9600-Baud Equalization

Introduction

The purpose of this document is to provide simple basic information on the equalization of a 9600-Baud sinusoidal waveform when referenced against the internal receive reference clock of a Terminal Node Controller (TNC).

Equalization

Equalization can be described as a condition where the peak and zero crossings of two sinusoidal waveforms (referenced to the horizontal x-axis, which represents time), are equal (in synchronization) to the peak and zero crossings of a reference clock's square waveform.

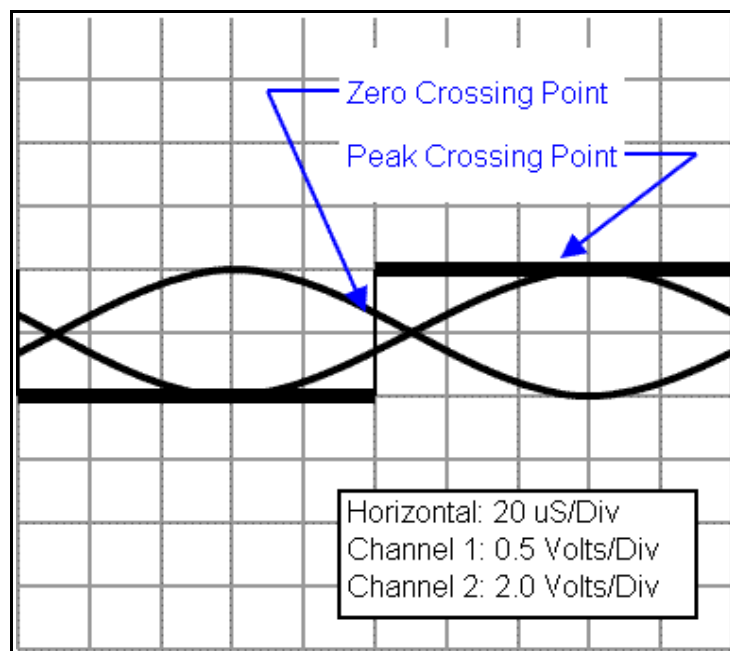Figures 1 and 2 illustrate non-equalized and equalized signal waveforms.

Figure-1: Non-Equalized Signal Waveform

The non-equalized signal illustrated in figure-1 shows the received signal waveform being out phase with the square-wave reference clock signal. As a result, a full bit period (the maximum width of the eye) is not being realized before the clock signal crosses the zero axis.
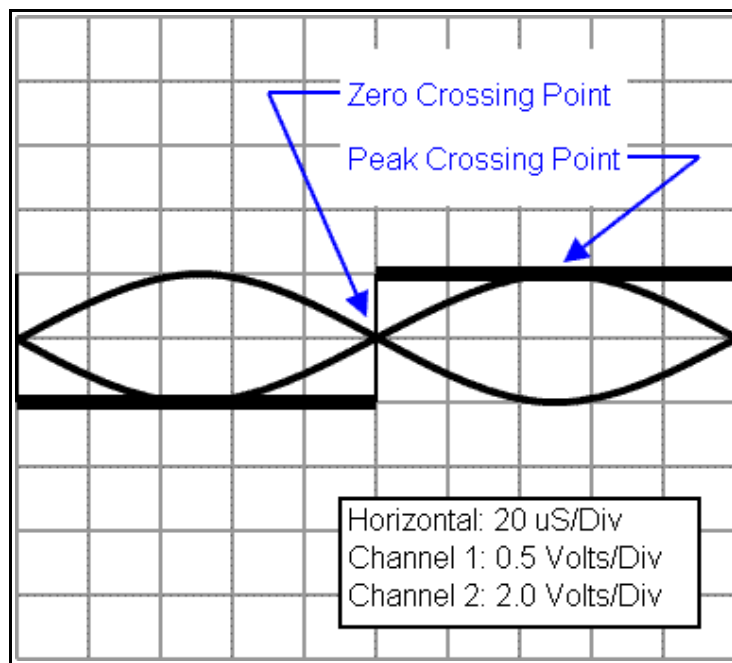
By D. Warner, W7SZS
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Figure-2: Equalized Signal Waveform

The equalized signal illustrated in figure-2 shows the received signal waveform being in phase with the square-wave reference clock signal. As a result a full bit period (the maximum width of the eye) is being realized.

A sharp eye pattern that is properly equalized will provide the best detection results for data decoding. Conversely, an eye pattern that displays jitter, is malformed, or shows indications of noise will be difficult to decode. When the received eye pattern resembles the transmitted eye in all respects and quality, then the Bit Error Rate (BERT) will be significantly reduced.

By D. Warner, W7SZS
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