

Figure 3-13 3-to-8-Line Decoder

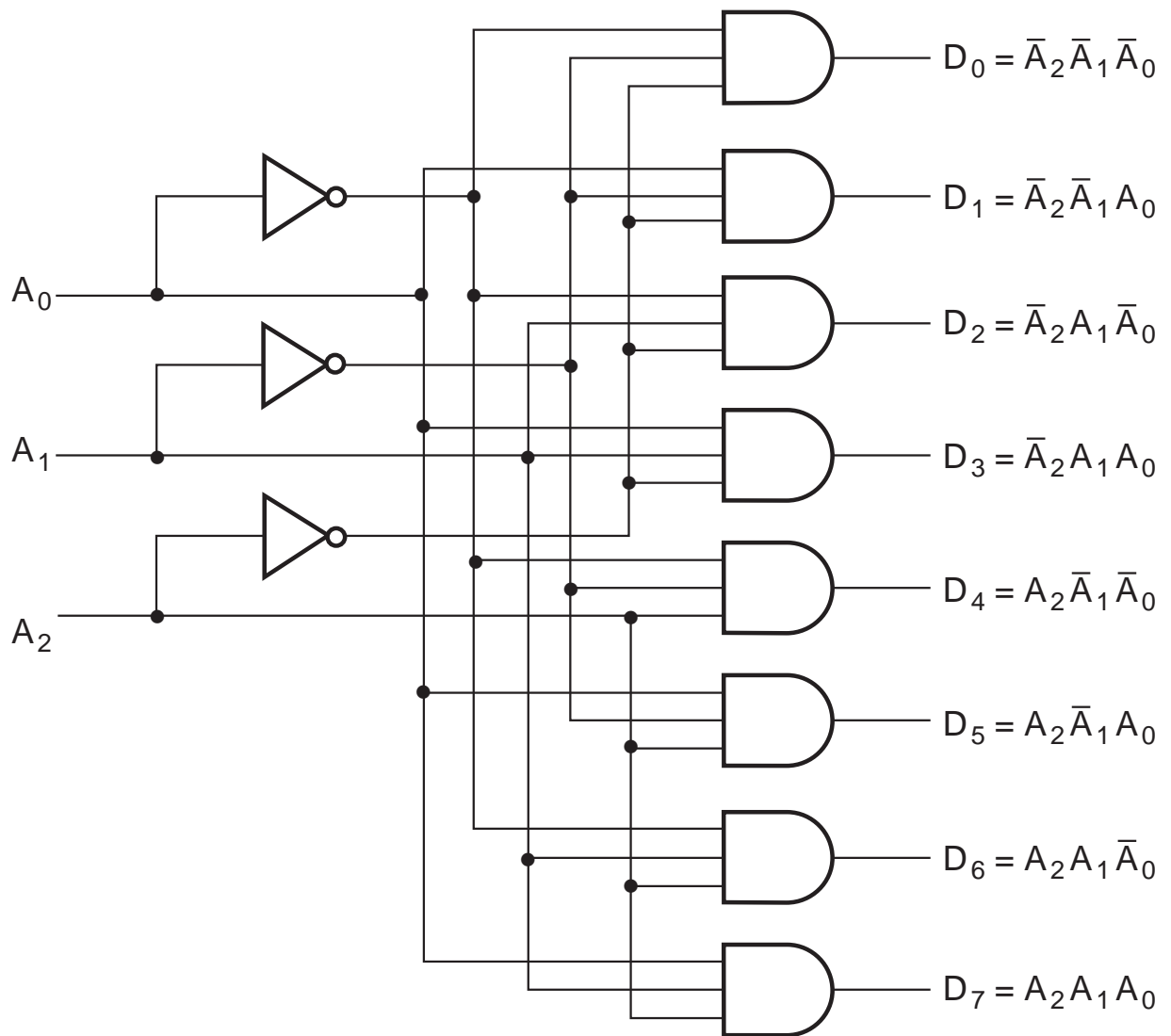
