

2018 8

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74LS00

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74LS20

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74LS86

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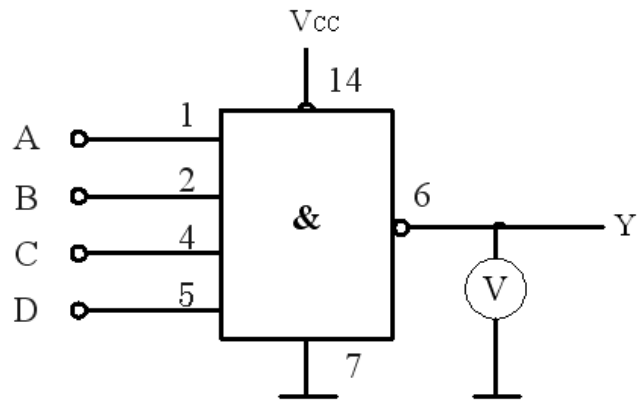
74LS20

3.1.1

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3.1.1

3.1.1



3.1.1

3.1.1

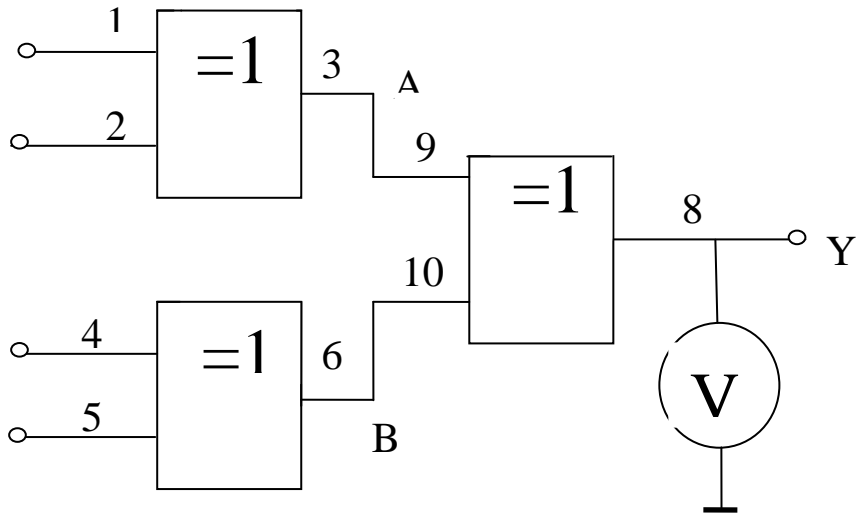
1	2	4	5	Y	V
H	H	H	H		
L	H	H	H		
L	L	H	H		
L	L	L	H		
L	L	L	L		

