

## DESIGN NOTES

### Online Archives of Past Articles in *High Frequency Electronics*

Presently, all publishers of magazines, newsletters, books—actually, anything printed—pay close attention to trends and attitudes about Internet-based information. The majority of our readers seem to prefer a printed magazine, although our Online Edition is gradually growing in popularity.

However, the highest online activity for us is continued growth in the number of downloads from our Archives of past articles. In the month of March this year, we had record activity with more than 25,000 visits to the web site. More than 15,000 of those visits were to the Archives. Our Archives have always been popular, and we interpret the increased traffic as simply part of the overall growth in use of Internet as a reference resource.

It also confirms our decision when this magazine was founded nine years ago to present all content online and provide an archive of all past articles. In the near future, you may notice some changes in the way our web site is organized, but there will be no change in our commitment to publish our magazine both in print and online.

### A Review of the Most Popular Archive Download in March 2011

In March, 1,076 users downloaded the tutorial article, “Analyzing Signals Using the Eye Diagram,” from the November 2005 issue. This tutorial provides a first introduction to the eye diagram for engineers new to digital communications. Here are some excerpts from the first part of that article:

“The eye diagram is an oscilloscope display of a digital signal, repetitively sampled to get a good representation of its behavior. In a radio system, the point of measurement may be prior to the modulator in a transmitter, or following the demodulator in a receiver, depending on which portion of the system requires examination. The eye diagram can also be used to examine signal integrity in a purely digital system—such as fiber optic transmission, network cables or on a circuit board. Figure 1 shows a simple eye diagram that is undistorted, and another that includes noise and timing errors.

“The transmission of digital signals by radio requires modulation of the RF signal by a train of digital pulses. At its simplest, the data will be a single sequence of logical zeros and ones that are either referenced to zero volts (RZ, or return-to-zero) or with no voltage reference (NRZ, or non-return-to-zero). NRZ

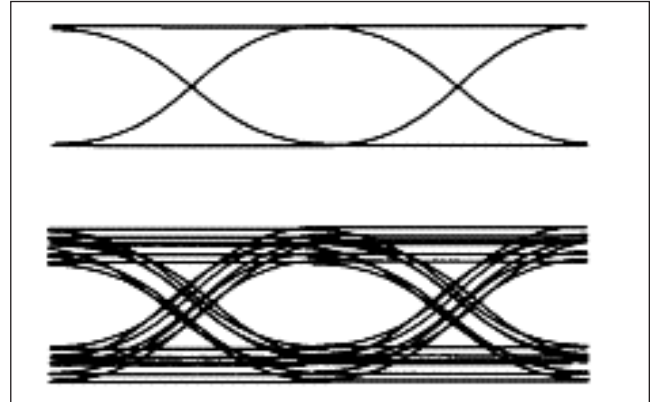


Figure 1 from the Nov. 2005 tutorial: At top is an undistorted eye diagram of a band-limited digital signal. The bottom eye pattern includes amplitude (noise) and phase (timing) errors. The various transition points can provide insight into the nature of the impairments.

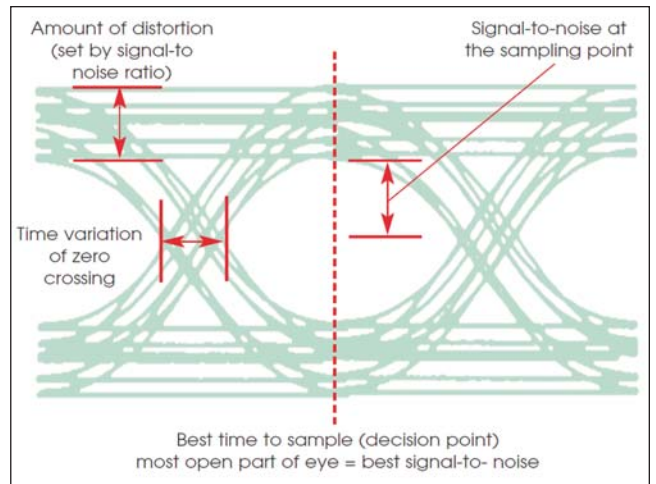


Figure 3 from the article: Basic information contained in the eye diagram. The most important are size of the eye opening (signal-to-noise during sampling), plus the magnitude of the amplitude and timing errors.

data signals are most common, and are the basis for the illustrations in this tutorial.”

The article continues with further notes on the information contained in the eye diagram (Fig. 3), along with discussion of jitter and error potential versus data rate.

Of course, if you are interested, we encourage you to visit the Archives at [www.highfrequencyelectronics.com](http://www.highfrequencyelectronics.com) and download the entire article!