

CSE231L/EEE211L
Lab 4 – BCD to Excess-3 Converter

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Decimal Digit	Binary Coded Decimal (BCD)				Excess-3			
	W	X	Y	Z	A	B	C	D
0	0	0	0	0	0	0	1	1
1	0	0	0	1	0	1	0	0
2	0	0	1	0	0	1	0	1
3	0	0	1	1	0	1	1	0
4	0	1	0	0	0	1	1	1
5	0	1	0	1	1	0	0	0
6	0	1	1	0	1	0	0	1
7	0	1	1	1	1	0	1	0
8	1	0	0	0	1	0	1	1
9	1	0	0	1	1	1	0	0
10	1	0	1	0	x	x	x	x
11	1	0	1	1	x	x	x	x
12	1	1	0	0	x	x	x	x
13	1	1	0	1	x	x	x	x
14	1	1	1	0	x	x	x	x
15	1	1	1	1	x	x	x	x

	1	1	1
x	x	x	x
1	1	x	x

$$A= \text{ } W+XY+XZ$$

	1	1	1
1			
x	x	x	x
	1	x	x

$$B=X'Y+X'Z+XY'Z'$$

1		1	
1		1	
x	x	x	x
1		x	x

$$C=YZ+Y'Z'$$

1			1
1			1
x	x	x	x
1		x	x

$$D=Z'$$

Side

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AB

CD

	00	01	11	10
0				
1				
1				
0				

$$\begin{array}{r} 01 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 01 \\ \hline 11 \end{array}$$

$$A' \rightarrow A \quad D' \rightarrow D$$

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$