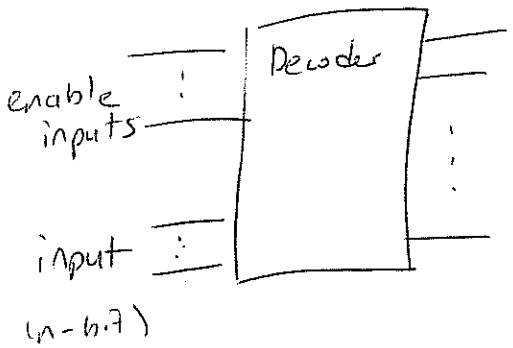
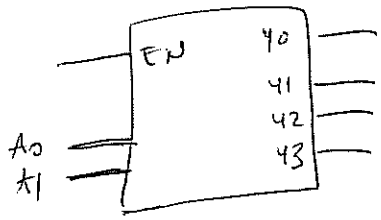
EECS 281, February 12, 2015



e.g.

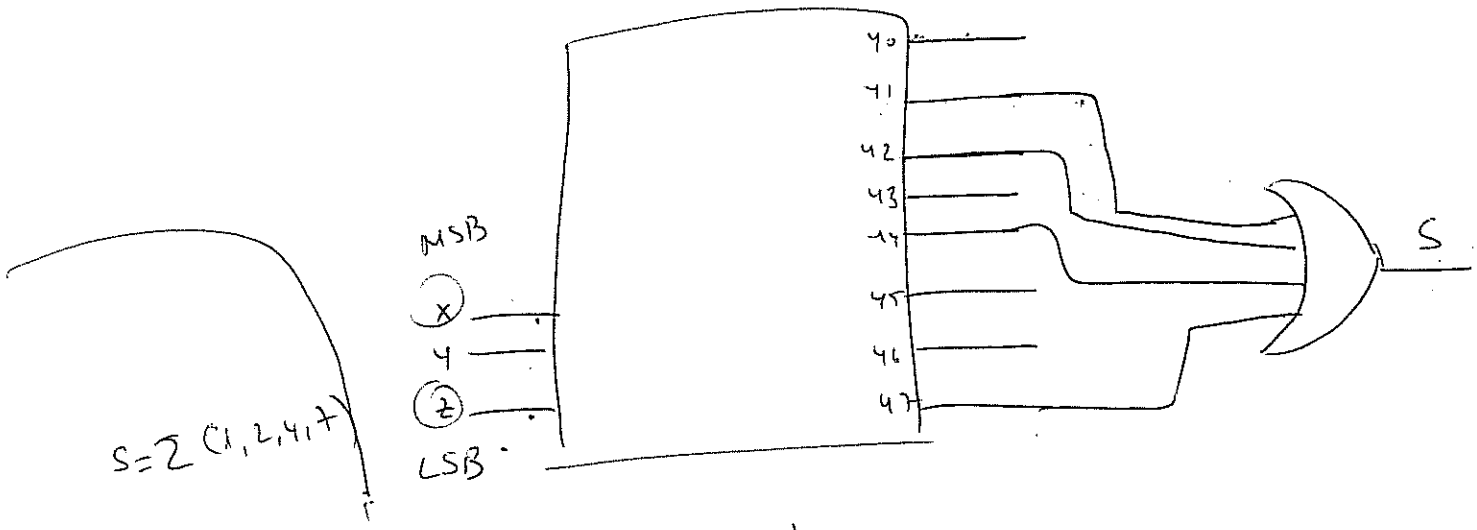


EN	A1	A0	Y3	Y2	Y1	Y0
0	X	X	0	0	0	0
1	0	0	0	0	0	1
1	0	1	0	0	1	0
1	1	0	0	1	0	0
1	1	1	1	0	0	0

Example: Using only a 3x8 decoder and two OR gates, implement the following functions:

