Errata Page
High-Speed Digital Design: A Handbook of Black Magic

High-Speed Digital Design is now well past it's 15th printing(!). Over the years, alert readers from all over the world have taken the time to write in about problems and errors they've spotted. Here is the complete list of all errata that has been found.

To use the errata listing it helps to know which version (printing) of the book you have. On page iv (the page facing the first page of the table of contents) near the bottom, just above the ISBN number, you will see a row of numbers in backwards order. The smallest number on this list is your version number. For example, if the list shows "10 9 8 7", then your book is from the 7th printing.

The first column of the errata listing shows the printing of the book in which we have confirmed each correction has been made. For example, I have confirmed that the errata item on page 146 was corrected by the 7th printing. If your book is from the 7th or later printing you need not check your book for that particular correction -- it's already been made. That particular correction may have been made in an earlier printing (Prentice Hall does not keep records of which correction was placed in which printing), but we know it was incorporated at least into the 7th (I know because I obtained a 7th-printing book and checked it).

I hope this listing helps you to get the most out of your book.

Correct in print#	Pg#	Changes confirmed
15	xi	Change "Olympic Technology Group" to "Signal Consulting, Inc."
tbd	6	Final sentence in first paragraph should read: "Propagation velocity (also called propagation speed), which is measured in inches per picosecond, is the inverse of propagation delay."
15	7	In the last line of the first paragraph after Equation 1.3, the sentence should read: "The physical length of the rising edge is 5.6 in."
15	8	In Figure 1.3, change " $l = 5.4$ in" to "$l = 5.6$ in."
tbd	22	In Equation [1.17]:change the first equals sign to an "approximate equals" symbol. Make sure the constants read as follows: $$\frac{T_{\text{L/R}}}{T_{\text{OPEN}}} \approx \frac{1.2 \cdot 10^{-09}}{0.8 \cdot 10^{-09}} = 1.5$$
tbd	27	Bottom terms in equation should be: "(50Ω)(2.7V)" in equation [1.29]
7	27	Some of the labels in figure 1.16 and the accompanying text are

		scrambled. In figure 1.16, the resistors shown in the "end view" as R_A and R_B should be R_2 and R_3, respectively. In the text preceding equation [1.29], the reference to R_2 should instead be to resistor R_B. The reference appears correctly in the equation itself.
tbd	28	The variable R_A should be R_2 in one place. The variable R_B should be R_3 in three places.
15	48	Change sentence to read: "The voltage drop in the low state ranges from 0.15 to <u>0.33</u>V."
tbd	66	In the second paragraph, "The noise margin percentage of 10KH ECL logic is <u>13.2</u>%…"
7	71	The caption of figure 2.19 should read "… with three loads of <u>20</u> pF."
tbd	71	At the bottom of page 71, "… then the definition of inductance (Equation <u>1.18</u>) to compute the ground bounce amplitude."
tbd	88	In the list near the bottom of the page the item related to the 125-Ω plot (third item of list) should be replaced to now read: "The 125-Ω source impedance damps the circuit considerably, almost eliminating the resonance."
tbd	100	Table 3.3 should read: | Feet	Belden 8216 RG-174/U (ps)	Belden 8240 RG-58/U (ps)	Belden 8237 RG-8/U (ps)
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1	29	9	4
2	77	22	10
3	140	39	16
4	219	60	23
5	300	84	32
10	1018	230	86
20		826	257
50		3583	1227	
tbd	101	In Example 3.3, Equation [3.27] should now read: $$\text{From Table 3.2, } t_{\text{BNC}} = 0.011\,\text{ns}$$ $$\text{From Table 3.3, } t_{\text{cable}} \cong 0.394\,\text{ns}$$ $$\text{From Table 3.4, } t_{\text{loop}} = 0.06\,\text{ns}$$ $$t_{\text{composite}} = \left(t_{\text{BNC}}^2 + t_{\text{cable}}^2 + t_{\text{loop}}^2\right)^{1/2} = 0.348\,\text{ns} \quad [3.27]$$
tbd	124	paragraph six, line2, change from: "while switch S1 is open" to: "while switch S1 is opening"
tbd	134	In equation [4.1] replace the term "speed" with "propagation delay"
7	146	In equation [4.27], the factor X in the exponent is erroneously set as a subscript. The term X should be multiplied by the radical, like this: $$e^{-X\left[(R+jwL)(G+jwC)\right]^{1/2}}$$

7	147	In equation [4.28], the factor X in the exponent is erroneously set as a superscript. The term X should be multiplied by the radical, like this: $e^{-X[(R+jwL)(jwC)]^{1/2}}$
15	155	In Equation [4.45], change 2.16 to 2.61
15	159	In the reference under figure 4.17, the correct page reference should be to Terman's page <u>36</u>.
tbd	166	In the paragraph proceeding equation [4.68], change to read: "It must be ~~much~~ shorter than…"
tbd	166	In equation [4.68], replace the strong inequality "<<" with a regular less-than sign "<".
tbd	166	Equation [4.69] should read: $$T = 2(length)(LC)^{1/2}$$
tbd	167	Equation [4.71] eliminate the minus sign in front of logarithms. Time to settle within $$E = T\frac{\ln(E)}{\ln(|R_1(w)R_2(w)|)}$$ $$= 2(length)(lc)^{1/2}\frac{\ln(E)}{\ln(|R_1(w)R_2(w)|)}$$
7	170	At the bottom of figure 4.22, in four places substitute the term (jwC) for the term (jw). Equations [4.73] and [4.74] are correct.
7	175	Below figure 4.25 the text should read "… the shaded area in Figure 4.2<u>6</u> roughly equals"
7	175	In [4.84] there should be no minus sign in the equation.
7	176	In [4.85] there should be no minus sign in the equation.
7	177	In figure 4.28 the text should read "~~2.7~~ <u>4.9</u>-ns delay structure"
7	178	In the first indented paragraph, the last sentence should read "For twisted-pairs lines"
tbd	186	In Equation [4.87]:change propagation delay in ns/in. to ps/in.
tbd	204	Equation [5.16] should be changed to read: $$v_{REVERSE}(t) = L_M\frac{di}{dt}$$
7	206	In Figure 5.16, 'Near end' should be labeled "C", and 'Far end' should be labeled "D."
15	206	In Figure 5.17, the third trace should be labeled "D". The last trace should be labeled "C" [e.g. A, B, D, C]
15	207	In Figure 5.18, the third trace should be labeled "D". The last trace should be labeled "C" [e.g. A, B, D, C]