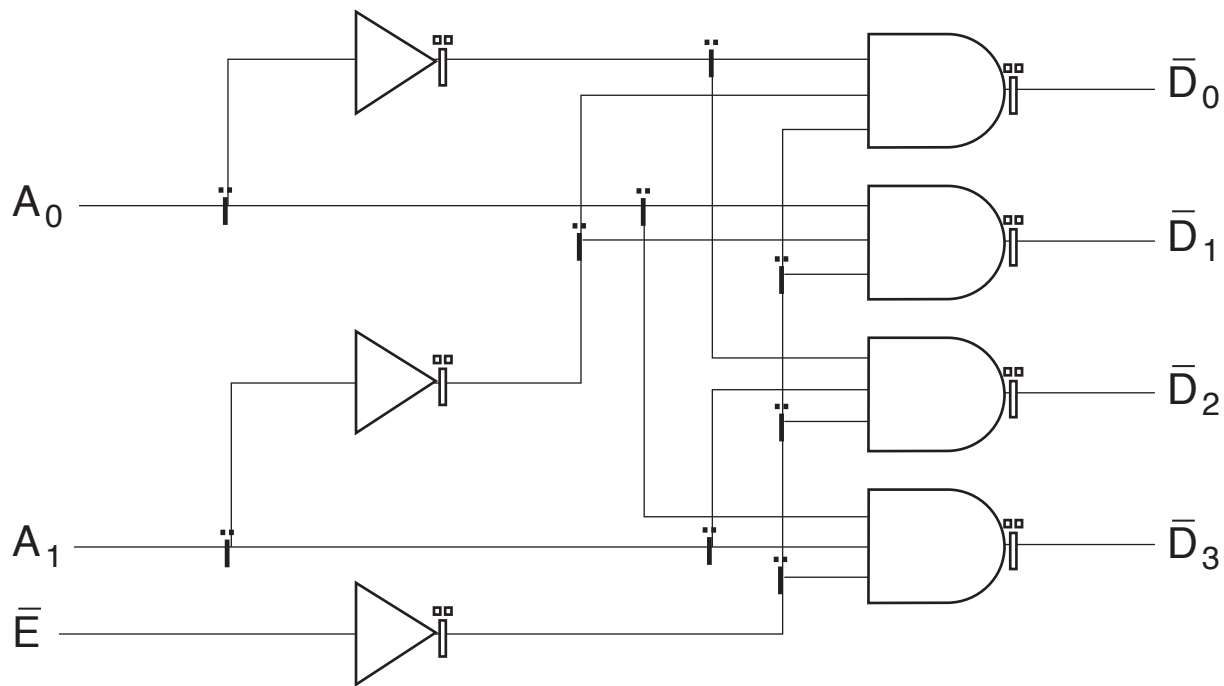


