§4.12

1. $F = \overline{\overline{A\cdot\overline{ABC}}\cdot\overline{B\cdot\overline{ABC}}\cdot\overline{C\cdot\overline{ABC}}}$

$= A\cdot\overline{ABC} + B\cdot\overline{ABC} + C\cdot\overline{ABC}$

$= (A+B+C)\cdot\overline{ABC}$

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
1	0	0	1
0	1	1	1
1	1	0	1
1	0	1	1
1	1	1	0

由真值表知：ABC取值一致时，F=0.

否则，F=1

∴功能为"不一致性判别"电路.

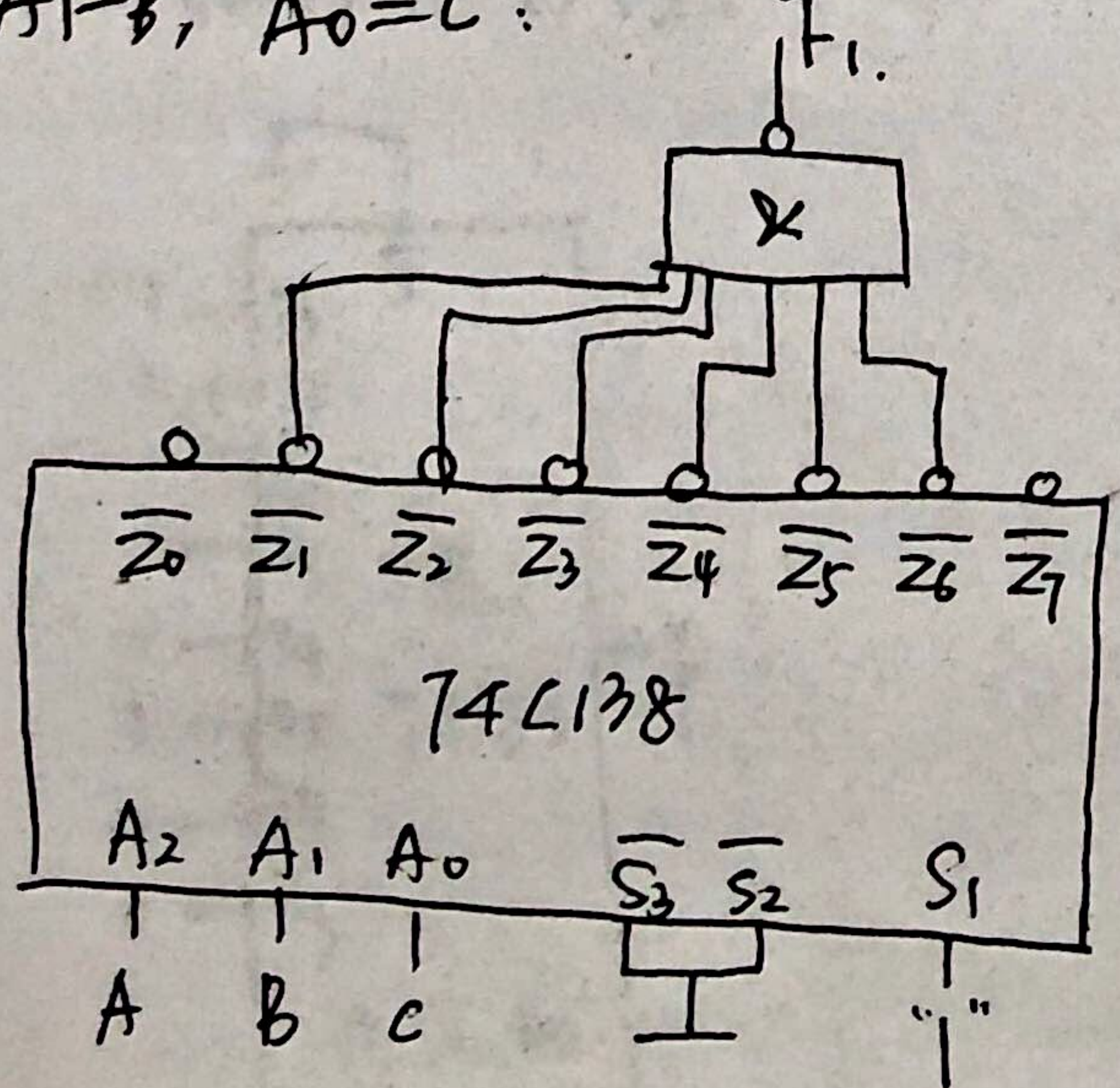
20.(1) $F_1(A,B,C) = A(\bar{B}+B)\bar{C} + (\bar{A}+A)\bar{B}C + \bar{A}B(\bar{C}+C)$

