

SAS-2 Channel StatEye Results 07–253r0

Kevin Witt
5-15-07

Initial SAS-2 Channel StatEye Results

➤ Goal

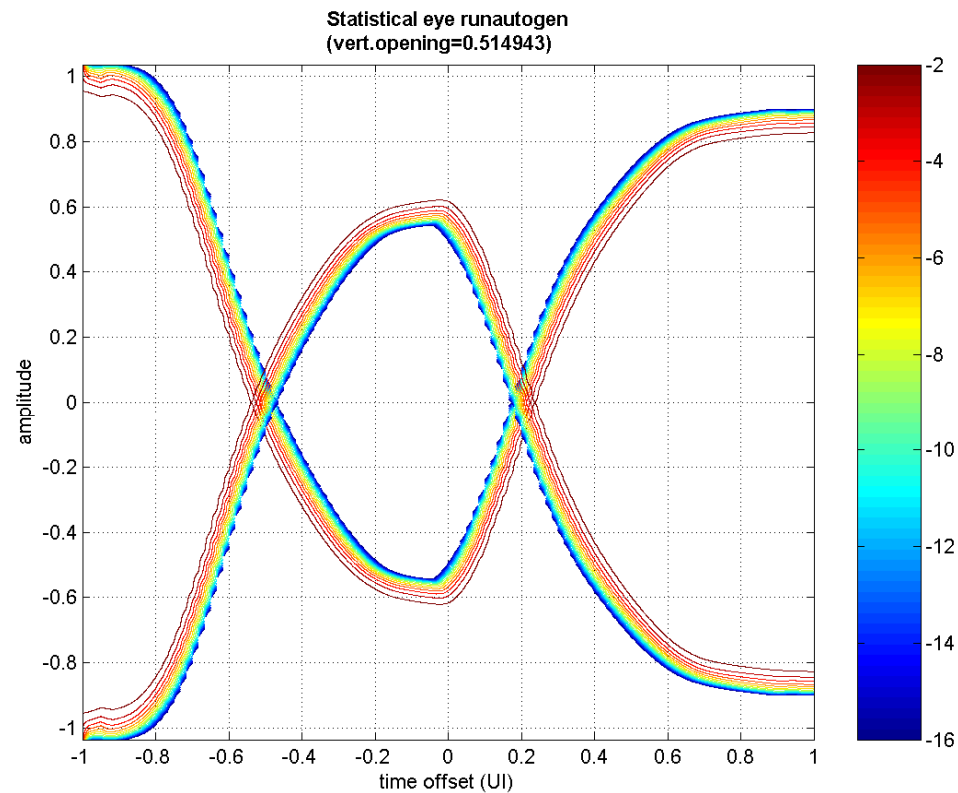
- ❖ Try using the latest StatEye program to determine inner-eye opening specification for SAS-2 reference receiver.

➤ Overview

- ❖ Quick Look at StatEye version 4.2.2.34954
- ❖ Used Harvey's Test Case as a starting Point
- ❖ SAS-2 Channels Investigated
 - Standard 1, 6 and 10m MiniSAS S-Parameter files
 - Reference Channel S-parameter file
 - Mike's Fast 10m File
 - HP25 S-Parameter files
- ❖ Observations

