Application Note:

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Converting between RMS and Peak-to-Peak Jitter at a Specified BER

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Converting between RMS and Peak-to-Peak Jitter at a Specified BER

1 Introduction

There are several ways to quantitatively state the amount of random jitter within a system. The following discussion addresses the differences between two conventions. The first method is to give a standard deviation of the jitter distribution (or equivalently t 1_1 ȷ ejat eo c metdy

range that contains the jitter, for example, 99.99999% of the time. This means that 0.00001% of the time the jitter will be outside of our peak-to-peak range. Calculating peak-to-peak jitter is important for jitter budget analysis. It is assumed that any samples that fall outside the peak-to-peak range will cause errors. Therefore, if a BER target of 10^{-12} is selected, it is necessary to select a range that will contain the jitter all but 0.0000000001% of the time.

2.1 Peak-to-Peak Jitter and Oscilloscope Measurements

When using an oscilloscope in histogram mode to measure random jitter, usually the measured peak-to-peak jitter is of little practical value. Most oscilloscopes generate the peak-to-peak value by simply finding the time difference between the two furthest points captured in the histogram. Because