2

1 74LS86

3.1.2

A B Y



3.1.2

2

3.1.2

3.1.2

3.1.2

1	2	4	5	Y	V
H	H	H	H		
L	H	H	H		
L	L	H	H		
L	L	L	H		
L	L	L	L		

3

1 74LS00

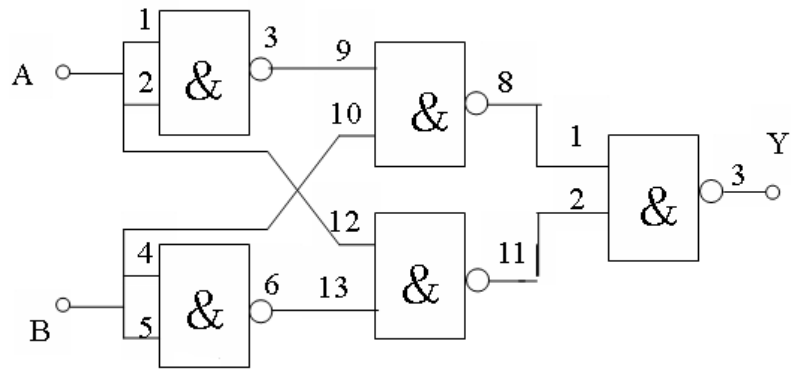
3.1.3

3.1.4

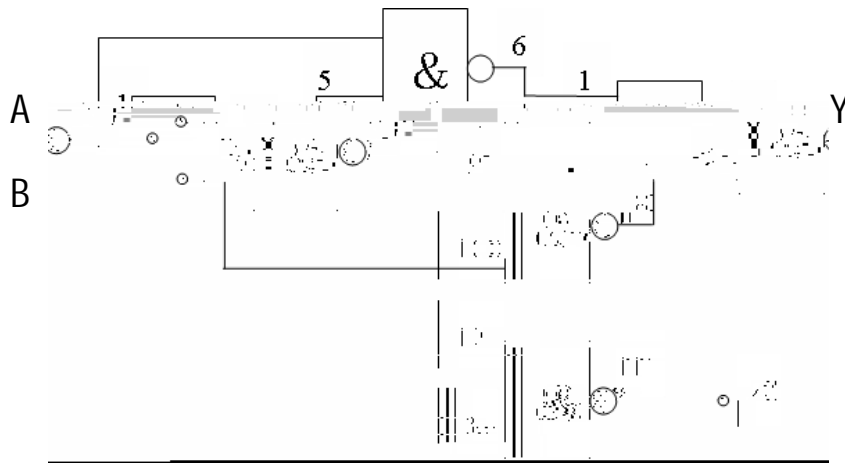
3.1.3

3.1.4

2



3.1.3



3.1.4

3.1.3

A	B	Y
L	L	
L	H	
H	L	
H	H	

Y

3.1.4

A	B	Y	Z
L	L		
L	H		

H	L		
H	H		

4

1

74LS00

$$F = \overline{\overline{A+B}} = \overline{\overline{A} \bullet \overline{B}}$$

3.1.5

3.1.5

A	B	F
L	L	
L	H	
H	L	
H	H	

2

74LS00

3.1.6

3.1.6

A	B	F
L	L	
L	H	
H	L	
H	H	

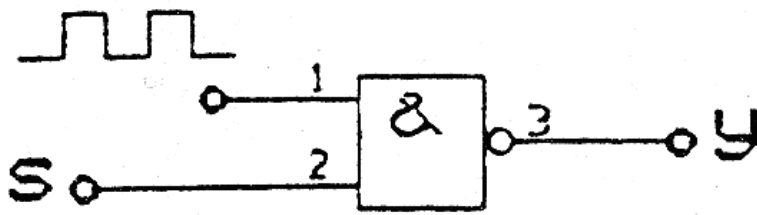
5

74LS00

3.1.5

S

S



3.1.5

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1

1

2

3

2

1

2

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74LS00

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74LS86

1

74LS54

1

3

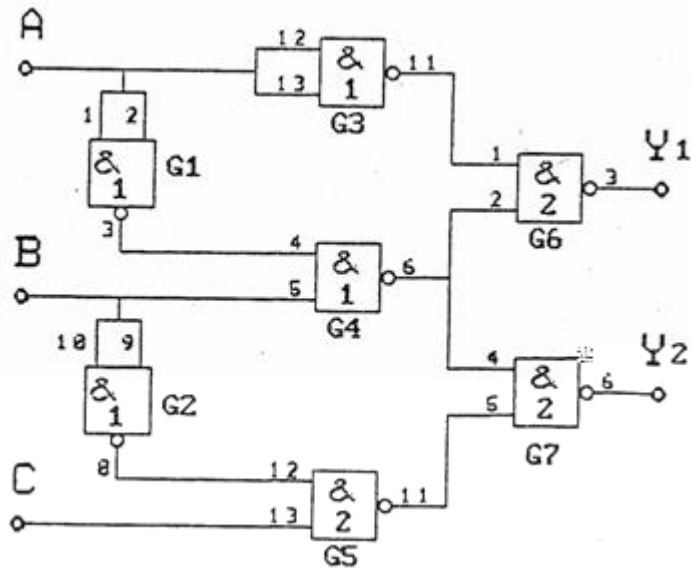
1

2

3

4

1



3.1.6 2 74LS00

1) 2 74LS00 3.1.6

2 A B C Y_1 Y_2

3 3.1.7 Y_1 Y_2

4

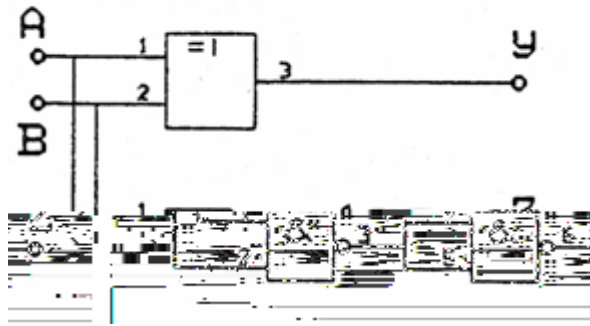
3.1.7

A	C	Y_1	Y_2
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

2

74LS86

74LS00



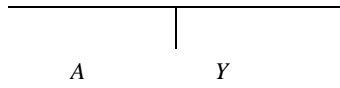
3.1.7

3.1.7

1 *A B* *Y Z*

2 3.1.8

3.1.8



1 0 1	
1 1 0	
