

Errata to the second and third printings, *Digital Video and HDTV Algorithms and Interfaces*

This note contains errata to the second and third printings of the book *Digital Video and HDTV Algorithms and Interfaces*, by Charles Poynton (San Francisco: Morgan Kaufmann, 2003). I encourage you to make these corrections in your copy of the book.

This note contains errata for the second and third printings. To determine which printing of the book you have, turn to the copyright page of the front matter (page iv) and examine the line starting 2007 2006 ... near the bottom of the page. The rightmost digit of that line indicates which printing you have. If you have the first printing, obtain the *Errata* for that printing: Not all the corrections you need are reported in this document. If you have the fourth printing or a subsequent printing, I suggest that you obtain the *Errata* for that printing, in order to avoid having to review errors reported here that are printed correctly in your copy.

I revise this note as I discover errors, and I tag each entry with the date it was posted. Prior to your making these corrections, I suggest that you check to see if a more recent *Errata* document has been posted. When you make the corrections herein, I suggest that you annotate, on the copyright page of your book, the *Errata* revision date that you find at the bottom of this page. Then when you check future revisions of this *Errata* document, you can easily identify any additional corrections that need to be made.

In the entries below, I acknowledge individuals who have reported errors. Corrections without attribution are generally mine. Corrections dated 2005-12-11 are thanks to Coe Ishimoto.

2005-12-11: Page 9. In Figure 1.11. Change *1920 picture lines* to *1080 picture lines*. Thanks to John Phillips.

2005-12-11: Page 29. Replace the caption paragraph to Figure 3.8 with the following (sized to allow you to physically cut and paste):

Figure 3.8 CONTRAST control in Photoshop applies a gain factor between zero (for CONTRAST setting of -100) and infinity (for CONTRAST setting of +100) to image data, but "pivoted" around a weighted average of the image data (instead of "pivoting" around zero, as is the case for the CONTRAST control in video). Each component result saturates if it falls outside the range 0 to 255.

2005-12-11: Page 30. Replace the last three lines of the third paragraph with this text:

control does, Photoshop "pivots" the gain adjustment around a weighted average of the image data ($0.299 R' + 0.587 G' + 0.114 B'$). The transfer function for a weighted average of 127 is graphed in Figure 3.8.

2006-02-15: Page 89. In line 7 of the first paragraph – immediately opposite the top marginal note – there are two spurious references to *Marginal note*, the result of a cross-referencing error. Replace the first reference with *Equation 10.1* and the second with *Equation 10.2*.

2005-12-11: Page 114. In the third line of the first paragraph, remove the word *and*.

2005-12-11: Page 115. In the second line of the second paragraph from the bottom, between *increased to 2750* and *achieve* insert *to*.

2005-12-11: Page 150. In the third line of the second paragraph, change *identify* to *identity*.

2005-12-11: Page 165. In the second line of the first paragraph, change *ILFP* to *ILPF*.

2005-12-11: Page 192. In the third line from the end of the second paragraph, change *ILFP* to *ILPF*.

2004-08-22: Page 205. Historically, $\bar{y}(\lambda)$ denoted the luminous efficiency function. In the book, I used the notation $Y(\lambda)$, which was under consideration by the CIE at the time the book was being written. Following publication of the book, the CIE decided to retain the $\bar{y}(\lambda)$ notation. In the bottom paragraph of page 205, in the bottom marginal note on that page, in Figure 20.1, and in the second paragraph of page 206, change $Y(\lambda)$ to $\bar{y}(\lambda)$.

2004-05-07: Page 207. In the line immediately above Equation 20.1, change *STDV* to *SDTV*. Thanks to Xingbo Wang.

2004-08-22: Page 208. In revising Publ. 15.2 to 15.3, the CIE has changed the coefficients in the equation for L^* to achieve exact C_0 and C_1 continuity at the breakpoint between the linear and power-function segments of the function. Insert this marginal note to the left of the paragraph preceding Equation 20.2:

The fraction $(2^4/116)^3$ is approximately 0.008856; the fraction $(116/12)^3$ is approximately 903.3. The approximate values were used in CIE Publ. 15.2 (1986).