$$S = \sum_{x,y,z} (1, 2, 4, 7)$$

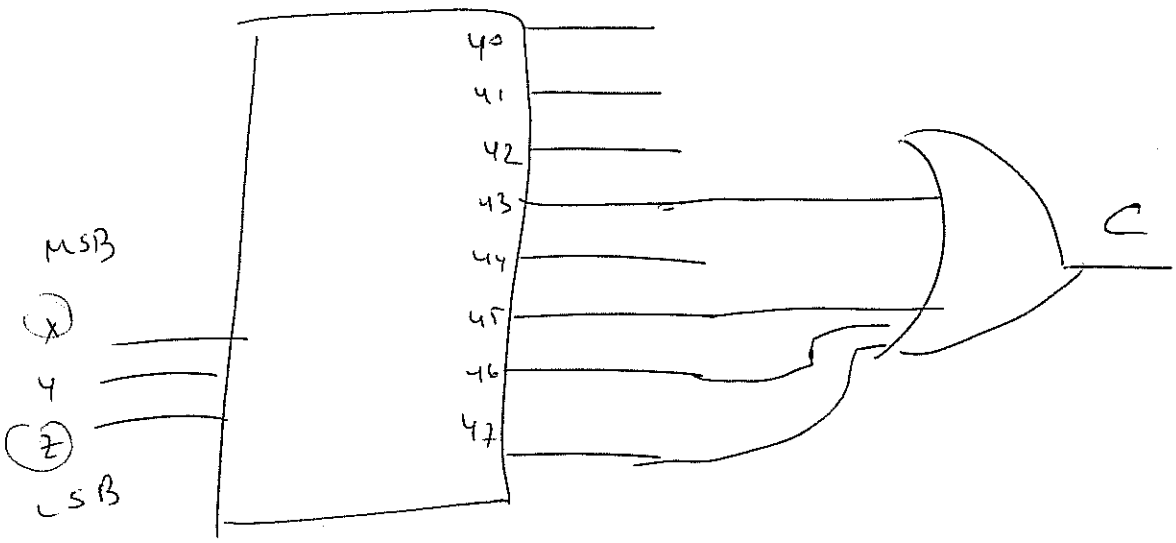
$$C = \sum_{x,y,z} (3, 5, 6, 7)$$



Row	x y z	S	C
0	0 0 0	0	0
1	0 0 1	1	0
2	0 1 0	1	0
3	0 1 1	0	1
4	1 0 0	1	0
5	1 0 1	0	1
6	1 1 0	0	1
7	1 1 1	1	1