Figure 3-14 A 2-to-4-Line Decoder



(a) Logic diagram

\bar{E}	A_1	A_0	\bar{D}_0	\bar{D}_1	\bar{D}_2	\bar{D}_3
0	0	0	0	1	1	1
0	0	1	1	0	1	1
0	1	0	1	1	0	1
0	1	1	1	1	1	0
1	X	X	1	1	1	1

(b) Truth table

$$\bar{D}_0 = \overline{E \bar{A}_1 \bar{A}_0}$$

$$\bar{D}_1 = \overline{E \bar{A}_1 A_0}$$

$$\bar{D}_2 = \overline{E A_1 \bar{A}_0}$$

$$\bar{D}_3 = \overline{E A_1 A_0}$$

(c) Logic Equations

3-19 Figure 3-15 A 3-to-8 Decoder Constructed with Two 2-to-4 Decoders

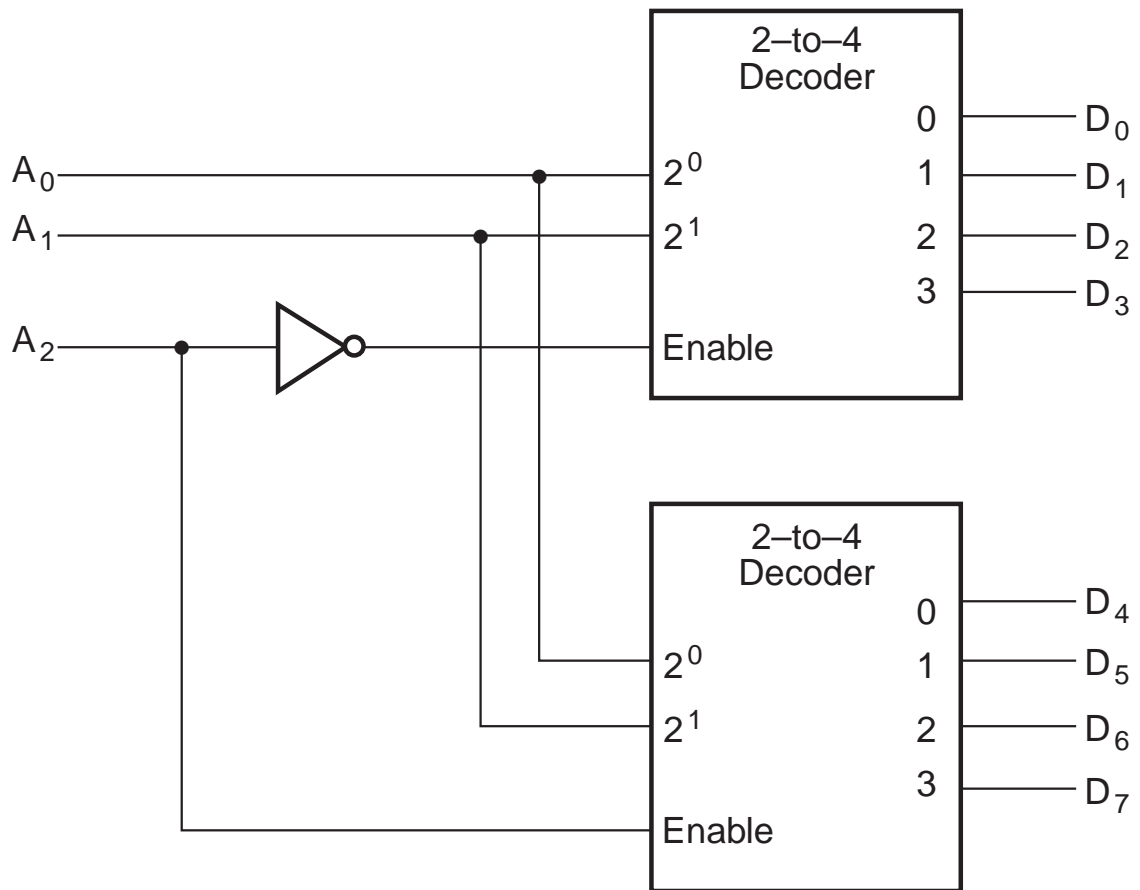


Figure 3-16 Implementing a Binary Adder Using a Decoder

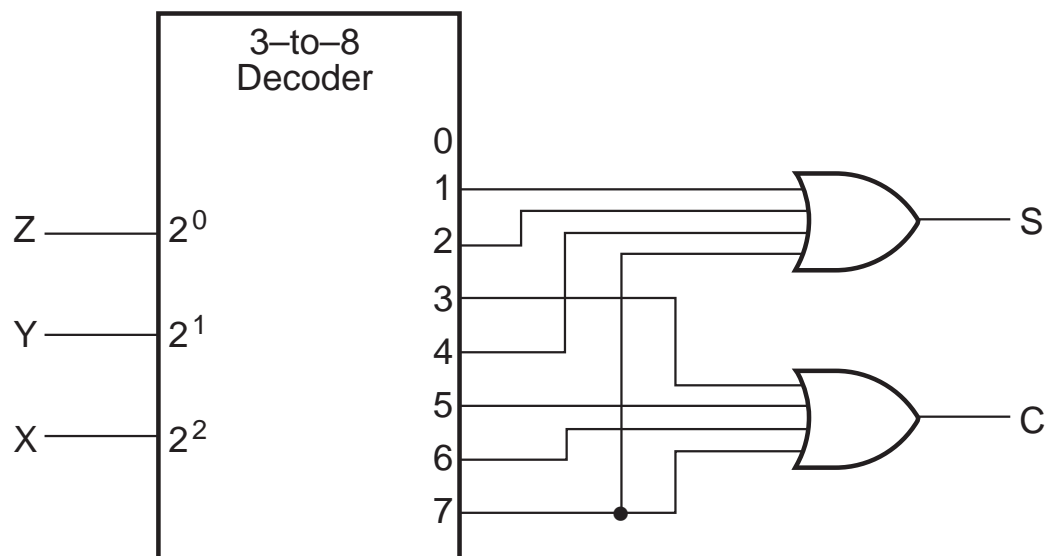


Table 3-5 Truth Table for Octal-to-Binary Encoder

Inputs								Outputs		
D ₇	D ₆	D ₅	D ₄	D ₃	D ₂	D ₁	D ₀	A ₂	A ₁	A ₀
0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	1	0	0	0	1	0
