Stanford Research Systems

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SR620 Error Terms

The systematic offsets in the SR620 can be "gauged out" if you provide reference signals with a known timing relationship and make a measurement with the SR620. The difference between the measurement and known timing relationship should remain constant for a well warmed-up instrument in a benign environment over an extended period of time. The additional +/-0.5ns error budget is, in part, to account for temperature changes from the calibration temperature.

There is a fine structure to the systematic errors with an 11.11ns period as shown on page 24 of the manual. As shown, this fine structure has peak-to-peak amplitude of about 30ps.

The front-end input followers do limit the rise-time to about 1.2ns, or about 300MHz. Your 50ps inputs will be slowed accordingly, which will lead to an offset which depends on the input threshold setting.

For inputs which are randomly phased with respect to the SR620's 10MHz timebase, there is a random error (jitter) of about 30ps (rms). The random error drops to about 6ps (rms) when the inputs are stationary with respect to the 10MHz timebase. (For example, if the events are triggered by the front panel reference output.)

It is worthwhile to run the auto-cal procedure (after the instrument has been on for at least an hour) in order to reduce offsets and noise in the measurements. (See bottom of page 17 in the operation manual for details.)