2004-08-22: Page 208. In Equation 20.2, change 0.008856 to $(2^4/116)^3$, and change 903.3 to $(116/12)^3$. The new equation is below:

$$L^* = \begin{cases} \left(\frac{116}{12}\right)^3 \frac{Y}{Y_n}; & \frac{Y}{Y_n} \leq \left(\frac{24}{116}\right)^3 \\ 116 \left(\frac{Y}{Y_n}\right)^{\frac{1}{3}} - 16; & \left(\frac{24}{116}\right)^3 < \frac{Y}{Y_n} \end{cases} \quad \text{Eq 20.2}$$

2004-08-22: Page 209. In the second line of the first full paragraph of the page, change "0.008856 or less" to " $(2^4/116)^3$ or less, that is, less than about 0.008856."

2005-12-11: Page 214. In the first line of the last paragraph, change *left* to *right*.

2004-08-22: Page 216. Historically, the notation $\bar{x}(\lambda)$, $\bar{y}(\lambda)$, and $\bar{z}(\lambda)$ was used for color matching functions. In the book, I used the notation $X(\lambda)$, $Y(\lambda)$, and $Z(\lambda)$ that was under consideration by the CIE at the time the book was being written. Ultimately the CIE decided to retain $\bar{x}(\lambda)$, $\bar{y}(\lambda)$, and $\bar{z}(\lambda)$. In the bottom paragraph of page 216, in the middle marginal note on that page, in Figure 21.4, in several places on page 217, and in the caption paragraph to Figure 21.5 on page 218, change $X(\lambda)$, $Y(\lambda)$, and $Z(\lambda)$ to $\bar{x}(\lambda)$, $\bar{y}(\lambda)$, and $\bar{z}(\lambda)$ respectively.

2004-08-22: Page 225. In Equation 21.3, change 0.008856 to $(2^4/116)^3$, and change 903.3 to $(116/12)^3$; the new equation is below. (See the notes above for page 208.)

$$L^* = \begin{cases} \left(\frac{116}{12}\right)^3 \frac{Y}{Y_n}; & \frac{Y}{Y_n} \leq \left(\frac{24}{116}\right)^3 \\ 116 \left(\frac{Y}{Y_n}\right)^{\frac{1}{3}} - 16; & \left(\frac{24}{116}\right)^3 < \frac{Y}{Y_n} \end{cases} \quad \text{Eq 21.3}$$

2004-08-22: Page 228. In the text immediately below Equation 21.12, change 0.008856 to $(2^4/116)^3$. To the left of that paragraph, insert this marginal note:

The fraction $(2^4/116)^3$ is approximately 0.008856; the fraction $841/108$ is approximately 7.787. The approximate values were used in CIE Publ. 15.2 (1986).

In Equation 21.13, change 7.787 to $841/108$. The new equation is here:

Eq 21.13

$$\frac{841}{108}t + \frac{16}{116}$$

2003-12-16: Page 266, In Equation 23.7, append the digit 5 to the end of the range of applicability of the first line of the equation: The range should read $-0.25 \leq L < -0.0045$.

2005-12-11: Page 268. In the second line from the bottom, change *STDV* to *SDTV*.

2004-07-03: Page 310. Replace Equation 25.12. Thanks to Andrew Murray and Masaki Kato. Beware that a previous correction to this matrix gave incorrect values:

Eq 25.12

$$\begin{bmatrix} 601 \\ 255Y' \\ C_B \\ C_R \end{bmatrix} = \frac{1}{256} \begin{bmatrix} 76.245 & 149.685 & 29.07 \\ -43.366 & -85.136 & 128.502 \\ 128.502 & -107.604 & -20.898 \end{bmatrix} \bullet \begin{bmatrix} 255R' \\ 255G' \\ 255B' \end{bmatrix}$$

2005-12-11: Page 335. In the second line of the last paragraph, delete the word *is*.

2005-08-25: Page 343. In the paragraph commencing "The V-axis switch," Walter Bruch's surname is mistakenly written with an umlaut. Please remove it – *Bruch*. Thanks to Benjamin Spitschan.

2005-12-11: Page 371. In the second line from the end of the first paragraph, change *HTDV* to *HDTV*.

2004-03-04: Page 383. The paragraph adjacent to Figure 32.2 should reference that figure, not Figure 31.2. Thanks to Don Orofino.

2005-12-11: Page 398. In the second line of the third paragraph, change *potion* to *portion*.

