

(19)
(12)

(KR)
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(43)

2002 - 0002337
2002 01 09

(21) 10 - 2001 - 0038765
(22) 2001 06 30

(30) 2000 - 199014 2000 06 30 (JP)
2001 - 067034 2001 03 09 (JP)

(71) 가 가

32 - 8

가 가

가

8 - 1

(72) 32 - 8 가 가

(74)

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(54) .

(母局; parent station)

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3 4 .

5 (子局; child station) .

6 7 , 6 , 7 6 .

8 9 , 8 , 9 8 .

10 11 , 10 , 11 10 .

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14 15 , 14 , 15 14 .

16 17 , 16 , 17 16 .

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(子局)

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 (pseudo ground level) , 1 2
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() 4 (2) (2) 2

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(16) (12) 가 , , () , , ,
 , , , 가 (17) (16) , , ,
 (2) .

(12) (10) ((102) (16) , , (17) () (10) ((101) . 1 (10) () () () (13; (主局)) / / (13) 1 2 (D+ D-) . 1 (D+) (Vx) , (CK) 2 (D-) (13) (11) () .

(11; (20)) (Vx) (P) (P) 1 2 (P₂₄ P₀) . 1 2 (P (Vx; =24V) (11) () (=0V) . (P24 P0) () (21) . (P) 1 - 140826 (21) (11) 가 , (11) . (2) 1) (13) .

1 (13) (10) (11) (13) (11) (12) (11) (14) (15) . (14) (15) (11) (14) (15) (16) (17) . 1 () (14)가 / (15)가 /

(13) 3 (132) (135) (139) (139) . (139) 1 , (139) n (n 1) (139) 가 m (m 1) . (14) m , (15) n .

(13) (131; OSC), (132), (133) (132) (131)가 , (CK) (CK) (Vx) . (132) (132) (CK) (Vx) () . (0) 50% , (CK) 1 (0+) , (Vx) (CK) (13a) 1 (D+) . , (earthing) (GND) (13b) , 2 (D-) .

(135) (132) (CK) (135) (134) (10)

(136), (137) .

K) (136) (134) (134) (135) (C)

(136) (137) 1 (D+)

2 (135) (CK) 1 (10)

(Vx) (Vx)

(Vx) (0+)

, 0+ = 2V .

, 2 (135) 「0」 (Vx) 「1」 (Vx)

3/4 (0+) 1/4 (0+) 3/4

가

「0011」 (136) 2 (

) (CK) 1

, 1 (D+) (139) (139)

(1311), (1310) (1311) 1 (D+) (1310)

(132) (CK) (

(138) (138) (139)

2 (139) (CK) 1 (Vx)

(lis) (Vx)

(10)

「0101」 (1311) () 2

(11) 1 (13) (

) () (

11) () 가 (11) (CK)

(自局) (1)
 가 . (13)

(132) 가 (13)
 (Vx) 가 1 (D+)
 (133) (13) (CK) 1
 1 (D+) Vx/2 (CK) 1
 가 .

(14) 4 (140; CV), (141),
 (142), (143), (144), (145)

(14) (140) (15) (150; CV)
 (20) (20) (140 150)
 8 10 (140) (14) (150) (15)

(140; CV) 5 DC() - DC (14)
 (Vx) 5 (Vcc) (P)
 24) (141) (12V) (14) (141) (Vcc; 5V)
 (Vx) () (Vcc) (T)
 (12) (16) (140) (16) (140)

(140) (14) ()
 , LED (Vcc) (Vx)
 1 (D+) (Vcc)

(141) 1 (D+)
 (142) (142)
 (144) (145) (143) (14)
 (144) (143)
 가 , 1 (145) (145) (144)
 (D+) () 1
 (16) (145)

2 (14) (CK) 1
 ((0+)) (Vx)

(0+) 가 2 (16) (CK) 3/4 가 (0+)

가 2 (11) 「1」 「0011」 (16) (14)

(15) 4 (150; CV), (151), (152), (153), (154), (155), (156), (157)

0) (150) (154) 4 (14) (150) (14)

(15) (144) (12) (17) (150)

(Vcc) (P₂₄) (LED) (150)

Vcc) 1 (D+) (155) (17) 1 () 가 1

(155) (155) (154) (156) (156)

(155) / (156)

(157) 1 (D+) (156)