0	0	0	0	1	0	0	0	0	1	1
0	0	0	1	0	0	0	0	1	0	0
0	0	1	0	0	0	0	0	1	0	1
0	1	0	0	0	0	0	0	1	1	0
1	0	0	0	0	0	0	0	1	1	1

Table 3-6 Truth Table of Priority Encoder

Inputs				Outputs		
D_3	D_2	D_1	D_0	A_1	A_0	V
0	0	0	0	X	X	0
0	0	0	1	0	0	1
0	0	1	X	0	1	1
0	1	X	X	1	0	1
1	X	X	X	1	1	1

Figure 3-17 Maps for Priority Encoder

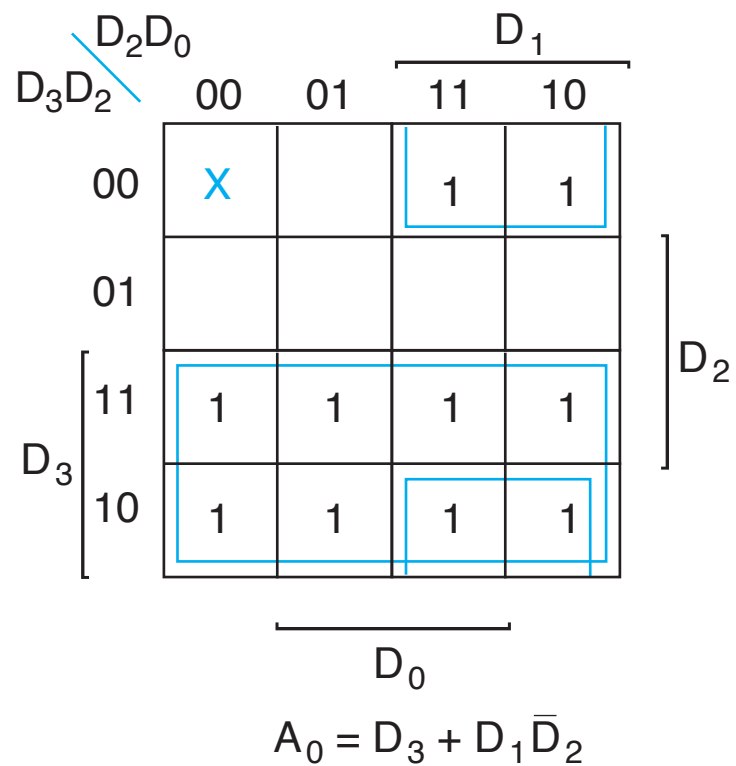
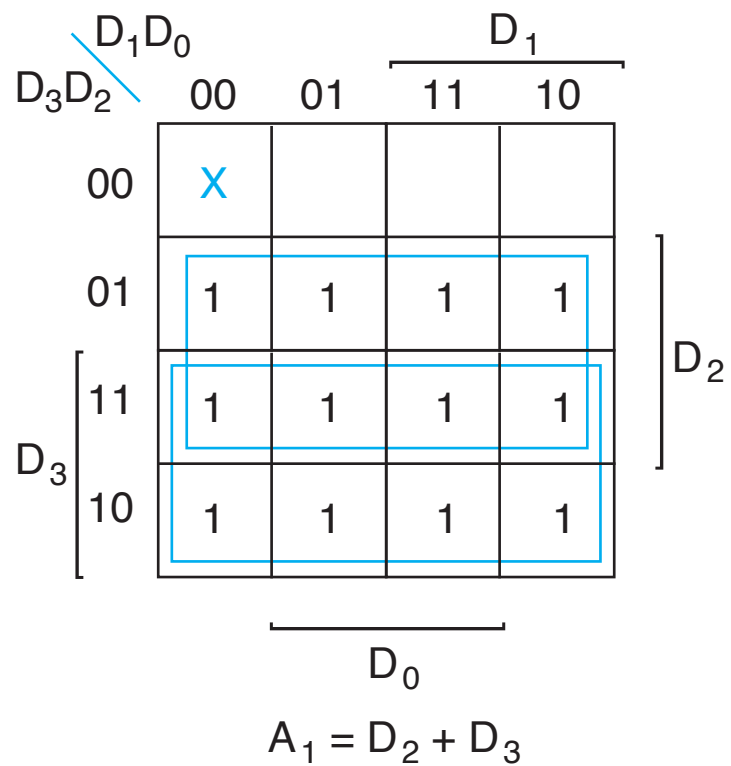