Baseline Run

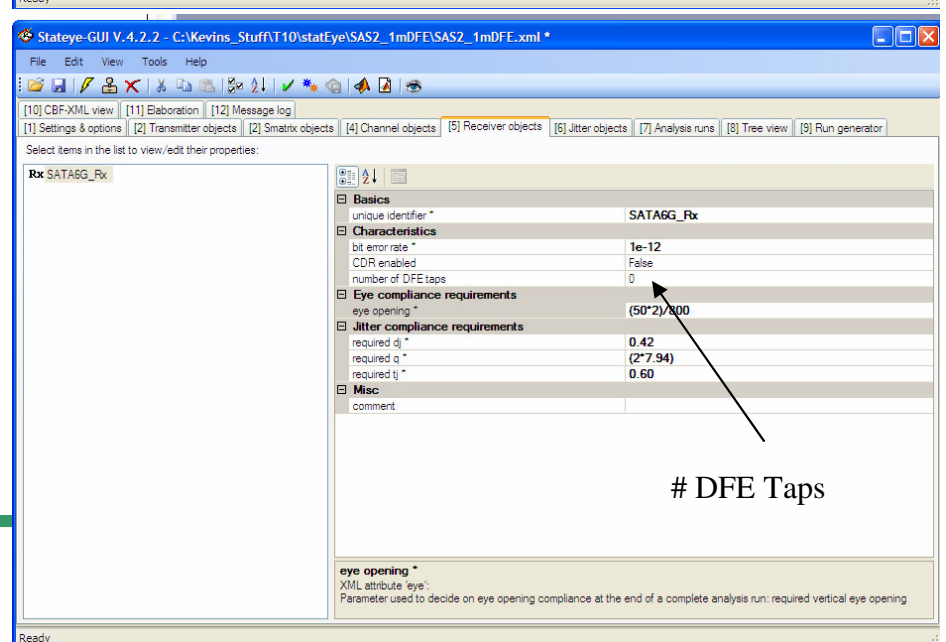
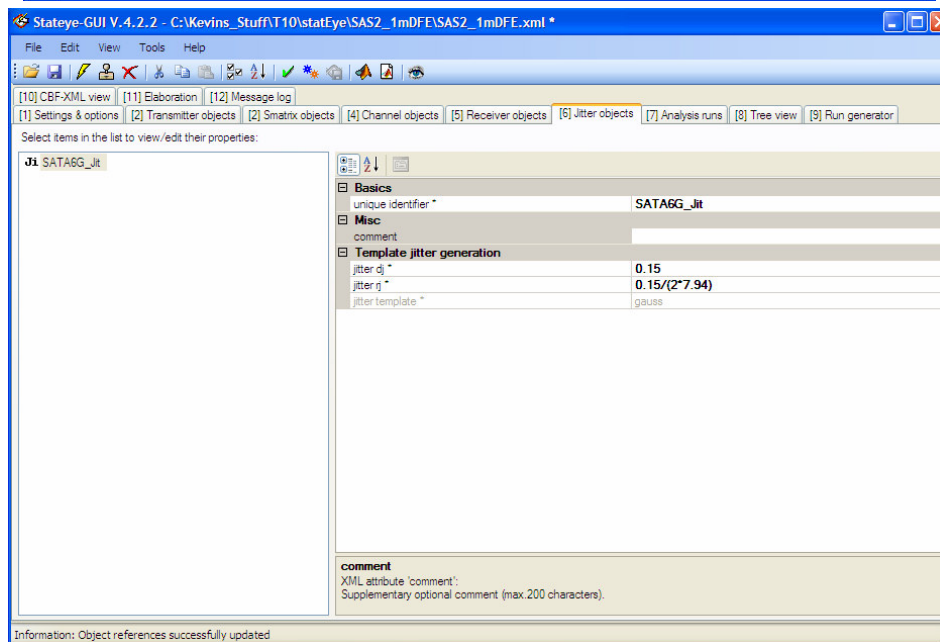