2006-06-28: Page 432. In the top paragraph, change "one field frame to another. This" to "one field to another. The switch."

2005-12-11: Page 453. In the last line of the last paragraph, between *represented* and *fewer bits*, insert *by*.

2005-12-11: Page 517. In the first line of the last paragraph, change *above* to *overleaf*.

2005-08-25: Page 530. In the second paragraph and in the third paragraph, Walter Bruch's surname is mistakenly written with an umlaut. Please remove them: *Bruch*. Thanks to Benjamin Spitschan.

2005-03-19: Page 543. Replace the marginal note:

The risetime (from 10% to 90%)
of a T pulse is about 0.59 times
the risetime of a T step:

$$t_R = \frac{2 \sin^{-1}(0.9 - 0.1)}{\pi} t_{HAD}$$

$$\approx 0.59 t_{HAD}$$

Consequently, the frequency
spectrum occupancy of a T pulse
is about $\frac{1}{0.59}$, or 1.7 times,
greater than that of a T step.
A $2T$ pulse has a risetime about
1.18 times the risetime of a T step.

2008-10-20: Page 543. In Eq 45.2, change $3t^3 - 2t^2$ to $-2t^3 + 3t^2$.
Thanks to Jay Zipnick.

2006-03-01: Page 550. In Figure 46.1, $35 H$ should read $25 H$. Thanks
to Kylo Ginsberg.

2006-04-03: Page 558. In the top three body rows of Table 47.1, three
occurrences of 148 should read 148.5 . Thanks to Benjamin Spitschan.

2004-07-06: Page 559, Table 47.2. In the columns *Contents, left half*
and *Contents, right half*, blank out all the entries that contain *tri/none*
or *tri/BR*. Don't forget the bottom row. A replacement table is
provided on page 7 of this document. These entries are correct for
interlace, but inapplicable (and therefore confusing) for progressive.
The same information is presented more clearly in Figure 47.2.

2006-03-01: Page 559, Table 47.2. Delete the entry 563 from the top
body line of the table; insert a new bottom body line containing 563
under the column head *Line number, first field (F=0)*. This change
clarifies that during video line 563 the F-bit is deasserted. A replace-
ment table is provided on page 7 of this document. Thanks to Kylo
Ginsberg.

2004-07-06: Page 561. The first two lines of the fourth paragraph are
printed correctly. However, in a previous *Errata* document, I wrongly
suggested changing *five* to *ten* in the first line and *one* to *two* in the
second. The proper correction is to Figure 47.2, as noted in the entry
below. (I thought I was wrong once, but I was mistaken!)

2004-07-06: Page 564, Figure 47.2. In the progressive system, change successive pairs of broad pulses to a single pulse. A replacement figure is provided on page 8 of this document. Thanks to Erik Garci, Jason Griffin, and Pierre Berthet.

2004-07-03: Page 573. In the last line of the first paragraph under the heading *Audio in NTSC*, change 25 to 75. Thanks to William Hooper.

2004-05-07: Page 601. In the first line of the caption of Table B.1, change *In radiometry* to *In photometry*. Thanks to Xingbo Wang.

2007-06-01: Page 613. Under *Alpha*, change *transparency* to *opacity*; change *zero (opaque)* to *black (0, fully transparent)*; and change *unity (fully transparent)* to *white (1, fully opaque)*.

2007-06-01: Page 634. Under *Key*, change *transparency* to *opacity*.

Replacement figures

<i>Line number, progressive</i>	<i>Line number, first field (F = 0)</i>	<i>Line number, second field (F = 1)</i>	<i>V</i>	<i>Contents, left half</i>	<i>Contents, right half</i>
1	1				
		564			
2	2				
		565			
3	3				
		566			
4	4				
		567			
5	5				
		568			
6	6				
	7–20 (14 lines)				vertical interval video
7–41 (35 lines)		569–583 (15 lines)			vertical interval video
	21–560 (540 lines)				picture ^{a,b}
42–1121 (1080 lines)					
		584–1123 (540 lines)	V = 0 (1080 lines)		picture
1122–1125 (4 lines)	561–562 (2 lines)	1124–1125 (2 lines)			
	563				

a In 1035*i* systems, picture occupies 517 lines (41 through 557) in the first field, and 518 lines (603 through 1120) in the second field. Other lines are blank, with V = 1. Picture is centered vertically on line 258 of the first field.

b In the 1024/30.00 variant of DV HD, described on page 469, picture lines 44 through 555 of the first (top) field and picture lines 606 through 1117 of the second (bottom) field are carried.