Figure 3-18 Logic Diagram of a 4-Input Priority Encoder

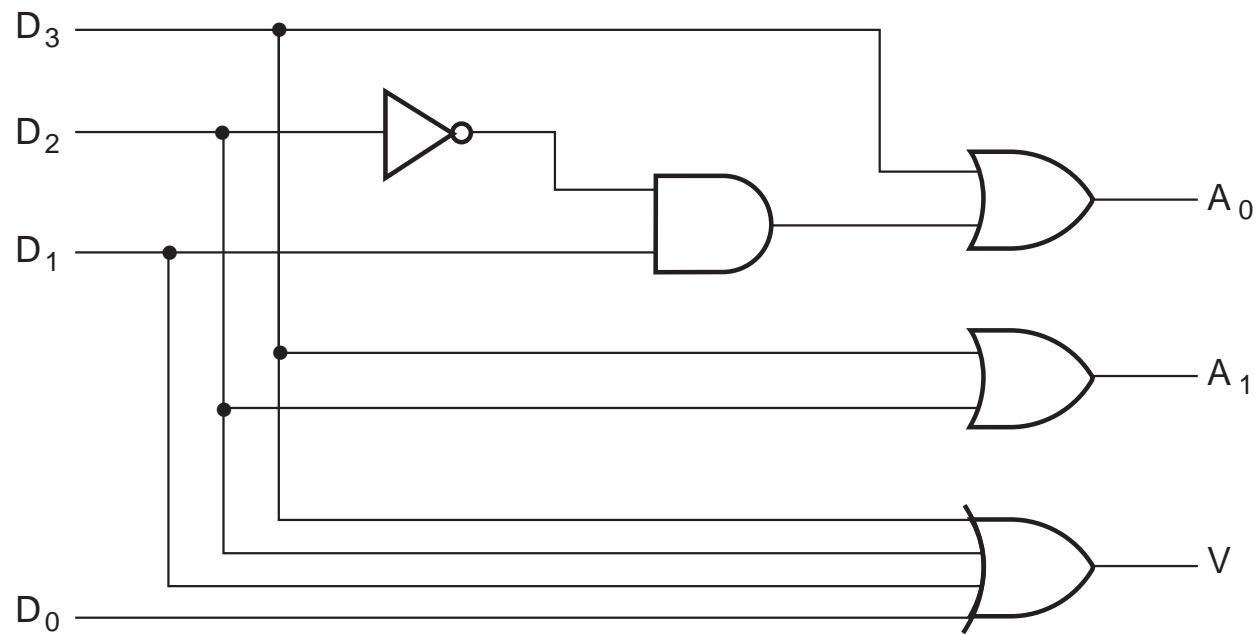