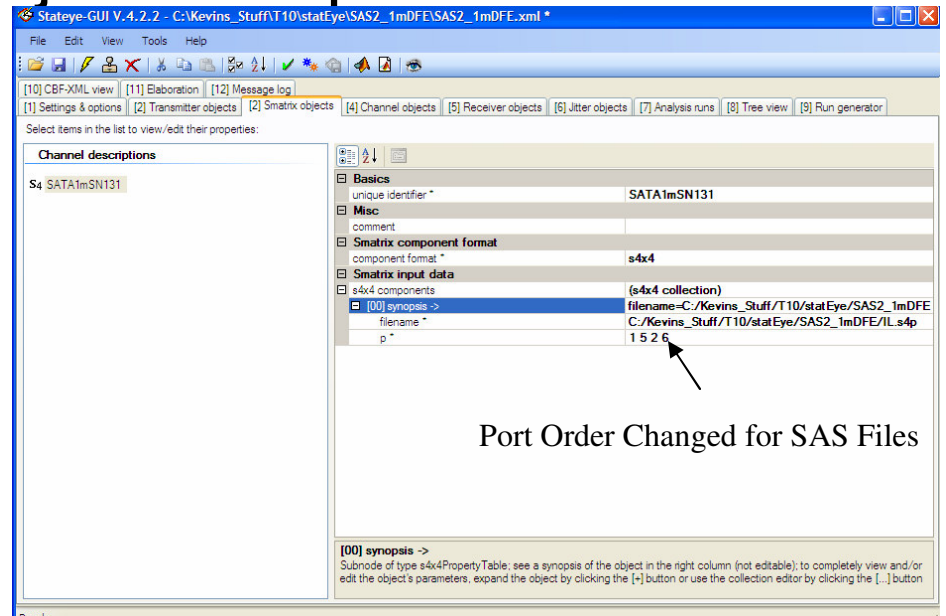
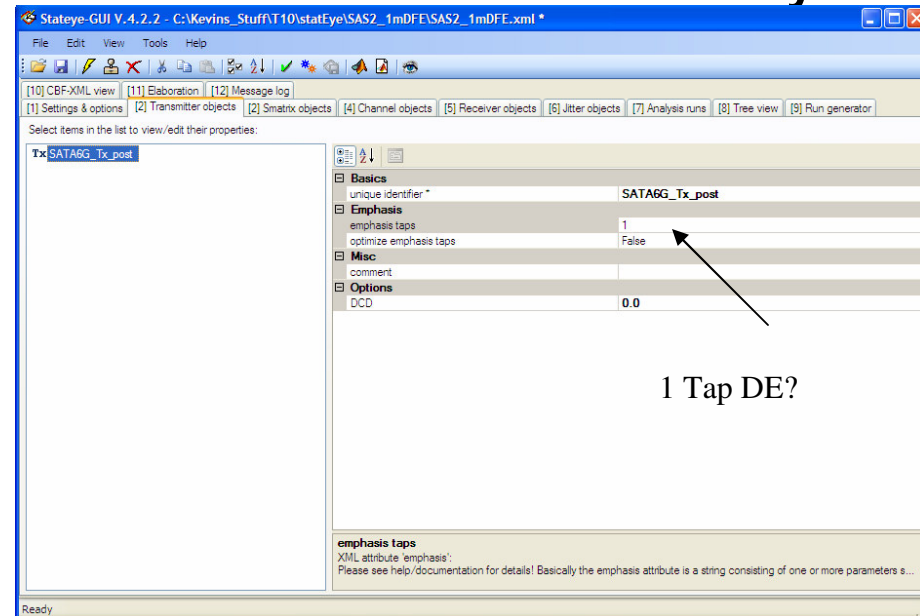
- Install and Run (This is what I get)