Table 47.2 **1080*i* and 1080*p* line assignment**

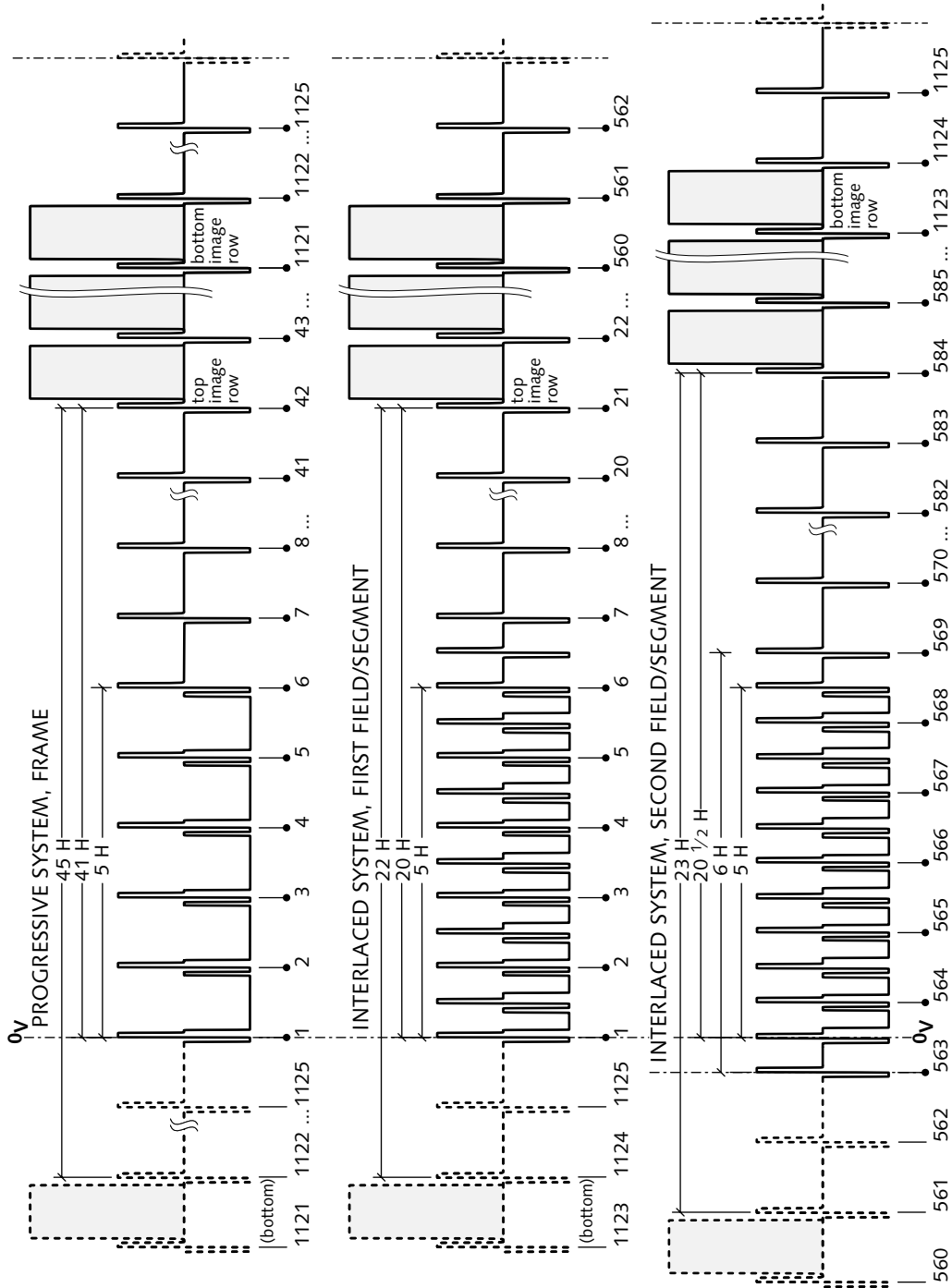


Figure 47.2 1080i and 1080p vertical blanking interval