

Errata Sheet

Principles of Testing Electronic Systems Mourad / Zorian Wiley and Sons, New York, July 2000

Page last updated Sunday, May 12, 2002

Chapter	Section	Page	Correction	Date
01	1.11.1	19	on the fifth line, change node E to node G	1/15/02
02	2.1	28	Fig. 2.1 in the permanent block, change soft to hard or replace by the new figure attached in this document	8/14/01
	2.3.2	32	last line of the 2 nd paragraph, change 2.13 to 2.11	1/15/02
	2.6	39	In Fig. 2.7a, the output of the hashed AND gate should be called H.	1/19/02
	2.7	41	on the 5 th line, remove the sentence starting with "Also.."	1/27/01
			In Fig. 2.9, $Z = AC + BD$, should read, $Z=(AB + CD)$	1/19/02
	2.9	46	Part b of Fig. 2.14 is wrong, it does not represent current Replace by the one shown in the Figures section below	1/19/02
03	Problems	80	Remove the period after P in the figure caption Also, see updated	
04	4.7.3 Routing	100-101 100 101	Change every node E to G to match the graph in Fig. 4.16 on line 9 change 6δ to 4δ last paragraph, 2 nd line change route C to route A.	2/02/01
05	5.4.2	114	5 th line of this section, change $E(0 \rightarrow 1)$ to $E(1 \rightarrow 0)$	2/02/01
	5.6.1	121	In the last row of Table 5.1, change h to I, and change $g = f + c$ to $g = (f + c)'$ It is preferable to replace the table by the correct one shown below	1/27/01 2/02/01
	5.6.2	122	The fault list associated with node f of Fig 5.8, change subscript g to f. and the OR gate G1 to G4 or better yet, replace the whole Fig.5.8 by the one given below.	2/02/01
	Table 5.2	123	In Table 5.2, row starting with f, remove the open parenthesis Replace the table as listed below	8/14/01
		124	in the last two lines of the 2 nd paragraph, change u/1 to u/0	2/02/01
	5.7.2	128	7 th line, f5 or f8 should be f5, f7, or f8	2/04/01
	Problems	130	In problems 3 and 4, change 5.1 to 5.2.	
06	Table 6.8	148	The last 2 column include wrong date. The correct data for PODEM and FAN should be, respectively: 0.48, 3.49, 5.05, 0.26, 4.79 and 0.8, 1.38, 0, 0, 2.17 respectively. The corrected table is given in the Table Section below.	5/11/02
	Table 6.9	150	In the third row and last column, change 3 to 1.	
	Fig 6.12	150	Change B,1 by B,0 or replace the Fig. 6.12 as given below	2/12/01
	Fig. 6.13	151	Change (B)01 by (C)01 and move (C)oo to the branch 1,0 better, replace by Fig. 6.13 below	2/12/01
	Problems	161	In problem 2, change Fig. P6.2 to P6.1 and in problem 6.3, change Fig. 5.2 to Fig. P6.3,	