Simulation Parameters

- Transmitter
 - ❖ 1 tap Emphasis, Optimization = false
 - ❖ DCD = 0
 - ❖ Swing ??
 - ❖ De-Emphasis ??
- Channel
 - ❖ Insertion loss only
 - ❖ No Cross-talk
 - ❖ No package or ref Tx/Rx S-parameters
- Jitter Object
 - ❖ DJ = 0.15 UI
 - ❖ RJ = 0.15/(2*7.94) UI
- Receiver
 - ❖ Variable # taps (0, 2, 5...)
 - ❖ CRU mode disabled

StatEye Object Setup



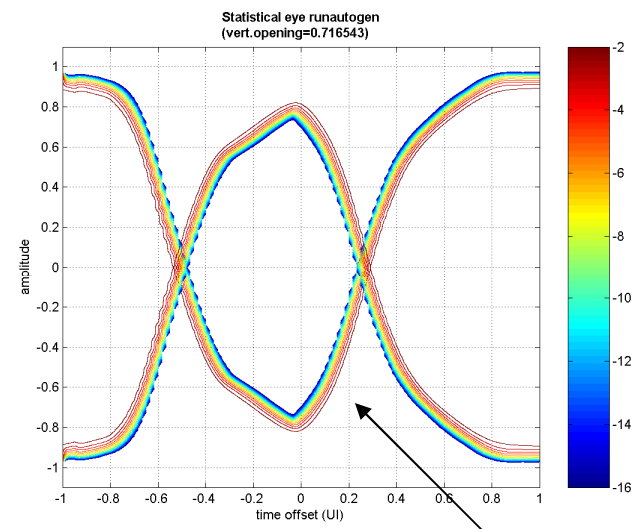
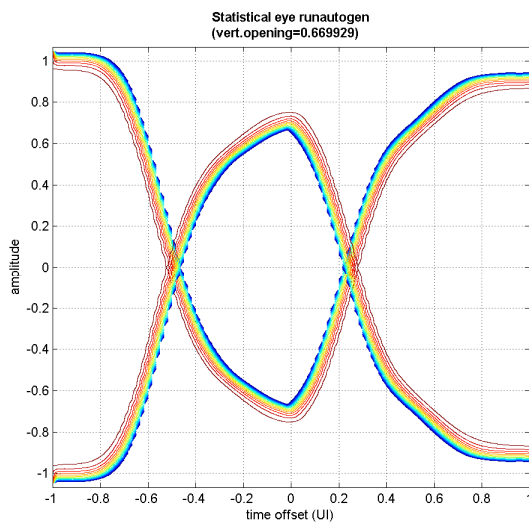
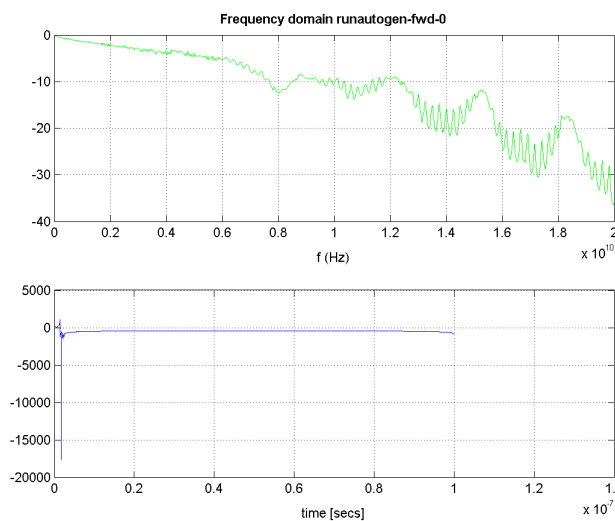
1m MiniSAS

- Easy Channel
- Port order (1526) for T10 S-parameter file format

S-Parameter

1-tap DE, 0-tap DFE

1-tap DE, 5-tap DFE



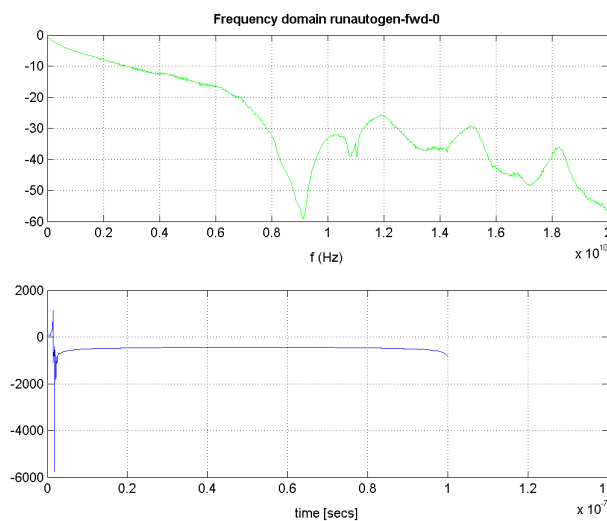
Not Much Change?