$= A\bar{B}\bar{C} + AB\bar{C} + A\bar{B}C + \bar{A}\bar{B}C + \bar{A}BC + \bar{A}B\bar{C}$

$= m_4 + m_6 + m_5 + m_1 + m_3 + m_2$

$= \overline{\overline{m_1}\cdot\overline{m_2}\cdot\overline{m_3}\cdot\overline{m_4}\cdot\overline{m_5}\cdot\overline{m_6}}$

令 $A_2=A$, $A_1=B$, $A_0=C$:



20.(2) $F(A,B,C,D)=\sum m(0,3,8,9,10,11)+\sum d(1,2,5,14,15)$

F

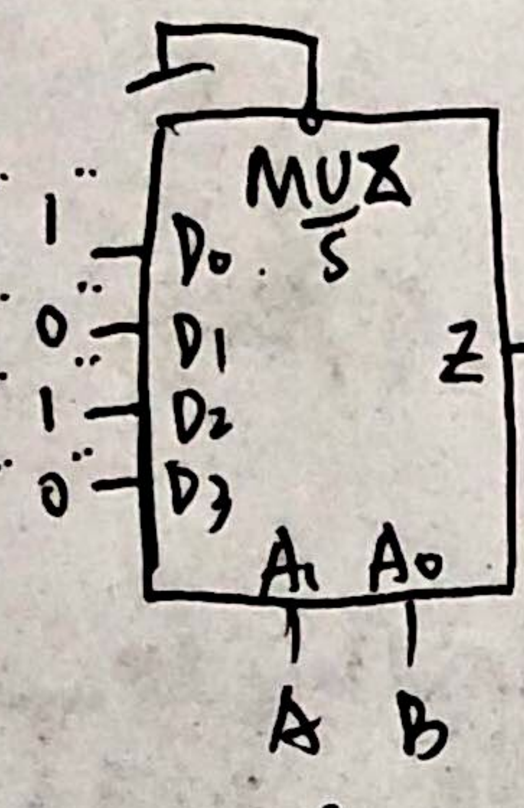
AB (A_1A_0) \ CD	00	01	11	10
00	1	d	1	d
01		d		
11			d	d
10	1	1	1	1

4选1: $Y=\bar{A}_1\bar{A}_0D_0+\bar{A}_1A_0D_1+A_1\bar{A}_0D_2+A_1A_0D_3$

以 A、B作为地址选择码:

$\therefore F=\bar{A}\bar{B}\cdot 1+A\bar{B}\cdot 1$

$\Rightarrow D_0=1,\ D_2=1,\ D_1=D_3=0.$



(4选1)

8选1: 以 ~~A·B·C·D 作为地址选择码~~:

~~A B C D F~~

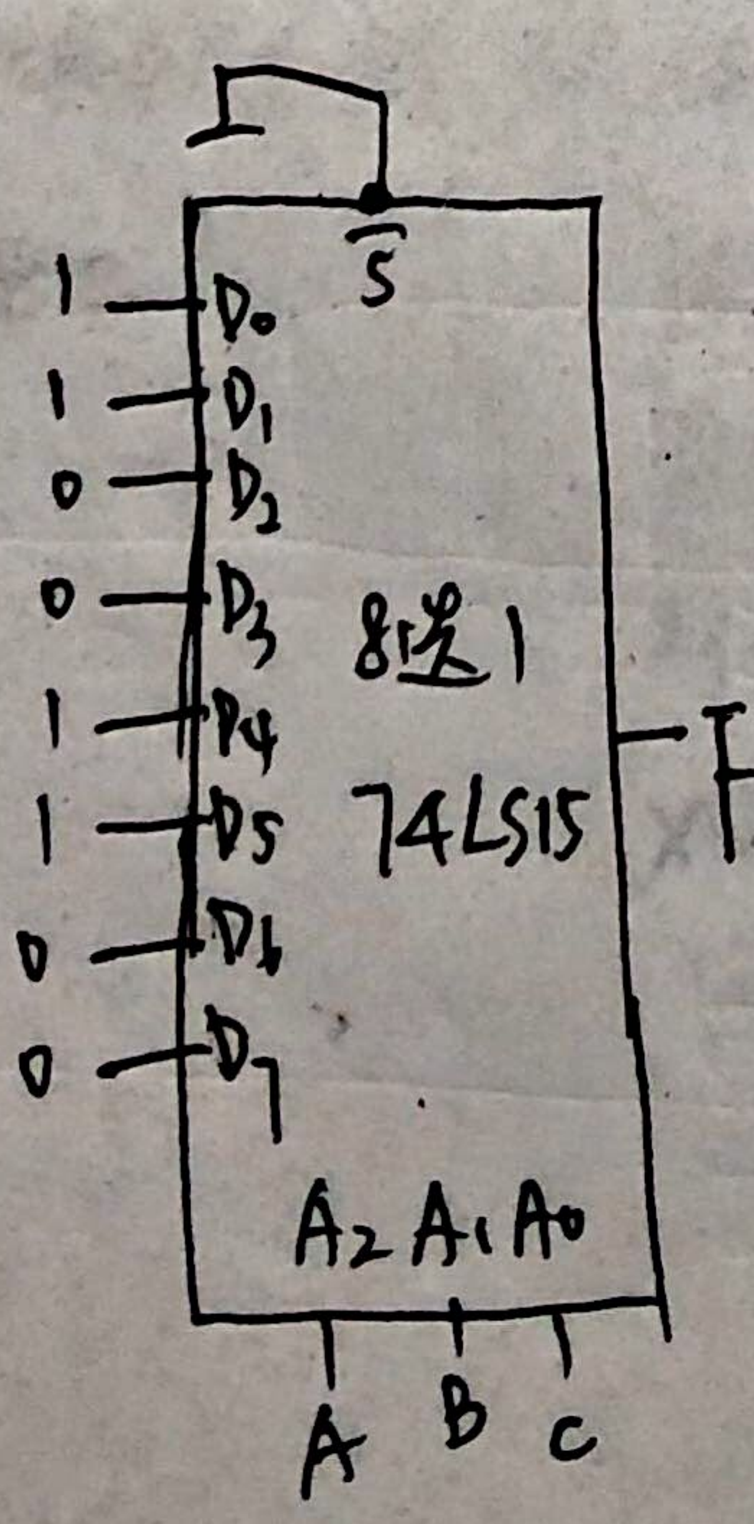
$Y=\bar{A}_2\bar{A}_1\bar{A}_0D_0+\bar{A}_2\bar{A}_1A_0D_1+\bar{A}_2A_1\bar{A}_0D_2+\bar{A}_2A_1A_0D_3+A_2\bar{A}_1\bar{A}_0D_4+A_2\bar{A}_1A_0D_5+A_2A_1\bar{A}_0D_6+A_2A_1A_0D_7$

$F=(A+\bar{A})\bar{B}(C+\bar{C})(D+\bar{D})$

$=A\bar{B}CD+A\bar{B}C\bar{D}+A\bar{B}\bar{C}D+A\bar{B}\bar{C}\bar{D}+\bar{A}\bar{B}CD+\bar{A}\bar{B}C\bar{D}+\bar{A}\bar{B}\bar{C}D$

$+\bar{A}\bar{B}\bar{C}\bar{D}$，以 A、B、C作为地址选择

$\Rightarrow D_0=1,\ D_1=1,\ D_2=0,\ D_3=0,\ D_4=1,\ D_5=1,\ D_6=0,\ D_7=0.$



附加：设Ai，Bi为本位，Ci为低位进位or借位.

Si为本位结果，Ci+1：高进位or借位.

X	Ai	Bi	Ci	Si	Ci+1
0	0	0	0	0	0
0	0	0	1	1	1
0	0	1	0	1	1
0	0	1	1	0	1
0	1	0	0	1	0
0	1	0	1	0	0
0	1	1	0	0	0
0	1	1	1	1	1

(减)

X	Ai	Bi	Ci	Si	Ci+1
1	0	0	0	0	0
1	0	0	1	1	0
1	0	1	0	1	0
1	0	1	1	0	1
1	1	0	0	1	0
1	1	0	1	0	1
1	1	1	0	0	1
1	1	1	1	0	1

(加)

S

XA \ BC	00	01	11	10
00		1		1
01	1		1	
11	1		1	
10		1		1

C

XA \ BC	00	01	11	10
00		1	1	1
01			1	
11		1	1	1
10			1	

$S = A\bar{B}\bar{C} + \bar{A}\bar{B}C + ABC + \bar{A}B\bar{C}$

$= \bar{A}(\bar{B}C + B\bar{C}) + A(\bar{B}\bar{C} + BC)$

$= \bar{A}(\bar{B}C + B\bar{C}) + A(\overline{\bar{B}C + B\bar{C}})$

$= A \oplus B \oplus C$

$C = BC + \bar{X}\bar{A}C + \bar{X}\bar{A}B + XAC + XAB$

$= BC + \bar{X}\bar{A}(B+C) + XA(B+C)$

$= BC + (B+C)(\overline{X \oplus A})$