TLK10031/TLK10034-TLK10232 Adaptive Equalizer Info (Preliminary)

ABSTRACT

All receive channels in this family incorporate an adaptive equalizer, which can compensate for channel insertion loss by attenuating the low frequency components with respect to the high frequency components of the signal, thereby reducing inter-symbol interference.

1 Overview

Figure 1 shows the response of the equalizer, which can be expressed in terms of the amount of low frequency gain e27 and the frequency up to which this gain is applied (i.e. the frequency of the 'zero') e28 . Above the zero frequency, the gain increases at 6dB/octave until it reaches the high frequency gain. These parameters are detailed in table 8.29.

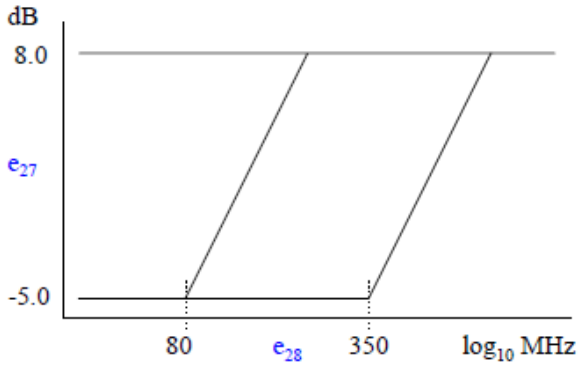

Figure 1. Equalizer Frequency Response.

2 Equalizer Settings

The equalizer can be configured via LS_EQ[3:0] (RXG) of the register LS_SERDES_CONTROL_3[11:8]. Table xx summarizes the options, which are:

- *No adaptive equalization*. The equalizer provides a flat response at the maximum gain. This setting may be appropriate if jitter at the receiver occurs predominantly as a result of crosstalk rather than frequency dependent loss.

- *Fully adaptive equalization*. Both the low frequency gain and zero position of the equalizer are determined algorithmically by analyzing the data patterns and transition positions in the received data. This setting should be used for most applications.
- *Partially adaptive equalization*. The low frequency gain of the equalizer is determined algorithmically by analyzing the data patterns and transition positions in the received data. The zero position is fixed in one of eight zero positions. For any given application, the optimal setting is a function of the loss characteristics of the channel and the spectral density of the signal as well as the data rate, which means it is not possible to identify the best setting by data rate alone, although generally speaking, the lower the line rate, the lower the zero frequency that will be required.

Table 1 Receiver Equalizer Configuration

LS_EQ[3:0]	Low Freq Gain	Zero Freq
0000	Maximum	
0001	Fully Adaptive	
0010	Reserved	
0011		
0100		
0101		
0110		
0111		
1000	Partially Adaptive	365 MHz
1001		275 MHz
1010		195 MHz
1011		140 MHz
1100		105 MHz
1101		75 MHz
1110		55 MHz
1111		50 MHz