Figure 3-19 4-to-1-Line Multiplexer

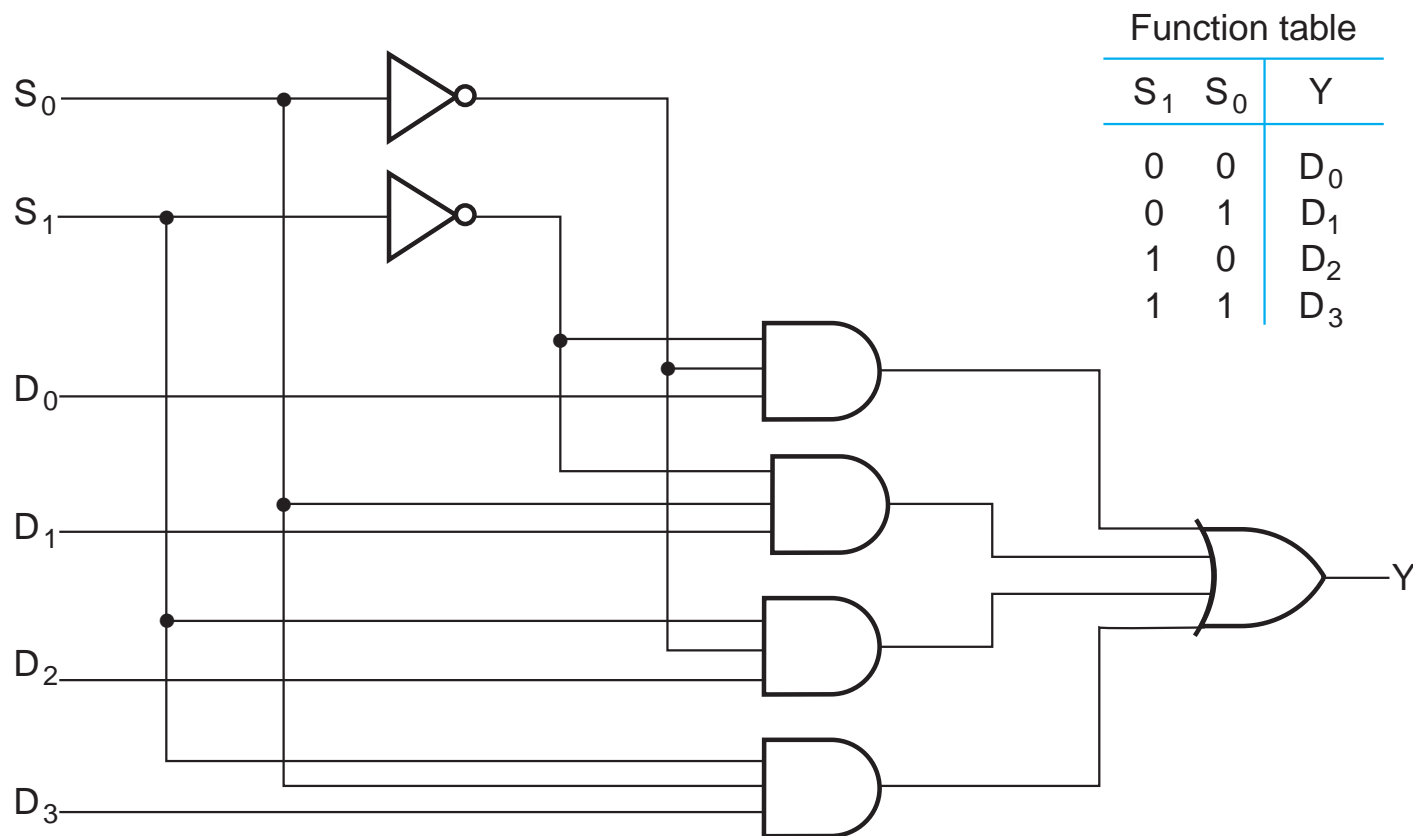
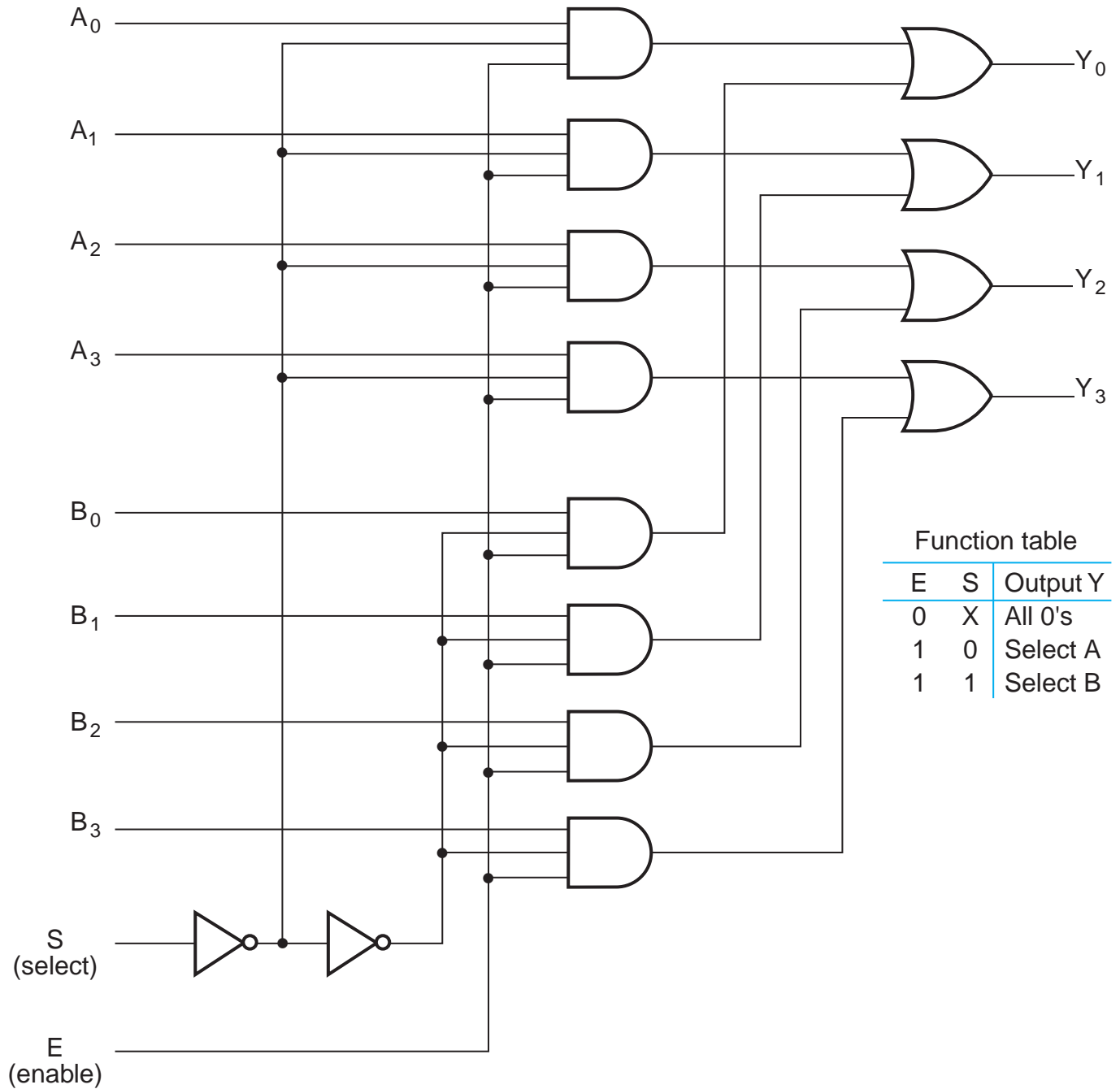