		162	Change figure caption to P6.3 instead of P6.2	
07	Problems	185	last line of the page: $B=C=1$ should be $B=C=0$	2/04/01
08	Figure 8.2	193	AND gate change the + to , in $\{CO0(A) + CO0(B)\}$ to $\{CO0(A), CO0(B)\}$ OR gate, change $\{COI(A) + COI(B)\}$ to $\{COI(A), COI(B)\} + 1$	5/12/02
09	9.7.1	224	Paragraph 3, line 3, change Section 2.2.2 to Section 9.4.2	4/18/02
	9.10.2	232	Fig. 9.15 is missing a connection. Replace by Fig. 9.15 below	4/08/01
	Problem	238	Problem 3 refer to Fig. 9.12 when it should be Fig. 9.13.	4/19/01
	Problem	238	The last word in problem 9.4 is path instead of tree	
	Problems	238	Problem 9.5, change Fig.9.2 to 9.3	4/08/01
10	10.3	245	second bullet from the top, change fo to of	4/13/01
	Fig. 10.5	248	Fig. 10.5 is missing a connection between the output of MUX 1 and the D of the flip-flop to its right. See updated figure below	4/13/01
	Fig. 10.8	250	The arrow from Capture-IR to Exit1-IR, should have 1 next to indicate the value of TMS	5/12/02
	10.8	257	2 nd paragraph, 3 rd sentence, change Secion to Second End of the same sentence, change parasable to parsable	5/12/02
	10.9	258	5 th line, change increae to increase	5/12/02
11	11.2.1	264	Last line of the 1 st paragraph, change Table 11.1.a to 11.1. second paragraph, 5 th line, change "be one of the last three columns" to "be the last column "	5/12/02 5/12/02
	11.2.2	264	2 nd line, change $C1 = 1$ to $C_i = 1$.	5/12/02
	11.2.3	268	2 nd line after Equation 11.11 change $C1 = 0$ to $C1 = 1$.	5/12/02
	11.3.4	274	2 nd paragraph, 7 th line, change 10110010 to 10110001	5/12/02
		277	First line after the long division, change the polynomial to $X^3 + X + 1$ instead of $X^3 + X^2 + 1$	5/12/02
	Table 11.5	275	8 th column, row before last, change 1 to 0 or see Table below	4/13/01
	Figure 11.13	279	Change LSFR to LFSR part b and d	5/12/02
	Figure 11.13	279	Change LSFR to LFSR in rightmost block	5/12/02
	11.3.5	279	1 st line, change $k = 5$ to $k = 4$, and $P(X) = X^4 + X + 1$ to $P(X) = X^4 + X^3 + 1$	5/12/02
	11.3.5.3	280	on 2 nd line from the bottom, change $X_1(X)$ to $XM_1(X)$	5/12/02
		281	4 th line from the end of the section, replace balance by other flip-flops	
	11.4	281	9 th line, change 11.3.4.1 to 11.3.4.2	5/12/02
	Figure 11.20	286	replace the or sign "+" by XOR	5/12/02
	11.5.5	287	2 nd line, change "A modification subsequently modified.." to A subsequent modification.."	5/12/02
	11.5.5	288	3 rd line from the end of the section, change is such to in such	5/12/0
	11.5.5	288	2 nd line from the end of the section, change form to from	5/12/0
	Problems	293	Problem 11.6, the denominator of the aliasing expression should read 2^L and not 2^N . Also, in Problem 11.7, after "Suppose that" add "in problem 11.6	4/13/01
12	12.3.2.3	303	Replace Fig. 12.5 by the one given below	4/20/02

Updated Tables

Table 5.1 Parallel Fault simulation

	<i>ff</i>	<i>a/0</i>	<i>b/1</i>	<i>c/1</i>	<i>d/0</i>	<i>e/1</i>	<i>f/0</i>	<i>f/1</i>	<i>g/0</i>	<i>g/1</i>	<i>h/0</i>	<i>h/1</i>	<i>i/0</i>	<i>i/1</i>	<i>u/0</i>	<i>u/1</i>
<i>a=1</i>	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<i>b=0</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>c=0</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>d=1</i>	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
<i>f=ab</i>	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>g=(f+c)'</i>	1	1	0	0	1	1	1	0	0	1	1	1	1	1	1	1
<i>h=cd</i>	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
<i>e=0</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>i=e+h</i>	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0
<i>u=g+i</i>	1	1	0	1	1	1	1	0	0	1	1	1	1	1	0	1

Table 6.8. Comparison of PODEM and FAN Algorithms

Circuit	Computing Time		Average Backtracks		%age of Faults Aborted	
	PODEM	FAN	PODEM	FAN	PODEM	FAN
1	1.3	1	4.9	1.2	0.48	0.11
2	3.6	1	42.3	15.2	3.49	1.38
3	5.6	1	61.9	0.6	5.05	0
4	1.9	1	5.0	0.2	0.26	0
5	4.8	1	53.0	23.2	4.79	2.17

Source: [Fujiwara 1983].