SAS/SATA PRODUCTS

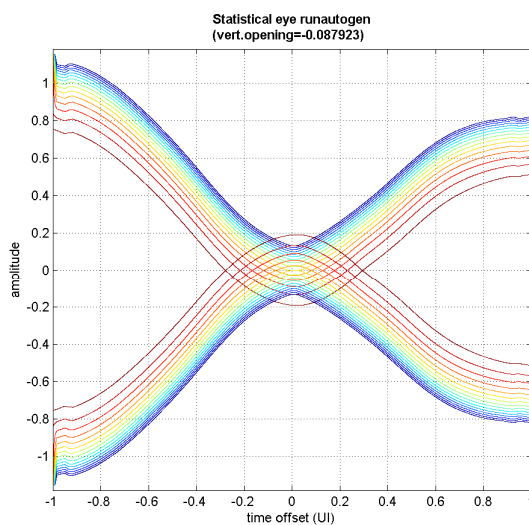
6m MiniSAS

➤ Channel close to SAS-1 TCTF

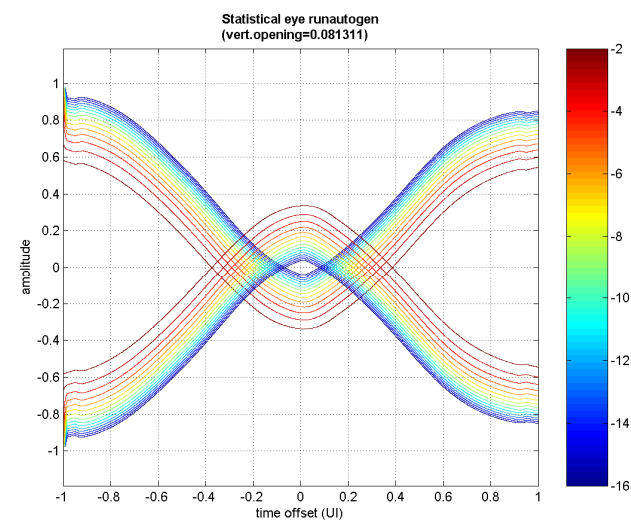
S-Parameter



1-tap DE, 0-tap DFE

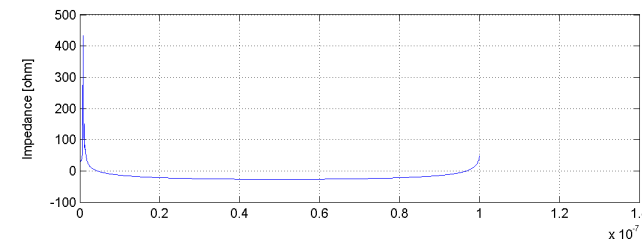
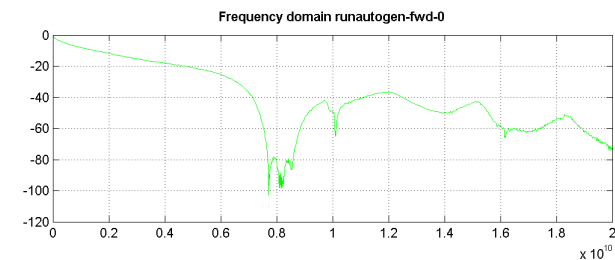


