# IEEE 802.3ap
# Signaling Ad Hoc

IEEE 802.3ap Task Force

3 Dec'04

intel

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**IEEE 802.3ap Task Force - 2-Dec-04**

# Today's Agenda

- Review Signaling spreadsheet
- Signaling spreadsheet updates and discussions (1hr)
  - Additions/deletions to parameter list

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

- Outcomes for today:
  - Close signaling spreadsheet parameter changes
  - Decide on TP4-TP5 link elements
  - Decide on Tx & Rx package model

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# Signaling ad hoc tasks for Jan'05 mtg

- From TF discussion in Nov 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

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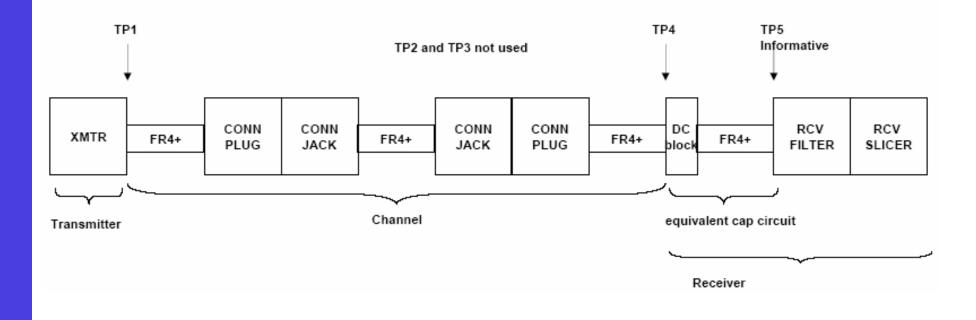IEEE 802.3ap Task Force - 2-Dec-04

# 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

From 22 Oct'04 Call

# Channel Simulation Model

- Current model with TPs from the channel ad hoc

TP1            TP2 and TP3 not used          TP4     TP5 Informative

| XMTR | FR4+ | CONN PLUG | CONN JACK | FR4+ | CONN JACK | CONN PLUG | FR4+ | DC block | FR4+ | RCV FILTER | RCV SLICER |

Transmitter         Channel         equivalent cap circuit

Receiver

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# Signaling Spreadsheet Update

- We need to close the parameter <u>list</u>
  - Not the parameter values – that's for the next mtg
- Focus on necessary elements for the signaling comparison tasks
  - We are <u>not</u> designing the link – we <u>are</u> comparing signaling solutions
  - For refining the solution this spreadsheet could have further uses – but not today
- Spreadsheet changes for discussion from v3.2 are shown in <span style="color:red">red text</span>
- Spreadsheet discussion-needed items from v3.2 are shown in <span style="color:purple">purple text</span>
- Changes are from recent reflector discussions & TF mtg notes
- A lot of reflector discussion was around simulations performed themselves rather than setup parameters.
  - We need proposals to resolve these

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# 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?

# 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?

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# Signaling Spreadsheet Update – Straw Polls

1. Should we fix a required data pattern?
   - Yes
   - No
2. What data pattern will we simulate <u>at a minimum</u>?
   - PRBS7
   - PRBS9
   - PRBS15
   - other
3. Should we add RJ and DJ parameters for the Tx output?
   - Yes
   - No
4. Should we require a minimum input-referred Rx offset ?
   - Yes
   - No
5. Should we require input-referred environmental noise?
   - Yes
   - No
6. Should we require a minimum amount of CDR jitter ?
   - Yes
   - No
7. 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

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

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

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

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

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

# 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!

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