1 1 1	

5

1

2

1

1

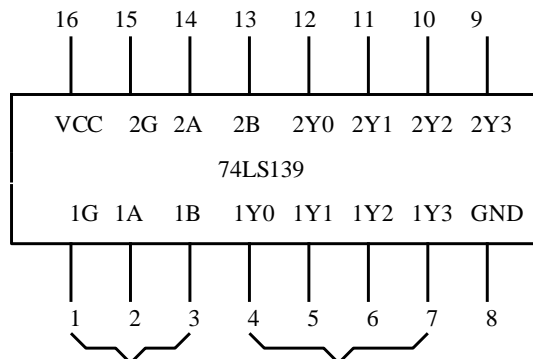
2

2

1

74LSI 39

74LSI 53



3. 1. 8 74LSI 39

3. 1. 10

G	B	A	Y ₀	Y ₁	Y ₂	Y ₃
H	X	X				
L	L	L				
L	L	H				
L	H	L				
L	H	H				

2

2 4

3 8

1)

2)

3)

3 8

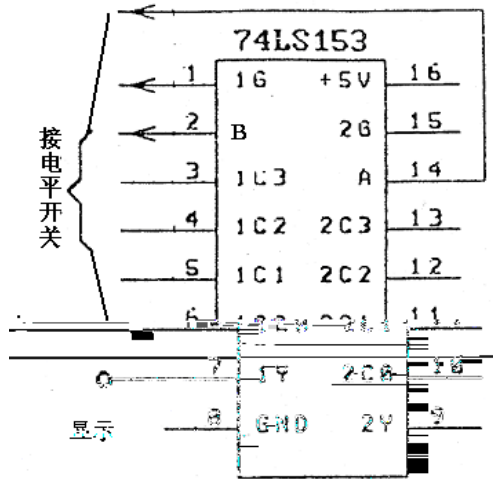
3

1 4 1

74LSI 53

3. 1. 9

3. 1. 11



3.1.9 4 1 74LS153

3.1.11

B	A	C ₀	C ₁	C ₂	C ₃	G	Y
X	X	X	X	X	X	H	
L	L	L	X	X	X	L	
L	L	H	X	X	X	L	
L	H	X	L	X	X	L	
L	H	X	H	X	X	L	
H	L	X	X	L	X	L	
H	L	X	X	H	X	L	
H	H	X	X	X	L	L	
H	H	X	X	X	H	L	

2) 4 1 74LS153 Y=AB+AC

Y=AB+AC 3.1.12

3.1.12

5

1

2 3

2

1

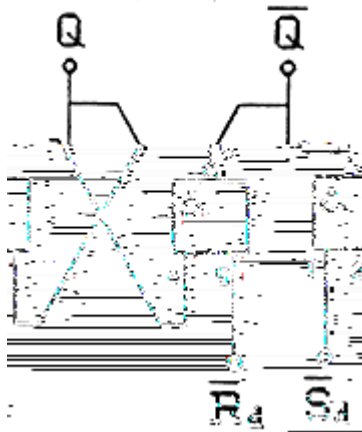
1

RS D JK @ 1yēāB *6 ¼ JVñ enUS

Ä

- 2
- 3
- 4
- 1 RS

RS 3.1.10



3.1.10 RS

1 3.1.13 $\overline{S_d}$ $\overline{R_d}$ Q \overline{Q}

3.1.13

3.1.13

$\overline{S_d}$	$\overline{R_d}$	Q	\overline{Q}	
L	L			
L	H			
H	L			
H	H			

2 $\overline{S_d}$ $\overline{R_d}$

3 $\overline{S_d}$ $\overline{R_d}$

4 $\overline{R_d}$ $\overline{S_d}$

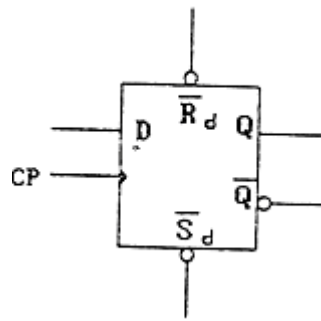
2 3 4 Q \overline{Q} RS Q

\overline{Q} $\overline{S_d} \quad \overline{R_d}$ 5 $\overline{S_d} \quad \overline{R_d}$ 0 \overline{Q} $\overline{S_d} \quad \overline{R_d}$ 0 \overline{Q} 3-5 0 \overline{Q}