$S = x'y'z + x'yz' + xy'z' + xyz$

$$C = \sum_{x,y,z} (3, 5, 6, 7)$$

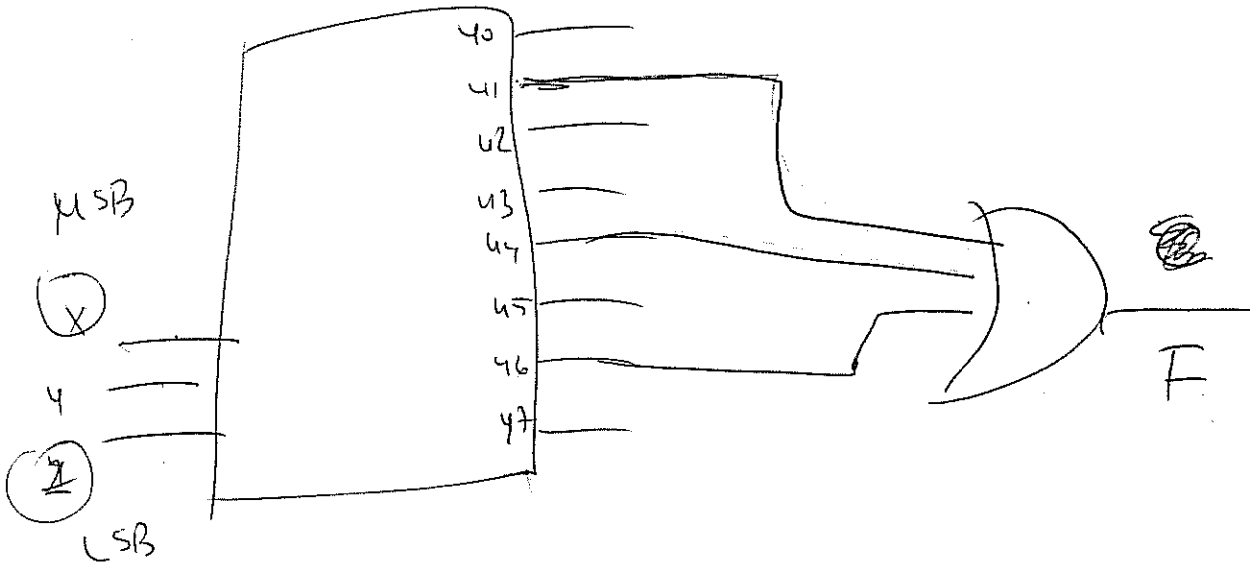


Example: $F = x'y'z + xz'$

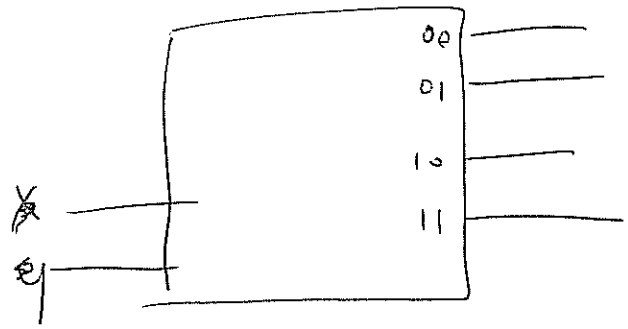
xz' :

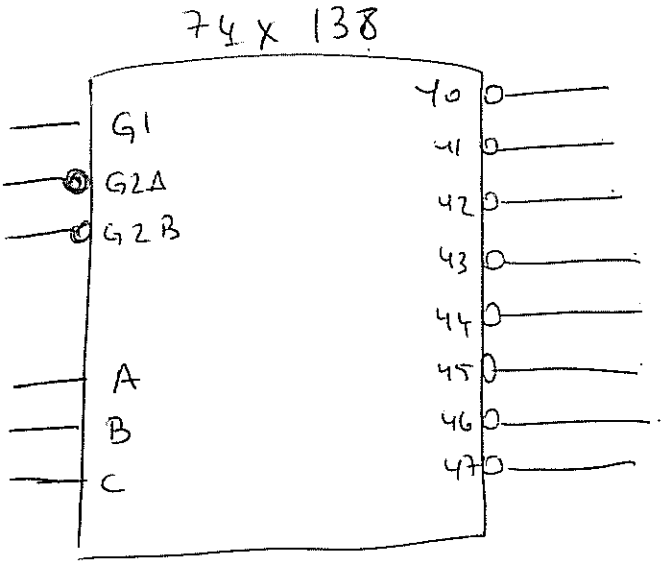
X	Y	Z
1	0	0
1	1	0

	X	Y	Z	F
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	0
6	1	1	0	1
7	1	1	1	0


Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
MSB
X
Y
Z
LSB
F

e.g.