Table 5.2 **8/14/01**

		Fault List				
	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	
NodeFF	PRIMARY INPUTS					PRIMARY OUT
<i>a</i>	1	<i>a/0</i>				
<i>b</i>	0	<i>b/1</i>				
<i>c</i>	0	<i>c/1</i>				
<i>d</i>	1	<i>d/0</i>				
<i>e</i>	0	<i>e/1</i>				
<i>f</i>	0	-----	$L_b \cap L_a \cup f/1$	<i>b/1, f/1</i>		
<i>g</i>	1	-----	-----	$L_f \cup L_c \cup g/0$	<i>b/1, f/1, c/1, g/0</i>	
<i>h</i>	0	-----	$L_c \cap L_d \cup h/1$	<i>c/1, h/1</i>		
<i>I</i>	0	-----	-----	$L_h \cup L_e \cup i/1$	<i>c/1, e/1, i/1</i>	
<i>u</i>	1	-----	-----	-----	$L_g \cap L_i \cup u/0$	<i>b/1, f/1, c/1,</i>

$$L_a \cap L_b' = L_a - L_b,$$

can be written as all elements of L_a minus the element in the intersection of L_a and L_b

$$\text{So } L_u = L_g - L_g \cap L_i \cup u/0 = (b/1, f/1, c/1, g/0) - (c/1) + u/0$$

Thus $Lu = b/1, f/1, g/0, u/0$, as indicated in the last column

Table 11.5 **4/13/2001**

T	M(t)	Standard (X^3+X^2+1)				Modular (X^3+X^2+1)					Modular (X^3+X+1)				
		y0	y1	y2	y3	y0	y1	D2	y2	y3	y0	y1	y2	D2	y3
0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0
1	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0
2	1	0	0	1	0	1	0	0	1	0	1	0	1	1	0
3	1	0	0	0	1	0	1	0	0	1	0	1	0	1	1
4	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
7	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1
8	x	X	1	0	0	x	1	1	0	0	x	0	0	1	1
						$R(X) = X^2$					$R(X) = 1$				

Updated Figures

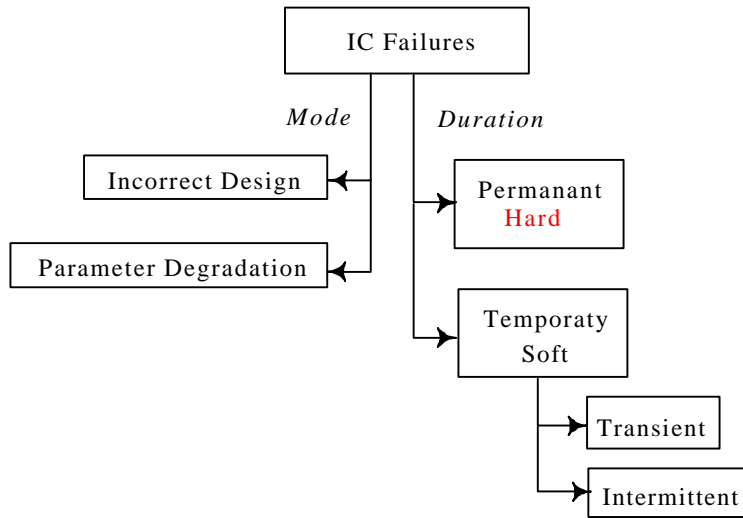
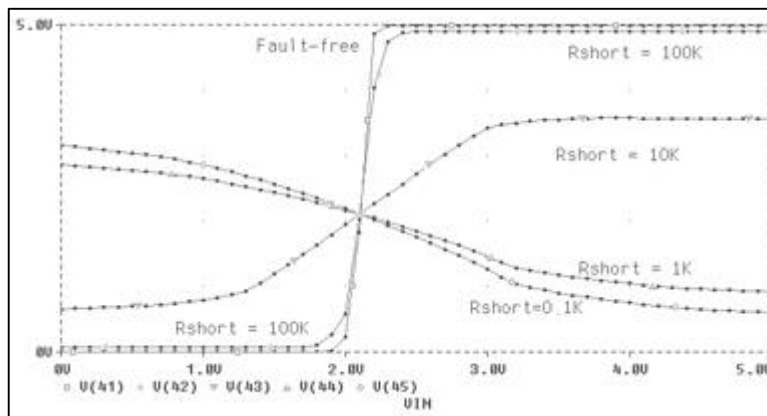
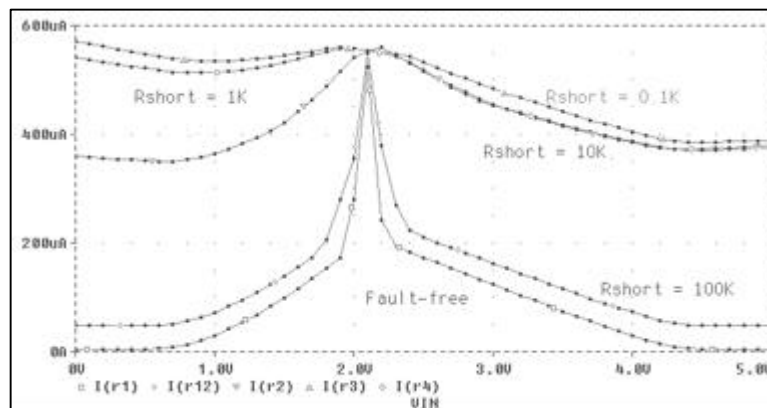