2 D

D 74LS74 3.1.11 $\overline{S_d}$ 1 $\overline{R_d}$

0 CP



3.1.11 74LS74

1 $\overline{S_d} \quad \overline{R_d}$ 0 \overline{Q} 2 $\overline{S_d} = \overline{R_d} = 1$ D CP CP 0 1

0

3 $\overline{S_d} = \overline{R_d} = 1$ CP=0 CP=1 D Q

3.1.14

3.1.14

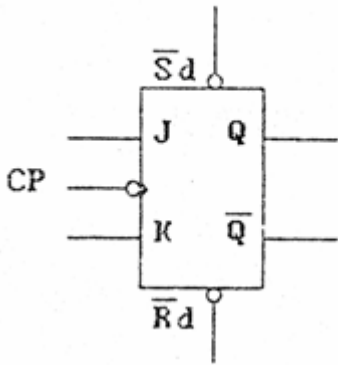
$\overline{S_d}$	$\overline{R_d}$	CP	D	Q ⁿ	Q ⁿ⁺¹
0	1			0	

4) $\overline{S_d} = \overline{R_d} = 1$ D \overline{Q} CP Q CP

3 JK

JK 74LS112 3.1.12 $\overline{S_d}$ 1 $\overline{R_d}$

0 CP



3.1.12 74LS112

1

3.1.15

3.1.15

$\overline{S_d}$	$\overline{R_d}$	CP	J	K	Q^n	Q^{n+1}
0	1					
1	0					
1	1		0	0		
1	1		1	0		
1	1			0	1	
1	1			1	1	