1 (D+) (11)

2 (15) (17)

2 (157) 2 가 「1」 가

(CK) 1 가 「0」 「0101」 가

(157) 2 (1311) ()

6 11 (10) (10) 6 (13) 7

6 (13) 8 (14) 6 (13) 9 8 ()

14) 10 (15) 11 10 (15)

2

(135) (CK), (END) . 6 7 , (132) (ST),
 () () . , 가 (10) (10)
 () (132) (ST) (CK)
 5t0 . t0 (CK) 1 . (CK) (131)
 (分周) (CK) (Dck) (ST) ,
 () ()
 (132) () (ST) .
 (CK) (END) ()
) (CK) , , (132)
 () . , (133)
 , 가 (END) (END) (CK)
 , 1.5t0 . (END) (END) (END)
 , (ST)가 , .1 (1 (ST)
 (END)) 가 (1 (1
 3) .1 가 1 .

(,)가 0 31 , 32
 (OUT0 OUT31)가 (102) (134) , ()
 134) 32 (ST) (CK)
 (OUT0 OUT31) , (Dops) . , 0 63, 127, 2
 55, . . . (OUT0 OUT31) (ST) ()
) . (31)가 (133) , 31
 , (END)가 (Pck) . , (133) 6
 가 가 5 , 「111110」 , 31
 가 (가) .

(Dops) (OUT0 OUT31) , 1 (「1」)
 (「0」) . , 「0011 . . .」 . (Dops)
 (136) . (ST), (END) (136) .

(132) (131) , (CK) (f0) 4 (4f0)
 (4CK) . (136) (4CK) () ,
 (OUT0 OUT31) ((Dops)) 「1」 , 1 (D+) 1 ()
 4CK) , 「0」 , 3 (4CK) (0+) , 3 (4CK) (Vx) .
 4CK) (Vx) . , 1 ()
 0 OUT31) (PWM) . (136) (CK) (OUT

(Pck) (136) 2 (Vx 0+) , 1 (Pck) .
 (CMP) (137) , (D+ D-)
 . 가 (137) (complementary) (TR1 TR2) ,
 . (CMP) (Pck) , (137) ((Pck)) (1311) , PC가

(137) 2V 24V (Pck)
 (D+) , 2 (Vx 0+)
 (0-)) , 1 (D+) (ST) (D
 (END) (0+) (Vx)

(14) 8 9 , 1 (D+)
 (141) (140) (Vcc; 5V) (141)
 12V

(141) 가
 PC(1)
 (TR1 TR2) (ZD1 ZD2) 1
 2V(PC(1), TR1 TR2) 16V(24V 12V (140)
 (D) (140) (ZD1) (12V)
 (ZD2) 16V

(141) PC(1)
 (140) 가 , (D+ D -)
 () PC(1) (TR1 TR2)
 (140) (11) ()
 가 (D+) (TR1) 1

(CK) (out0 out31;) PC(1) 1
 (D+) 가 16V , (CK)
 가 (d0) (141) (d0) 가 (1432)
 (144) (d0) 9 (out0 out31)
 (PWM) (CK) , CV (Vcc) (d0)
 5V

imer) (ST)가 가 (d0) (Ton; on delay t
 3t0가 (st) 3t0 (ST)
 (END) (CK) (st)
 (st) () (St) 가 가 (1432)
 (144; SR) (R) (d0; (CK))

5 (ST) (schmidt) () (ST;
 가 (2.5V)
 (R) (C)
 (END; 1.5) 가 (CK)

(8 0 (143) (1431) (14) 0 3
)가 (143) 가 (1432) (st)
 (dc) (CK) 가 (1431)
 (CK) ,0
 (st) 9 가 4
 (144) (dc)

(d1)가, (do)가 (Toff) (Toff)
 () (do) (do)
 1/2 t0가 (d1) 「1」
 1/4 (0+)
 가). 「0」 3/4 (0+)
 (d1) , (3/4 - 1/2) = 1/4 (0+)

(144) (dc) (CK) 「1」(
)」 , 「1」 (144) (Sr1 Sr4)
 (144) (dr1 dr4) (CK)
 () (dr1 dr4) D (flip - flop) (FF
 1 FF4)

(145) (FF1 FF4) (d1;)가
 (FF1) (dr1) (d1)
 (d1) (FF2 FF4) 가
 「0011」 (out0 out3) (0 3)