Figure 2.1 Classifications of IC failures



(a)



(b)

Fig. 2.14 on p. 46

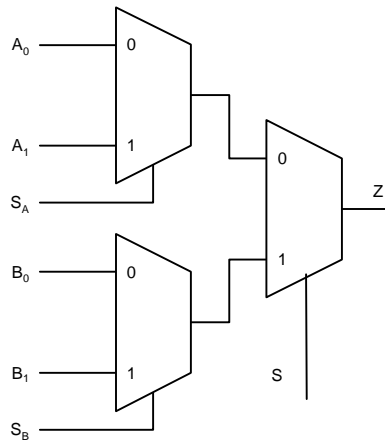


Figure P3.6

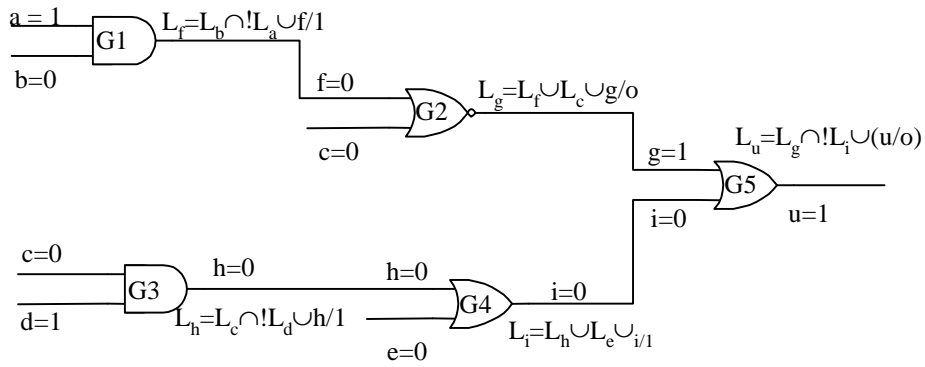


Fig. 5.8 a

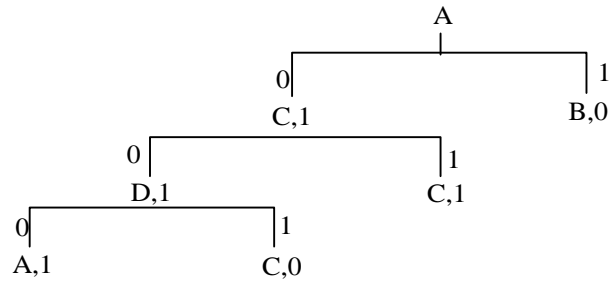


Figure 6.12

Level