Figure 3-21 Quadruple 2-to-1-Line Multiplexer

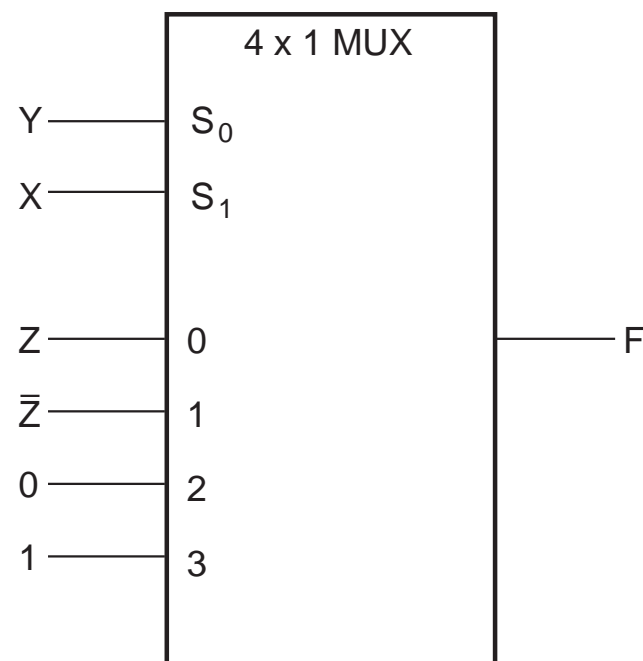


Function table		
E	S	Output Y
0	X	All 0's
1	0	Select A
1	1	Select B

Figure 3-22 Implementing a Boolean Function with a Multiplexer

X	Y	Z	F	
0	0	0	0	$F = Z$
0	0	1	1	
0	1	0	1	$F = \bar{Z}$
0	1	1	0	
1	0	0	0	$F = 0$
1	0	1	0	
1	1	0	1	$F = 1$
1	1	1	1	

(a) Truth table



(b) Multiplexer implementation

Figure 3-23 Implementing a Four-Input Function with a Multiplexer

A	B	C	D	F	
0	0	0	0	0	$F = D$
0	0	0	1	1	
0	0	1	0	0	$F = D$
0	0	1	1	1	
0	1	0	0	1	$F = \bar{D}$
0	1	0	1	0	
0	1	1	0	0	$F = 0$
0	1	1	1	0	
1	0	0	0	0	$F = 0$
1	0	0	1	0	
1	0	1	0	0	$F = D$
1	0	1	1	1	
1	1	0	0	1	$F = 1$
1	1	0	1	1	
1	1	1	0	1	$F = 1$
1	1	1	1	1	

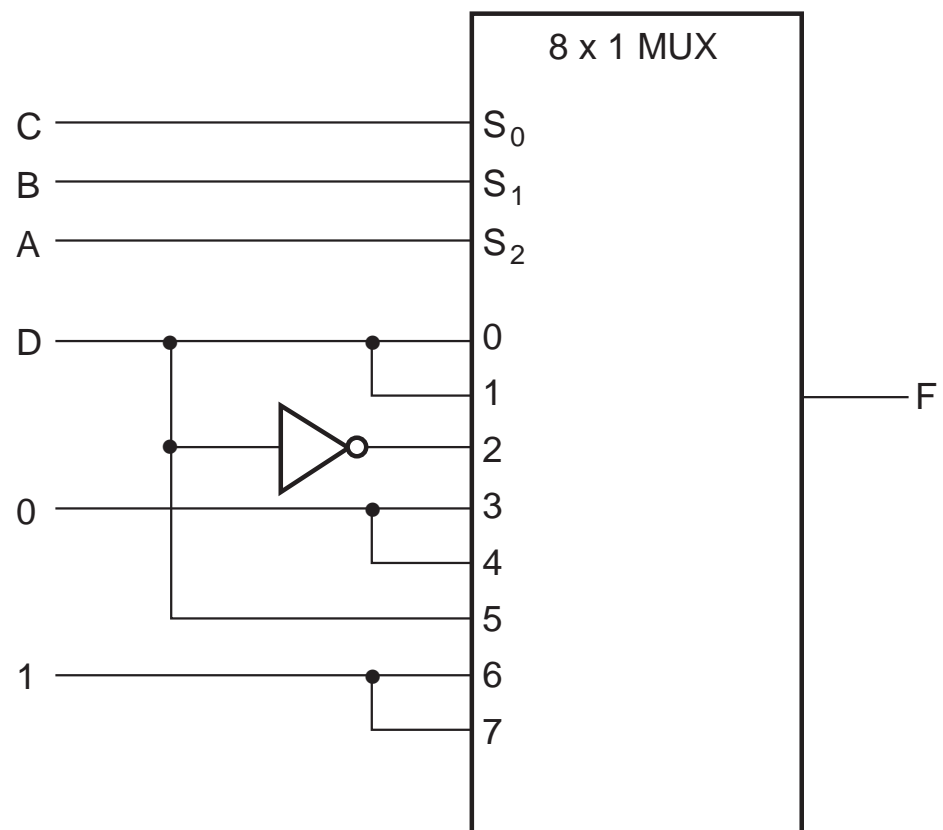


Figure 3-24 1-to-4-Line Demultiplexer