15	210	The format of the equations should remain the same, but please substitute these numbers. There are a total of eight changes. equation [5.19] D=(4 divisions)(50 mV/division) = 200 mV equation [5.20] F=(1 division)(50 mV/division) = 50 mV equation [5.21] D/A = 0.200/2.5 = 0.08 equation [5.22] F/A = 0.050/2.5 = 0.02
7	211	Replace both paragraphs in section 5.7.6 with the following: "A series terminator extinguishes reverse coupled crosstalk at the near end. An end terminator attenuates the returning reflection of the main signal, the reverse coupling from which would be again pointed toward the far end. Using both terminators eliminates both sources of reverse coupling noise, improving overall crosstalk considerably." "The reduced coupling gained by combining series and end terminations lets us route parallel bus traces closer than would otherwise be practical."
7	212	In section 5.8.1, the end of the next to the last sentence should read: "as well as those routed over a ~~power~~ <u>ground</u> plane"
15	250	Change 2nd sentence in paragraph six to read: "Holes deeper than ~~three to~~ six times their diameter will not plate uniformly."
15	250	Change sentence in paragraph six to read: "At a standard board ~~width~~ <u>thickness</u> of 0.063 in., this limits the minimum hole diameter to <u>about</u> ~~the range~~ 0.010 ~~0.020~~ in., depending on the care with which the plating shop adjusts its equipment and on the yield required."
7	250	In the fifth indented paragraph, the third sentence should read "At a standard board thickness three" rather than "At a standard board width three."
7	304	The text under [9.11] should read "The radiation from one signal wire amounts to <u>82</u>uV"
7	304	The text under [9.13] should read "The radiation from one signal wire amounts to <u>94</u>uV"
7	305	In Rule 6, the second sentence should read "Emission in Equation 9.6 is proportional to the inverse ~~square~~ of rise time."
tbd	324	Equation [10.1] should read: $$t_{10-90\%} \cong \frac{3L^2}{K}$$
7	327	Figure 10.4 is misleading. The picture shows symmetrical leading and trailing edges. Real signals show a faster rise with a sharper initial corner, and a slower trailing edge. Please see new picture on last page of errata.

7	327	Third indented paragraph, second line should read "becomes <u>even more</u> asymmetric."
tbd	328	Equation [10.1] should read: $$t_{10-90\%} \cong \frac{3L^2}{K}$$
tbd	331	In equation [10.7] the term (delay) should appear in the denominator, not the numerator of the equation. Substitute the term "2538/delay" for the existing term "2538(delay)" $$K_r = \frac{2538}{delay}\frac{1}{Z_0}\frac{\Delta_1\Delta_2}{X^2}$$
15	381	In Figure 12.8, replace "Oscilloscope" with "Oscillator."
15	387	The 'Pease' section should read: "Those who read Bob Pease's column in <u>Electronic Design</u>..."
tbd	411	Under the heading "Variables Used:" In the paragraph under "Bulk resistivity of copper" change the constant in the second line of the paragraph to read "6.58E-07."
15	435	The definition of er should read: "Relative electric permittivity..."
tbd	436	In the "Variables used" section, The definitions for variables h1 and h2 are swapped. Change to read: h1 Trace headroom below upper ground plane (in.) h2 Trace height above lower ground plane (in.)
15	436	The label for 'er' should be "Relative dielectric constant."
7	437	*The following information comes from Robert Canright, of Richardson, TX. Mr. Canright traced my references for stripline impedance, which I found in Harlan Howe's book, all the way back to the original source papers by Seymour Cohn. In Mr. Cohn's paper, he found a typographical error which was duplicated in Howe's manuscript and, unfortunately, found its way into my text.* The net effect of this error is to change the stripline impedance formulas by as much as 2% in cases where t/w approaches 0.25. If you remain in the region of guaranteed accuracy, (t/w < 0.11) the results are affected by only 1/2 of one percent. Mr. Canright points out that in many modern designs, the ratio t/w can easily exceed 0.25. The equation for ZSTR_K1(w,t) should read: $$\text{ZSTR\_K1}(w,t) := \left[\frac{w}{2}\right]\cdot\left[1+\frac{t}{\pi\cdot w}\cdot\left[1+\ln\left[\frac{4\cdot\pi\cdot w}{t}\right]\right]+0.255\cdot\left[\frac{t}{w}\right]^2\right]$$
tbd	439	In the 7th line of text, change the word "permeability" to "permittivity".

Cable length (ft)

10   25   50   100

2 ns/div

30 AWG
0.05-in. wire pitch

Step responses are
offset horizontally
so they all fit in
this display.

FIGURE 10.4

**Step Response of
Ribbon Cable**