2 $\overline{S_d} = \overline{R_d} = 1$ $J=K=1$ CP Q CP

D D \overline{Q} CP Q

4

1 D JK T ,

2 CP CP Q

3

5

1

2 4

3

1

1

2

2

1

2

3

4 74LS00 1

74LS10 1

74LS175 D 1

74LS73 JK 2

3

1

2 D JK

3

4

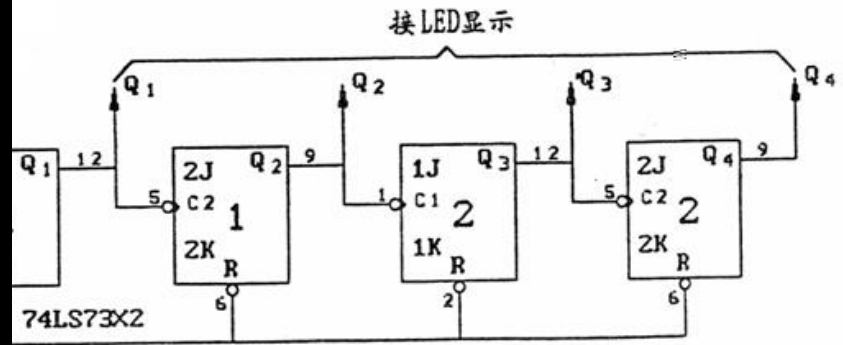
1

3.1.13

1 CP

Q₁ Q₂

3.1.16

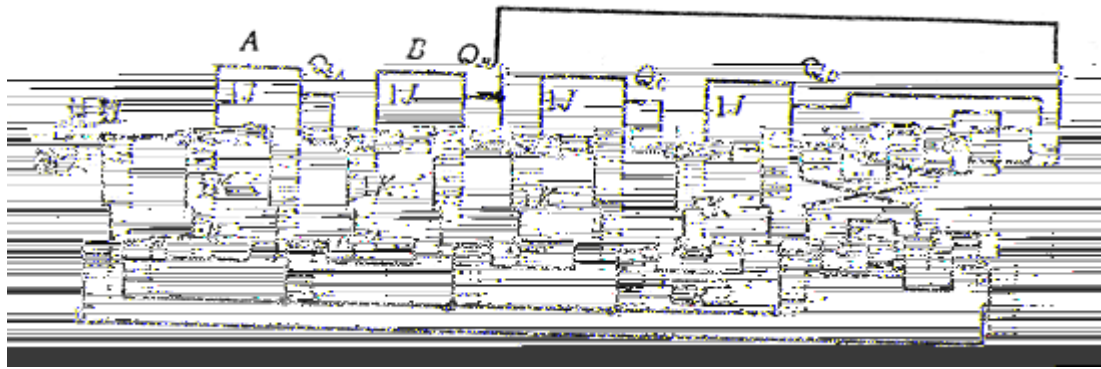


3.1.13

3.1.16

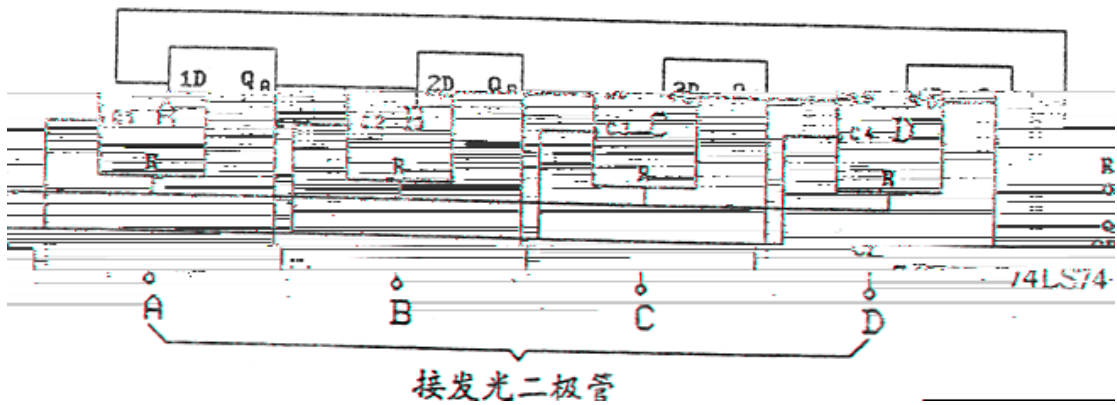
Q_3	Q_4	CP	Q_1	Q_2	Q_3	Q_4
		9				
		10				
		11				
		12				
		13				
		14				
		15				

16



3.1.14

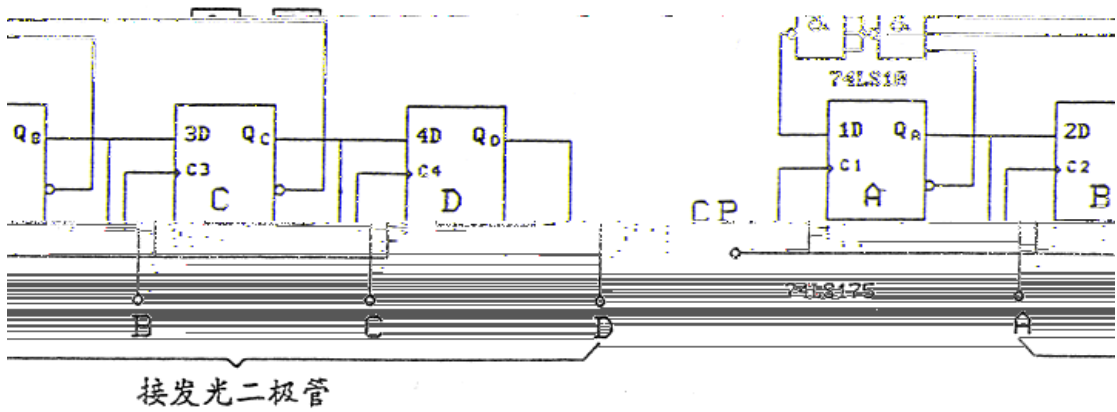
2
 1 3.1.15 ABCD 1000,
 0 1 CP



3.1.15

1

2 3.1.16



3.1.16

2

5

1

2

3

1

1

2

3

2

1

74LS160 12

1

2

2

74LS161 12

3

74LS160

M 1

M 0

3

4

1

2

74LS161 74LS160

CP 1Hz

$Q_0Q_1Q_2Q_3$

3

Multisim Max+plus

5

1

2

74LS161 74LS160 12

6

1

2

3

4 Multisim Max+plus

5

()