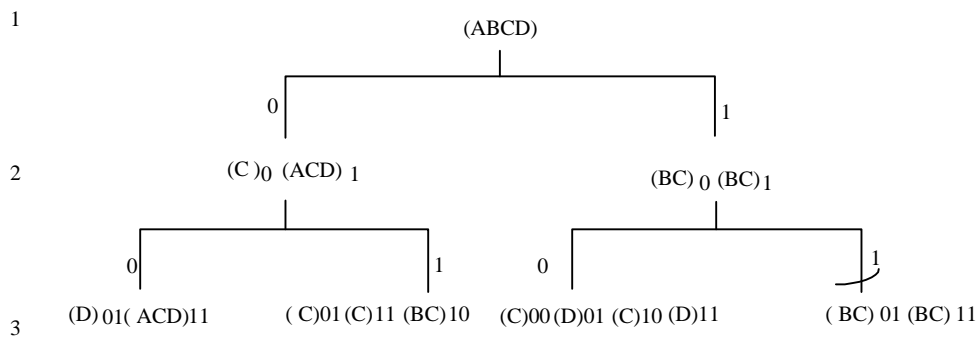


Figure 6.13

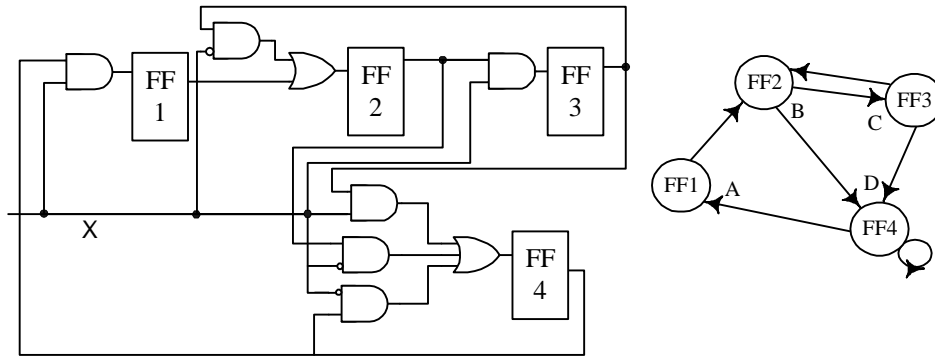


Figure 9.15

Update 4/08/01

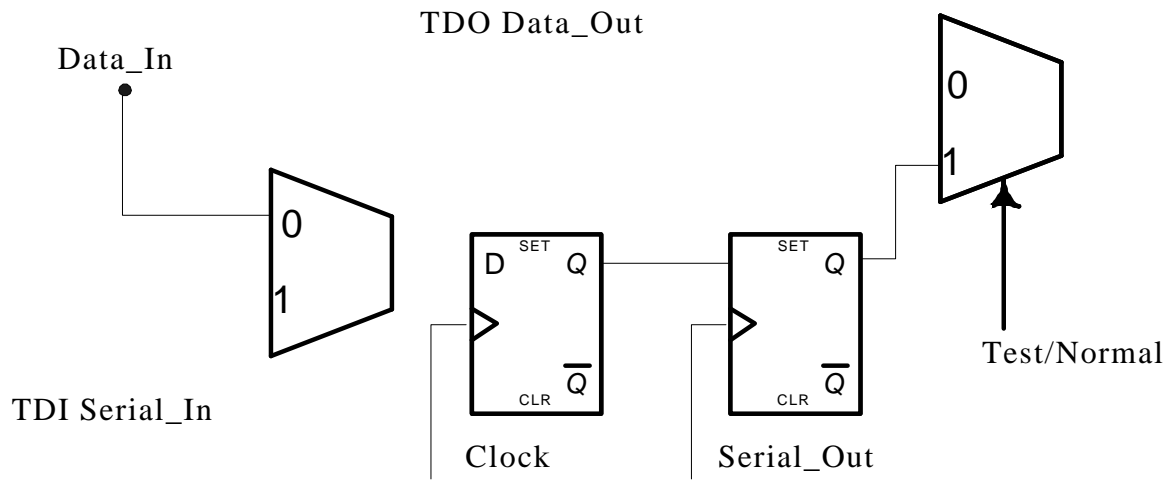


Figure 10.5

updated 4/13/01

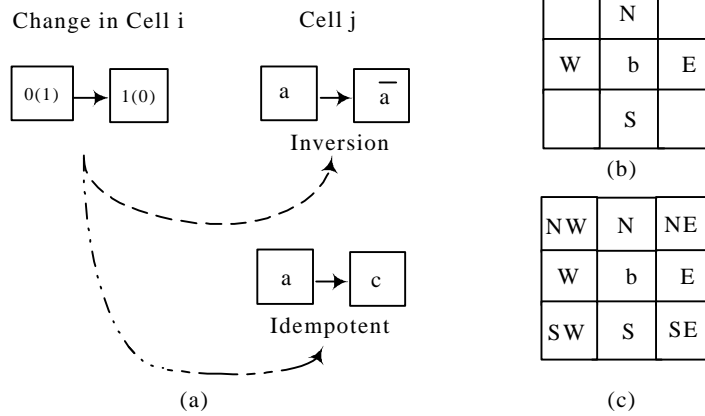


Figure 12.5 Updated for clarity 4/20/02