00
01
10
11
X
Y


74 x 138
G1
G2A
G2B
A
B
C
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7

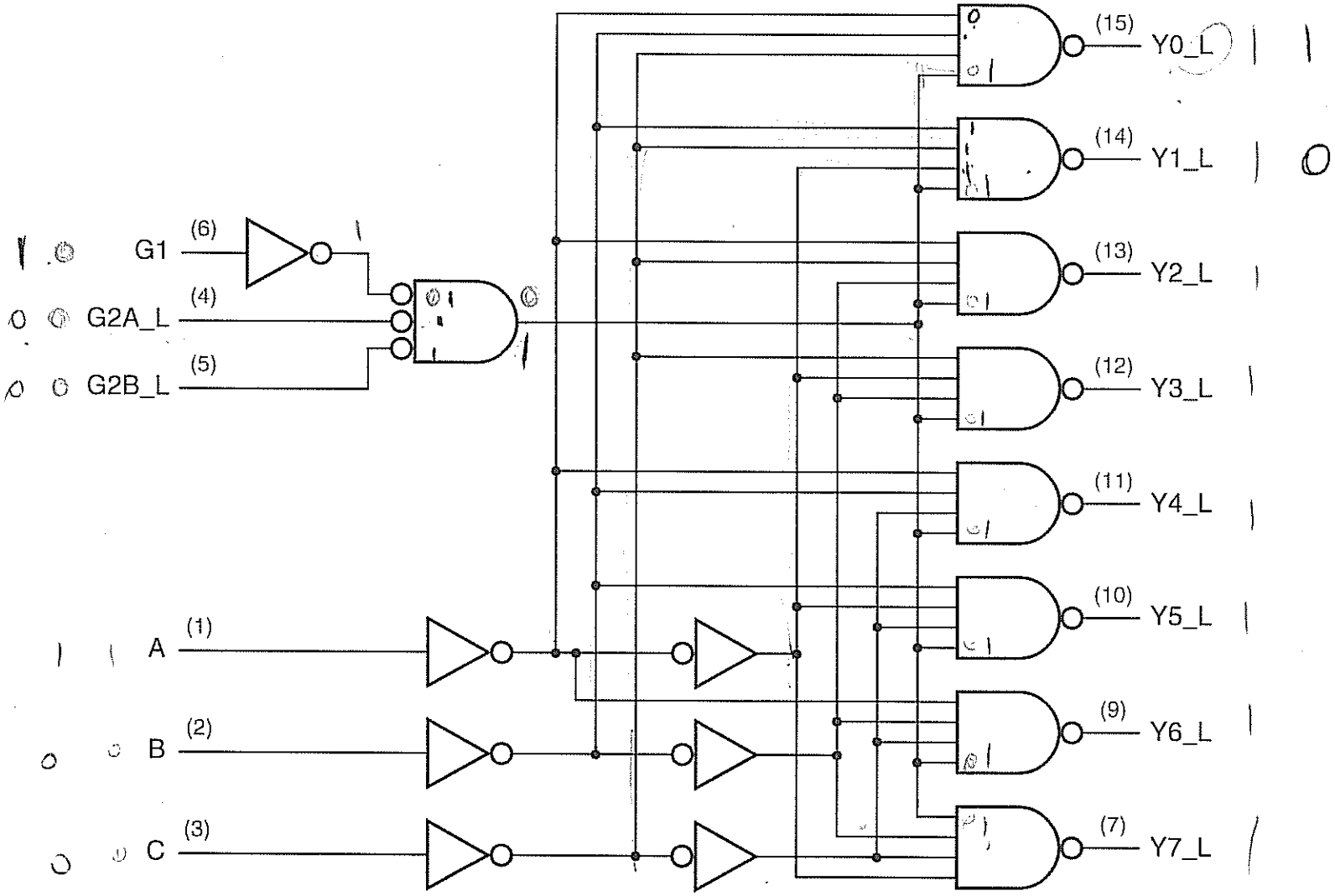


Figure 6-35

Logic diagram for the 74×138 3-to-8 decoder

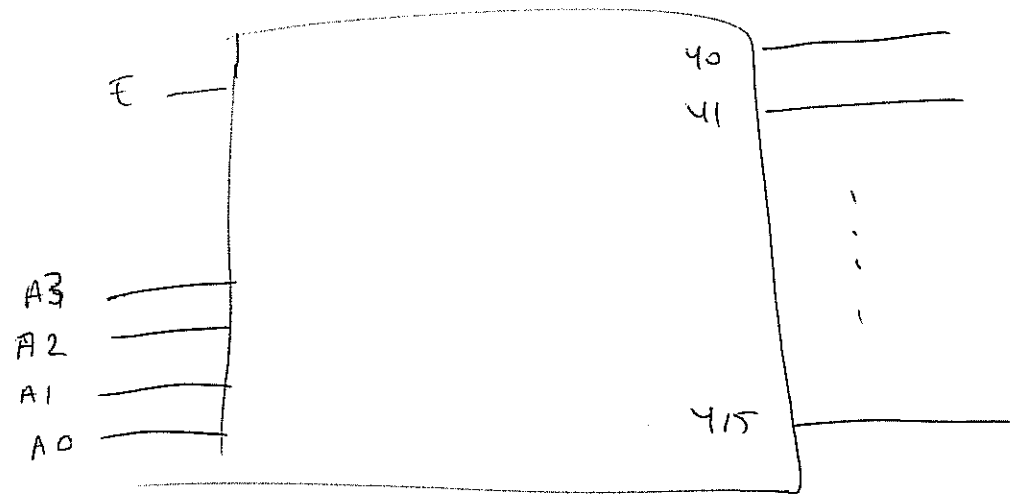
* signal is said to be asserted when it is at its active level.