1-tap DE, 5-tap DFE

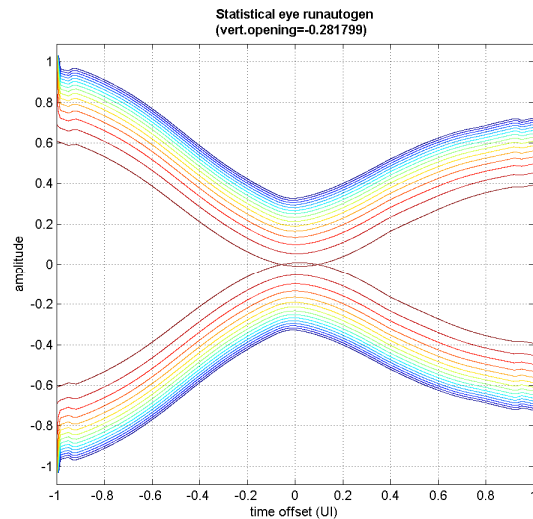


10m MiniSAS

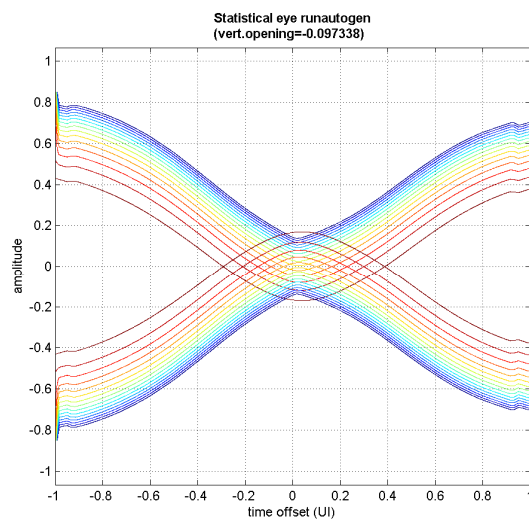
- 10 MHz step size S-Parameter file
- Note: 1MHz step size S-parameter files causes runtime errors



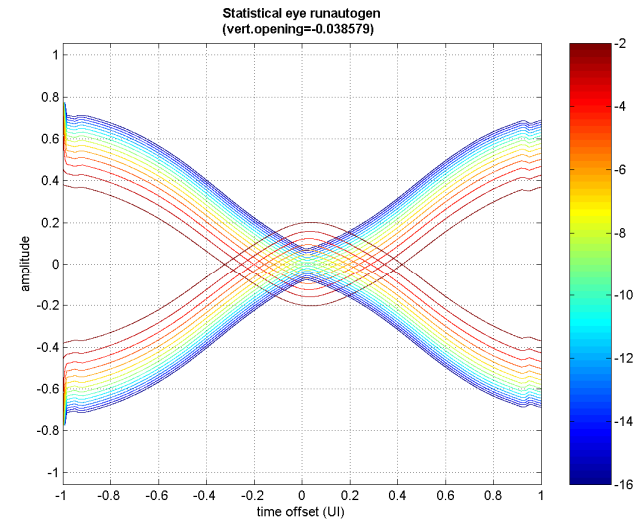
1-tap DE, 0-tap DFE



1-tap DE, 2-tap DFE



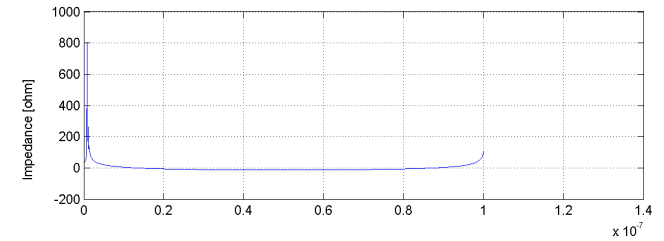
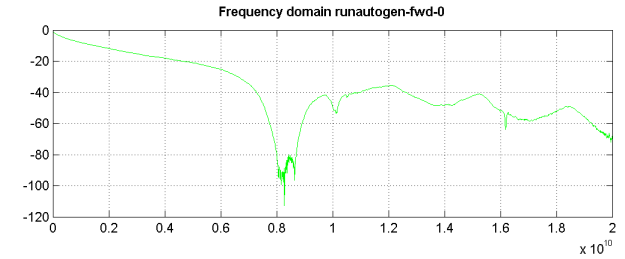
1-tap DE, 5-tap DFE