6

7

1

1 555

2 555

2

1

2

3

4 555

3

1 555

2

3 555

4

T_w

T

f_o

D

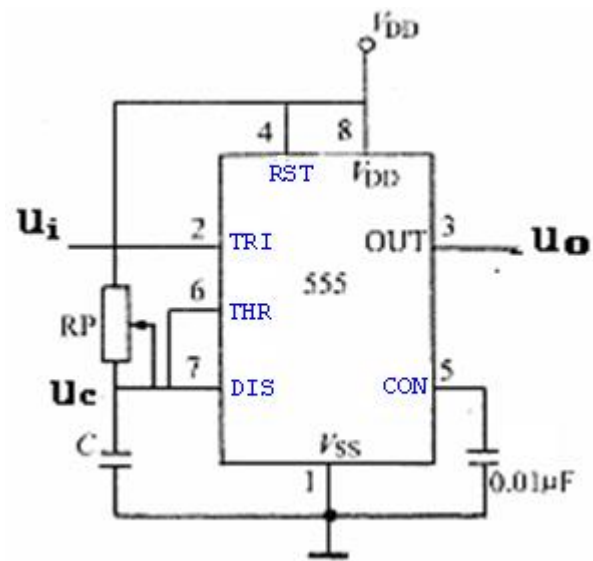
4

1 555

3. 1. 17

$R_p=10K$

$C=0.047\mu F$

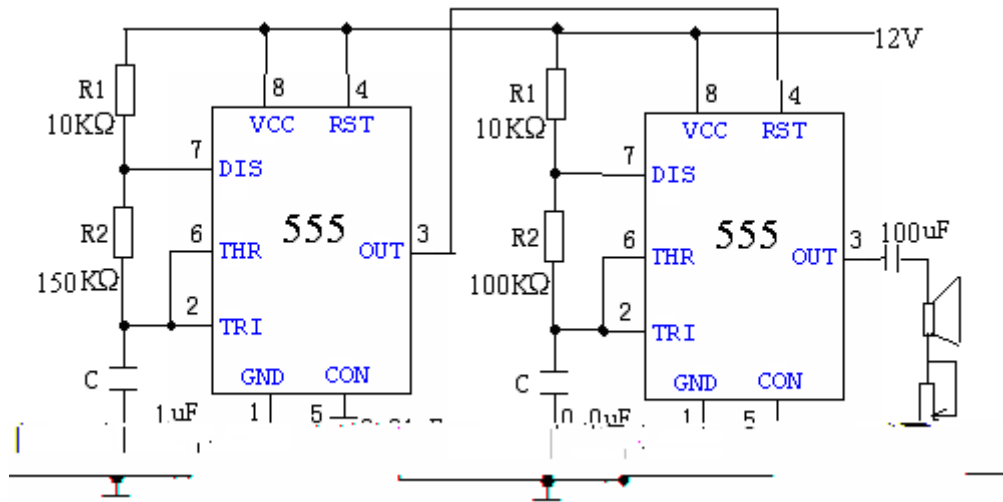


3.1.17

1

- 1 u_b u_c u_b u_c
 - 2 R_2 C R_2 C T_w
 - T f_0 D
- (3)

3.1.19



3.1.19

- 1
- 2
- 3 555 4 5 555

5.

- (1)
- (2)

1

- 1 555
- 2

3
4
5
2

1 555

2

3

3

1 555

2

3

4

4

1

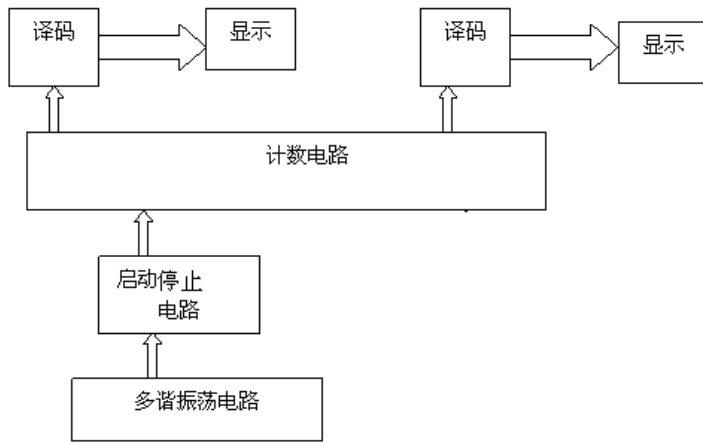
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4	:	74LS160	2
		74LS247	2
		74LS00	1
		74LS08	1
		555	1

5.