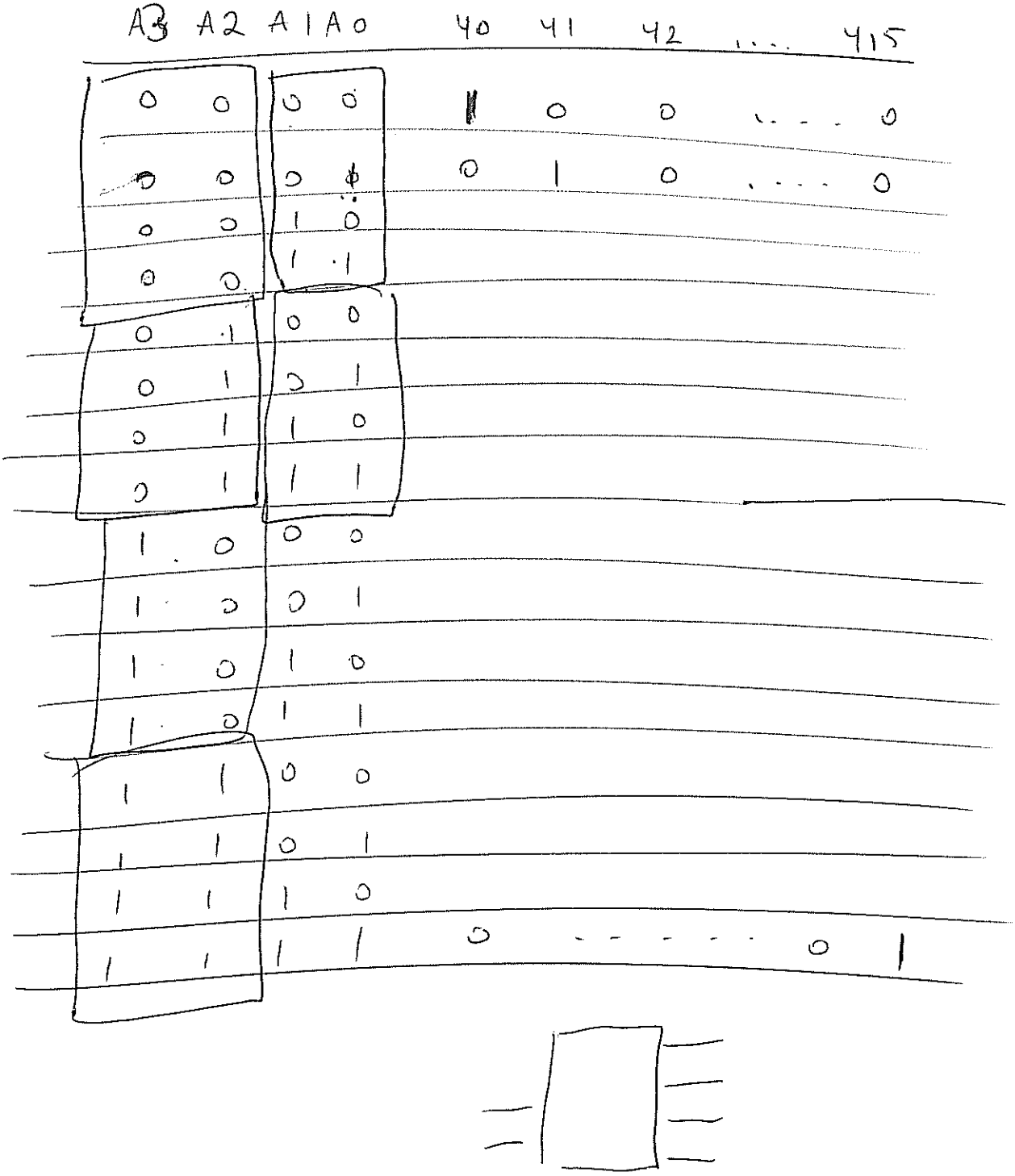
Active level: → active high : if the signal performs the named action or denotes named condition when it is HIGH/1.
↘ active low.

Example: Five 2x4 decoders with one active high enable sign
Implement 4 x 16 decoder.

FIVE 2x4 DECODERS WITH ONE ACTIVE HIGH ENABLE SIGNAL, ASSUME ACTIVE HIGH OUTPUTS.

4 X 16 DECODER.




A3 A2 A1 A0 Y0 Y1 Y2 ... Y15

0011 = 3

1010 = 10