Clock Coupling in the HR Standard

By Jan Boer

Lucent Technologies

and

Mark Webster

Harris Semiconductor

The Problem

- Harris Semiconductor and Lucent Technologies independently analyzed timing recovery requirements and algorithms
- Conclusion:
  - if the LO oscillator and the sampling clock at transmit are not coupled the receiver will suffer severe performance degradation compared to a situation where the clocks are coupled

Timing recovery #1

- Analyze zero crossings at the incomming CCK signal.
  - Zero crossings very noisy, especially in a real environment
  - Timing tracking becomes unreliable at about 50 ns delayspread
- relatively simple circuit, low performance

Timing recovery #2

- Early late detection after Channel Matched Filter..
  - CMF has to run at twice the chiprate, extra circuitry to calculate the interchip values
  - Signal after CMF/ Walshcorrelation still very noisy; effect of channel estimation on performance
  - Timing tracking reliable up to 200-250 ns delayspread.

Timing recovery with coupled clocks

- Estimation of phase error (easy on QPSK/CCK)
- Timing tracking can be easily calculated from the phase error and clock can be adjusted.
- Simple circuitry; no performance limitations because of the sample timing

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Proposal

- Normally (just because of the bill of materials) clocks are coupled. In some applications the clocks have to be uncoupled.
- Notify the receiver through the service field that the clocks are coupled, such that receiver can make use of this for optimal performance.

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