

The eye diagram

SPG technical staff

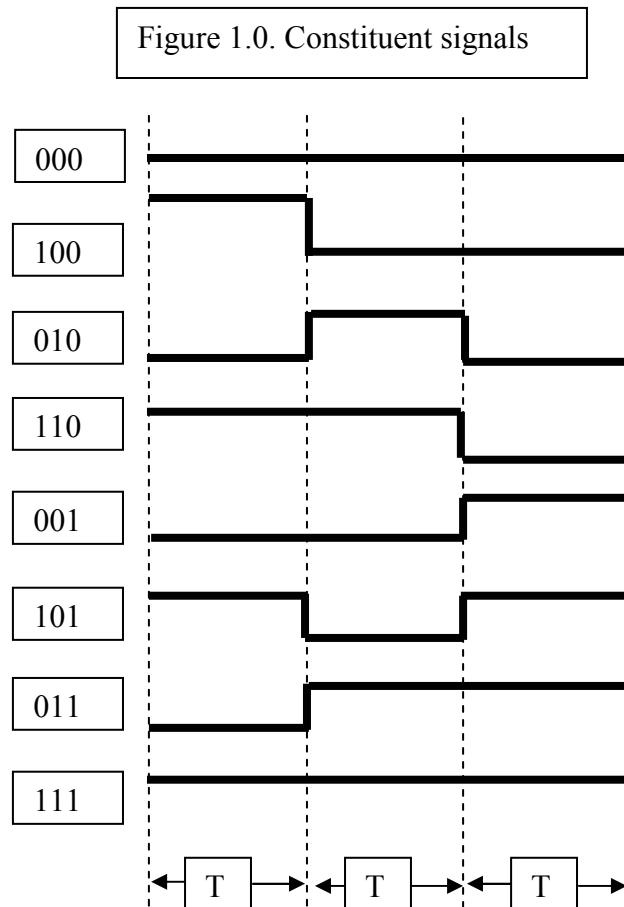
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1.0 Introduction:

The eye diagram is a valuable tool in the design and development of digital communication systems and can be used to analyze, evaluate, diagnose and fix errors. This brief article explores the technique about its construction, simulation and interpretation. The article is a composition of information from various sources. It is hoped that the tutorial nature of the document will be used as a source for both practicing engineers as well as newcomers to the field.

2.0 Construction of the eye diagram:

Refer to the figure below. It shows the basic sequences to be used to construct an eye diagram whether on a laboratory instrument or in simulation.



T = Data time

Now let the signals be overlaid on each other continuously within the $3T$ time. Then the overlaid signal will appear as:

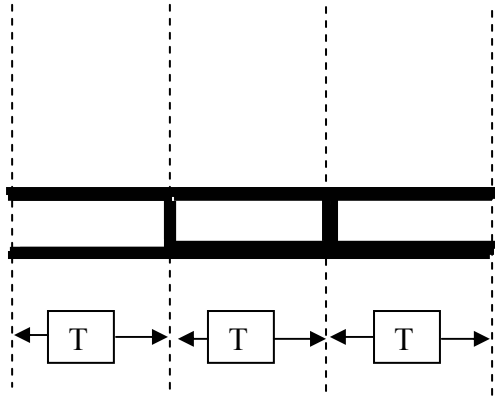


Figure 2.0. An eye digram

i.e. an eye diagram!

This is an idealized waveform. An actual eye diagram will be more likely to look like:

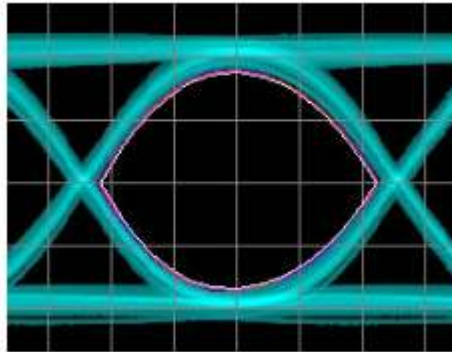


Figure 3.0. A more realistic eye

or even like figure 4.0.

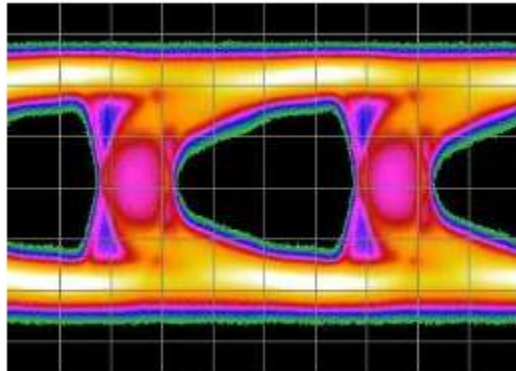


Figure 4.0. Lots of noise of every kind!

So what kind of information does the eye convey?

Figure 5.0 shows graphically the basic information at a glance.

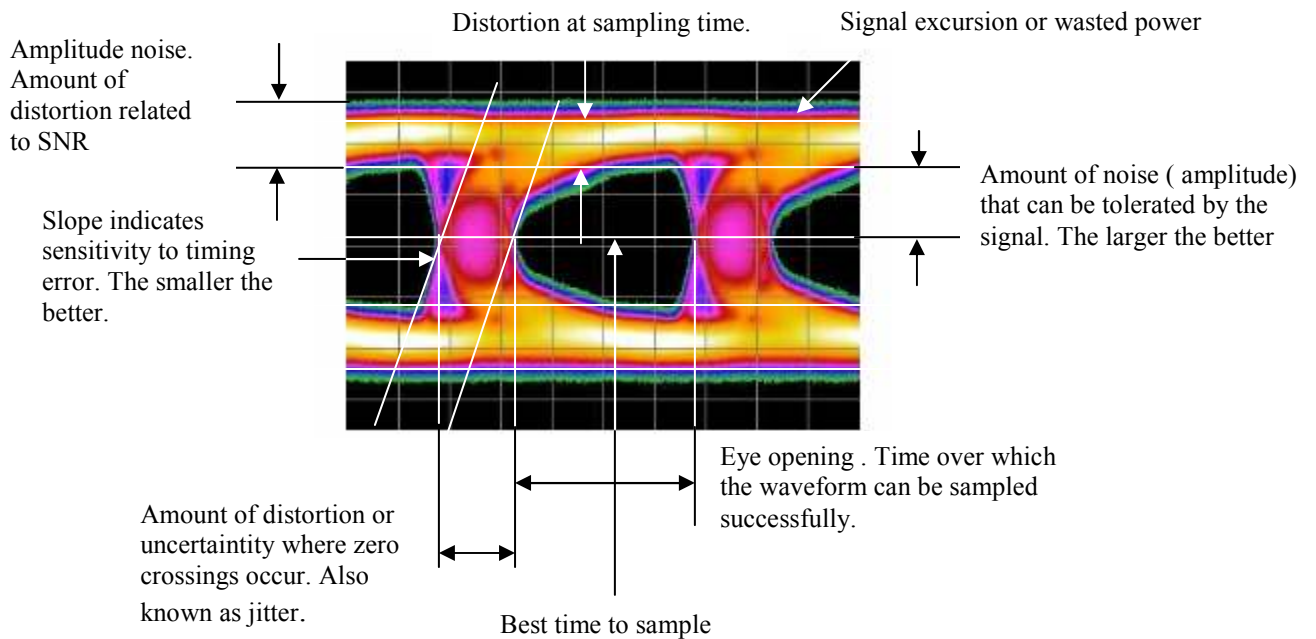


Figure 5.0 Interpretations