SAS/SATA PRODUCTS

10m MiniSAS

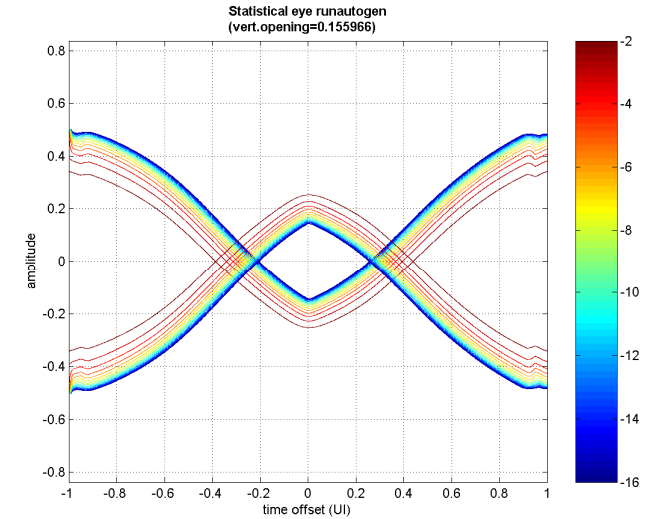
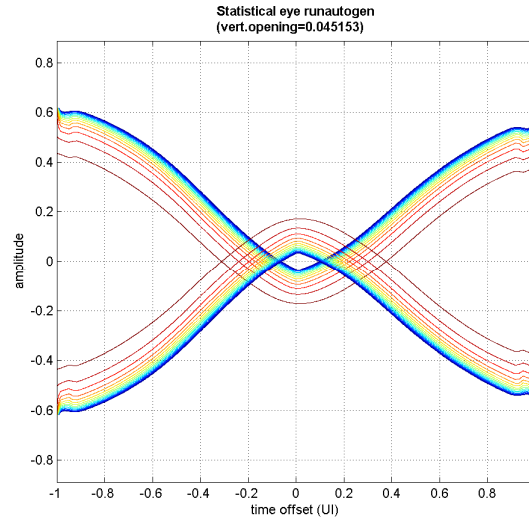
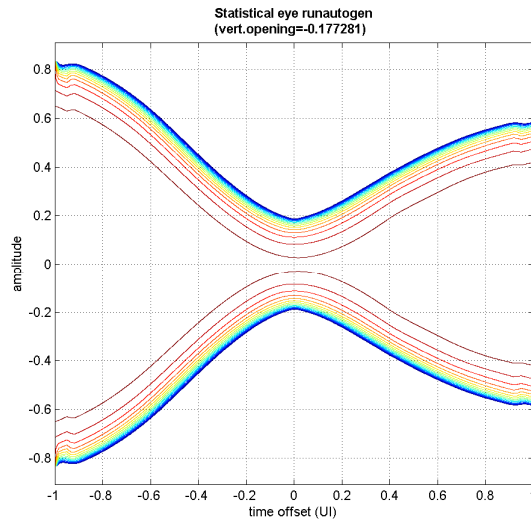
- Reduced group delay version (T10-07-252r0)



1-tap DE, 0-tap DFE

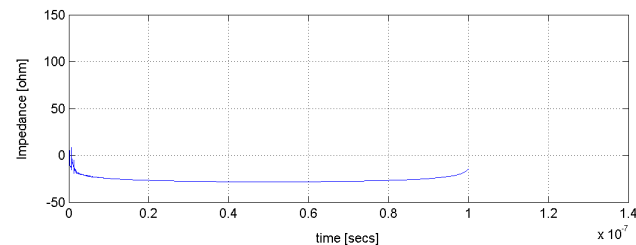
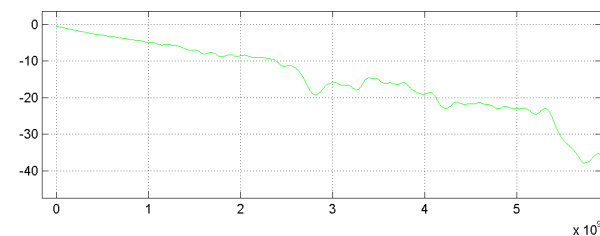
1-tap DE, 2-tap DFE

