UI_{RMS}$
   - $0.025UI_{RMS}$
   - Other
2. **What value should we use for Tx Dj?**
   - $0.01UI_{P-P}$
   - $0.025UI_{P-P}$
   - $0.05UI_{P-P}$
   - Other
3. **What values should we use for Tx DCD?**
   - $0.01UI_{P-P}$
   - $0.025UI_{P-P}$
   - $0.05UI_{P-P}$
   - Other
4. **What value should we use for Rx input environmental noise?**
   - $5mV_{RMS}$
   - $10mV_{RMS}$
   - $25mV_{RMS}$
   - Other
5. **What value should we use for CDR Rj?**
   - $0.005UI_{RMS}$
   - $0.01UI_{RMS}$
   - $0.025UI_{RMS}$
   - Other
6. **What value should we use for CDR Dj?**
   - $0.01UI_{P-P}$
   - $0.025UI_{P-P}$
   - $0.05UI_{P-P}$
   - Other

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