(15) 10 11 4 8
 (150) (154) (140)
 (144) (14) (, , 0
 3) (4) 가

OR (155) (0 3) 4 () 2 AND
 (154) (dr1 dr4) 10 (dr1 dr4) (154)
 (CK)
 (dr1 dr4)
 OR 4 AND (in0 in3) 8 (out0 out3) AND

OR 2 NAND (1562) NAND (1562) (INV2) , ,
 (d0) 가 NAND (1562) (156)
 (in0 in3) (dr1 dr4) 11 「0101」
 (in0 in3)가 (d0) NAND
 (1562)가 「0101」 (in0 in3)가 (dip)

(dip) (157) 1 (D+) (dip)
 PC(2) (TR4) , PC(2)가 ON (TR3 T
 R3) (D+) (dip) 가
 R4)가 ON (TR4)가 OFF (D+)
 (TR4)가 ON (ZD2) 3V
) 4V가

(D+) (15) , () (d0) 1 , 1
 (D+) 가 (D+) (135) (137)
 1 (D+) , (

(TR4) 가 (TR4) 10
 (ZD3) (R) (TR4) 10
 OmA() (135) (TR1) ON , 1
 (D+) Vx=24V (TR4)가 ON
 (TR1) 100mA 가 2 μ sec
 lis

가 (139) , 6 7 , 1 (D+)
 (1311) 가 (Diip) (Diip)
 () (Diip)
 가

(139) (1311) , 1 (D+) (135) (137) (TR1) (TR2)
 6 PC (137) (0+), 2V (Vx) (Vx)
 PC가 (1311) , 6 (lis) (lis) (Vx) 「0」가
 「1」 (15) (TR4)가 ON PC 「0」가
 (lth) , PC ON .

PC (lis) (R1) (1310) (FF)
 , (INV) (Diip)가 , (Diis) (CK) 1 (Dick)가
 (FF) (CK) (FF) (CK) 1/4 3/4 가 .
 (132) (Diis) (138)

(138) 32 (Diis) (CK) 1 (Diis)
 가 (Dick)가 (138) (CK) 1 (Diis)
 (138) (in0 in31)가 / (0 31) 32
 가 (138) 「0101 . . .」 (101)

1 「0」 (D+) 「1」 「0」 「1」 「0」 「
 4가 가 (13) , 12
 1 「0」 「1」 (lis) 가 . 12

12 (TR1) (lis) 가 「1」 , (V
 x) 가 , 100mA 가 . , 10 (V
 (15) (TR4) 가 (lis) 가 (I
 is) , 가 「0」 , (Vx) 가 (ip) 가 .
 , 1 (D+) 가 (Vx; =24V) , (15) (TR4) 가 「1」 , (ip)
 (Vx) , (lis)가 . , (11) 가 , (ip)

, (lis) (lth=is)가 (15) (TR2)
 (100mA) (ip) . , (lis) PC
 「1」 , 「0」 .
 (R1)

7 (Vx) 가 「1」 PC
 가 ON (INV) (Diis)
 가 (Diis) (138) (138) (Diis)
 「1」
 (Vx) 가 「0」 PC 가 OFF
 (INV) (138) (Diis)
 「0」
 (2)
 1 1 (1) 1
 2 2 1 (2) (1
)
 34)가 1 가 2 . (1
 , 13 (135) 1 (10)
 1 (134) 1 () ,
 (10) 2 (134) 2 (, Vx/2)
 (0+) () , 1 2 ,
 , (14) 1
 (Vx) , 1
 (16) (14) 1
 (Vx) (, Vx
 /2) , 2 (16) .
 , 1 (#1) 「0」 3/4 (Vx)
 1/4 (Vx) 1/4 (Vx) , 3/4 「1」 (Vx)
 . 1 (#1) , 3/4 (Vx)
 2 (#2) 「0」 Vx/2 , 「1」 (Vx)
 (0+) . 2 (#2) 「0011」 「1010」 ,
 , 1 2 (#1 #2) ,
 13 .
 2 1 (13) 가 , , 8
 (14) (14)가 . 14 (13)

15 14 (13) 16 (14)
 17 16 (14) 8 (14)
 4) 1 (#1; OUT0p OUT31p) 16 (1)
 2 (#2; OUT0v OUT31v) (11)
 () , 8 (14) 16 (14)가
 8 (14) 16 (14) (11) ,
 (11) .

