



## Serial ATA Technical Errata

Errata ID	41
Affected Spec Ver.	1.0 Gold
Corrected Spec Ver.	

### Submission info

Name	Company	Date
Mike Jenkins	LSI Logic	11/01/02

### Description of the specification technical flaw (add space as needed)

The purpose of specifying the minimum  $t_{rise}$  and  $t_{fall}$  is to limit the high frequency content of the signal, primarily to limit EMI. However, too tight a range between the maximum and minimum values poses a design problem, especially considering the variability of methods and environments used to measure  $t_{rise}$  and  $t_{fall}$ . This is also a particular difficulty in designing for future, higher data rates.

Because of the purpose of specifying *minimum*  $t_{rise}$  and  $t_{fall}$ , it should be thought of in absolute time units, that is, picoseconds. The *maximum*  $t_{rise}$  and  $t_{fall}$ , on the other hand, exists to limit data-dependent jitter. (The value of 0.41 UI is the rise time of a ...010101... sine wave. Hence, each transition has just enough time to reach the full amplitude prior to the next transition.) So, it makes sense to specify the *maximum*  $t_{rise}$  and  $t_{fall}$  in UI.

One difficulty with the current minimum rise time specification is that the 3 Gb/s *maximum* rise time will be  $0.41 \times 333.3 \text{ ps} = 137 \text{ ps}$ , while the present (1.5 Gb/s) *minimum* rise time is  $0.2 \times 666.7 \text{ ps} = 133 \text{ ps}$ . There is not much design room to get to 3 Gb/s operation.

A survey of four existing multi-gigabit serial standards yielded *minimum* rise time specifications of 50, 60, 75 and 100 ps. At 1.5 Gb/s, these equate to 0.075, 0.09, 0.112 and 0.15 UI. Based on these examples, 0.15 UI appears to be a conservative value for minimum  $t_{rise}$  and  $t_{fall}$ , which lines up well with the 100 ps TDR rise time used for characterization.

### Description of the correction

		<del>0.2</del>	0.15			range of minimums specified
$t_{rise}$	0.3	<del>0.2</del>	0.15	0.41	UI	20%-80% at transmitter
$t_{fall}$	0.3	<del>0.2</del>	0.15	0.41	UI	80%-20% at transmitter

Common mode DC level

Table 11, section 6.6.2, page 76

Disposition log

11/1/2002 Errata proposal submitted for review (Mike J.)  
12/18/2002 Proposed min rise/fall time changed from 0.1 to 0.15 UI, and added official  
errata number (41). (Mike J.)  
12/20/2002 Removed discussion of possible values for 3 Gb/s rise/fall spec. (Mike J.)

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