3. 1. 20



3. 1. 20

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555 RC

2

S +5V

S

3

74LS160 74LS161 74LS290

74LS160

74LS160

74LS160

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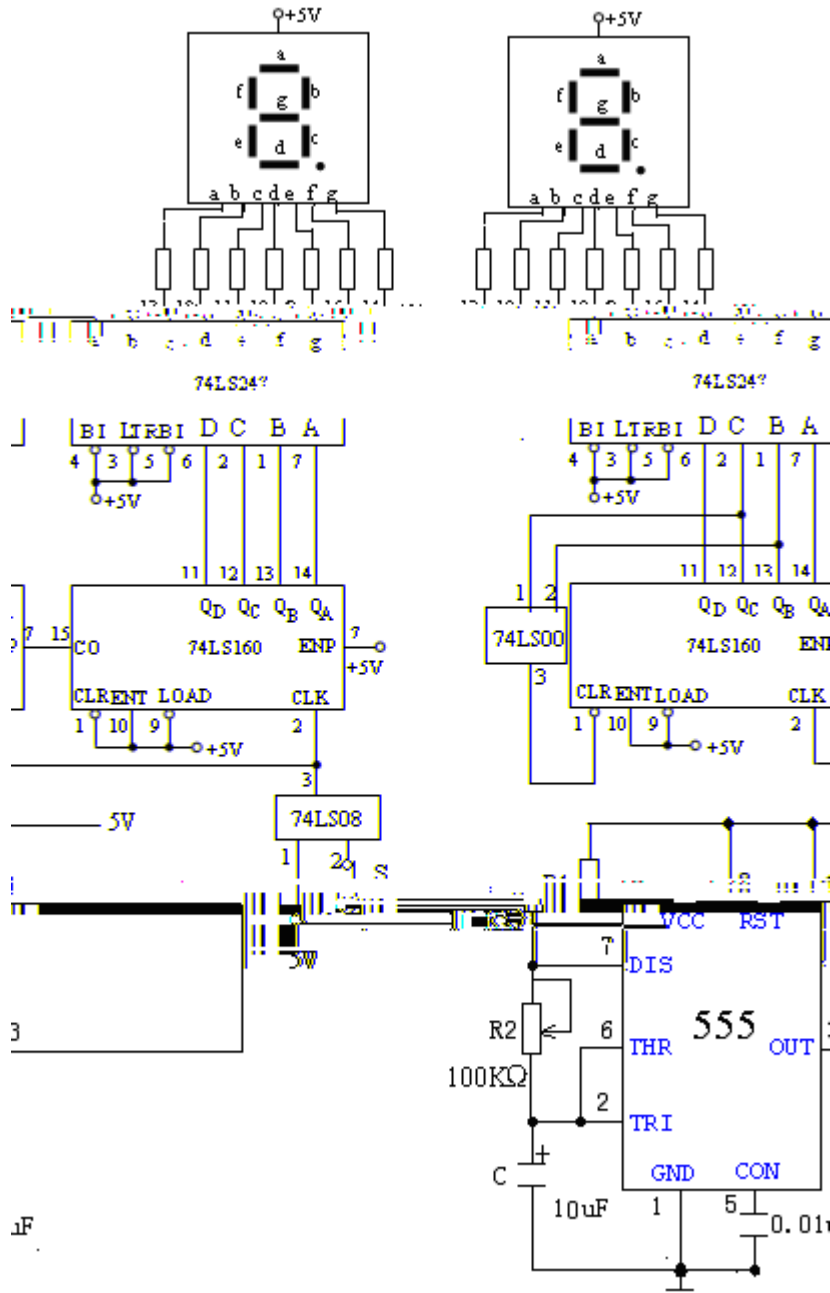
74LS248