1-tap DE, 5-tap DFE



HP25

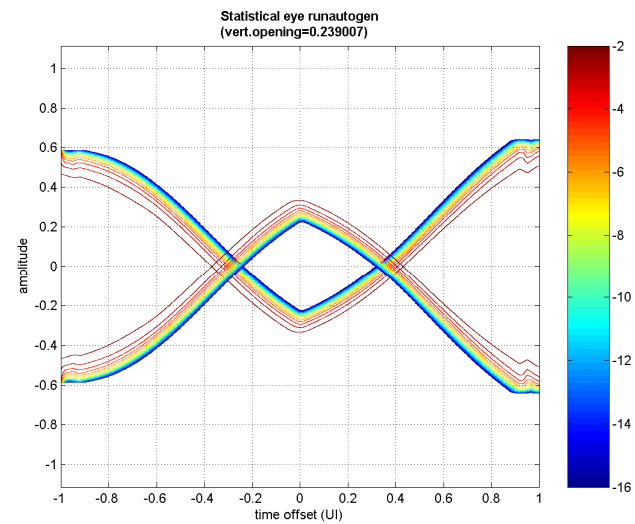
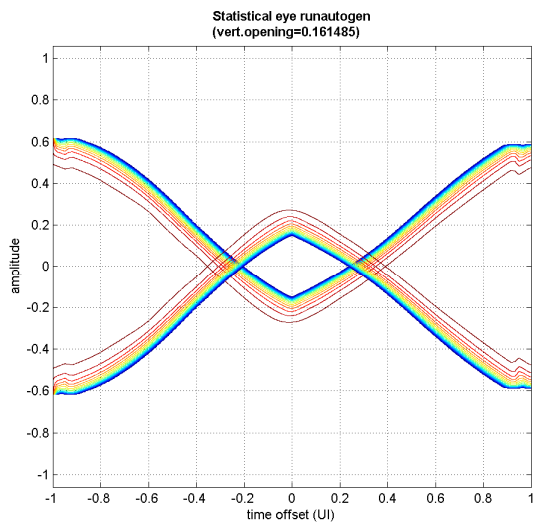
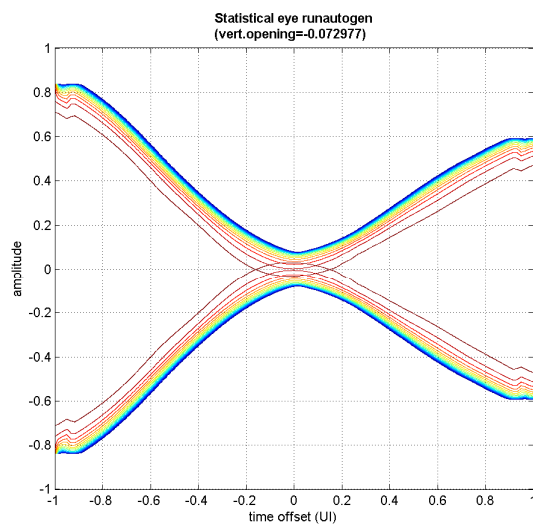
- 10 MHz step size S-Parameter file



1-tap DE, 0-tap DFE

1-tap DE, 2-tap DFE

1-tap DE, 5-tap DFE



SAS/SATA PRODUCTS

Observations

- Transmitter Object
 - ❖ 1 tap Emphasis w/ out Optimization Used.
 - Selecting 0 and 2 taps or enabling optimization causes compiler to fail,
 - ❖ How do we adjust swing to 800mV? What is the assumed launch amplitude?
 - ❖ Need to Manually set De-Emphasis to 3dB, if its not optimized what is it set to?
- Channel Model (S-Parameter File)
 - ❖ Reference Channel (10M MiniSAS) 1 MHz step size to 20GHz causes MatLab DLL to crash.
 - Error forwarded to Harvey
 - ❖ 10MHz 10m step size MiniSAS runs quickly but results are suspect.
 - ❖ Mike's reduced group delay file looks more realistic.
 - ❖ Crosstalk,
 - If enabled what is the aggressors amplitude.
 - How many aggressors?
 - What is the phase relationship?
- Receiver Object
 - ❖ DFE does not seem to open the eye much in the 1m MiniSAS case.
 - ❖ Not sure what the CRU button does.
 - ❖ Trend is correct.
- Need to understand the program more before any conclusions can be drawn.