74LS247

, 74LS247

, 74LS247

3. 1. 21



3.1.21

6

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EDA

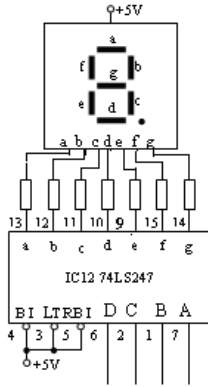
3.1.21

2

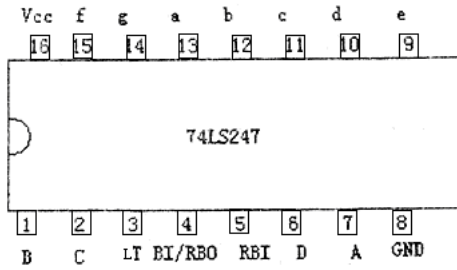
3.1.22 , 74LS247 DCBA 0101 1001 0011

3.1.17 74LS247 3.1.23 ,74LS247 3.1.18

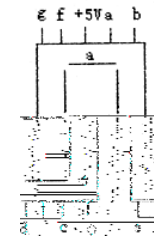
3.1.24



3.1.22



3.1.23 74LS247



3.1.24

3.1.17

D	C	B	A	
0	0	0	0	
0	0	0	1	
0	0	1	1	
0	1	0	1	
0	1	1	1	
1	0	0	1	

3.1.18 74LS247

LT	RBI	BI/RBO	D	C	B	A	a	b	c	d	e	f	g	
0	x	1	x	x	x	x	0	0	0	0	0	0	0	8
x	x	0	x	x	x	x	1	1	1	1	1	1	1	
1	0	0	0	0	0	0	1	1	1	1	1	1	1	0
1	1	1	0	0	0	0	0	0	0	0	0	0	1	0
		.								.				.
		.								.				.
1	1	1	1	0	0	1	0	0	0	1	0	0	0	9

3.1.19

CP	Q _D	Q _C	Q _B	Q _A	
	0	0	0	0	0
1					
2					
3					
4					

4

N

74LS160

74LS00

6

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3.1.26

3.1.20

CP	Q _D	Q _C	Q _B	Q _A	
	0	0	0	0	0
1	0	0	0	1	1
2	0	0	1	0	2
3					
4					
5					
6					

5

555

3.1.27

1HZ

R2

3

A.

B

C

6

7

1

2

3

4 Multisim Max+plus

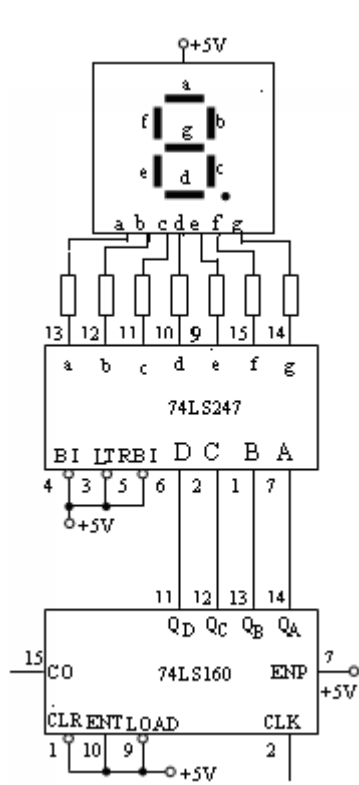
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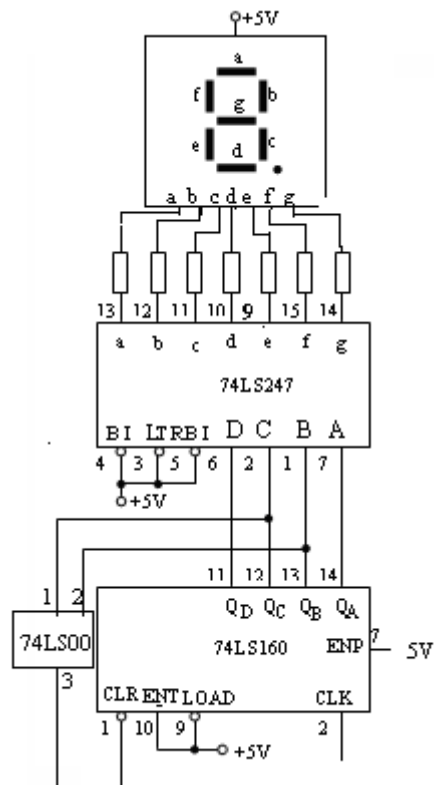
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3.1.25



3.1.26



3.1.27