14 15 , 14 (13) 6 (13) , 1
 (OUT0p OUT31p) , 2 (OUT0v OUT31v) (CK)
 . 1 (OUT0p OUT31p) 1 .

1 (OUT0p OUT31p) (Dops) 가 , 2 (OUT0v OUT31v)
 (Dovs)가 . (136) (Dops) (Pck) ,
 (Dovs)(Pck) (Dvl Dvh) . , (Pck)가 , 2
 가 (Dv1)(「1」) , 2 가 Dvh(「1」)

(136) (Pck, Dvl Dvh) (137) (137)
 (CMP1 CMP3) (TR1 TR3) . (TR1 TR3 TR2)
 가 . (TR1) (Vx) ,
 (TR2) (0+; 2V) , (TR3) (Vx/2)
 . , (TR1) PC가 .

(Pck, Dvl Dvh) (137) (Pck) (TR
 1) (Vx) (Dvl Dvh) . , (Dv
 1) 「1(Vcc=5V)」 (Vx/2(12V)) , (Dvh) 「1(Vcc=5V)」 (0+
 ; , 2V) . (Vx/2) (0+) (Pck)가

1 (D+) (ST) (Vx) , (Dv1) (「1」)
 (136) , (END) , (Pck)가 (ST) 1
 (END) Vx/2 . (D+) 가 Vx/2가 .

(13) 1 (#1) 8
 (14) () . 1 16 (1)
 4) . 2 (#2) 16 (1)

16 17 , 16 (14) 1 (OUT0p OUT31p)
 8 (14) , 2 (OUT0v OUT31v)

16 (14) 8 (14) (d0) , , (1
44) (dr1 dr4) . , 8 (141) (ZD1
ZD2) 12V 16V가 (d0) 17 (9) .

16 (14) , (d1) (141) , PC(1)
(TR1 TR2) ((d0)) , PC(2) (TR3
TR4) ((d1)) (d1)가 . (d0) 8
(141) . (d1)
가
PC(2) (TR3 TR4) PC(2)
PC(1) (ZD1, ZD2 ZD3)
12V(PC(1), PC(2), TR1, TR2, TR3 TR4) , 16V(24V 12V) 8V(1
2V 2V) .

2 (OUT0v OUT31v) , (ZD3) , PC(2) 1
(D+) 가 (0+; , 2V) ,
(, Vx/2) . , 2 가 「1」 , 「0」

(145) (FF1 FF4) (d1; ,)가 .
(FF1) (dr1) , (d1)
(d1) (FF2 FF4) , 가 ,
「1010」 (out0v out3v) . (0 3)

(3)
2 2 2 2 , 1 , 3
(2) (2)
2 , 4 . (138)가 1 가 2

18 (15) (17) ,
(Vx) 2 1 (#1) , 1
(17) , (15)
2 , (#2) ,

(139) 1 1 (Vx)
(lis) (Vx) (#1) ,
2 (#2) . , 1 2

(10) , 1 2 (138)

(lis) , 1 (#1) 「0」 (Vx)
 (lis) , 「1」 (Vx)
 , 2 (#2) 「0」 (#1) , 「1」
 , 2 (#2)
 , 1 2 (#1 #2) 「0101」 「1100」 ,
 18 .

3 , 10 (13) 가 ,
 (13) (15) (15)가 (19)
 , 20 19 (13) . 21 (15)
 , 22 21 (15) . 10 (15)
 1 (#1; IN0i IN31i) . 21 (15)
 2 (#2; IN0f IN31f) . (11)
 () , 10 (15) 21 (15)가 .
 10 (15) 21 (15) (11) ,
 (11) .

19 20 , 19 (13) 14 (13) , 1
 (IN0i IN31i) , 2 (IN0f IN31f) . 1
 (IN0i IN31i) 1 2 .

1 (D+) 가 (T) (T)
 (1311) AMP , (CMP)
 (Difp) (Difp)
 가 (Difp)
 2 OR (1310) (CNT) . (Difp)

(CNT) (CK) 1 (Difp) , (Difs)
 , (CNT) (Dick)가 () ,
 (CNT) (Difs) 2 OR (CNT) (Dick)
 , (Dick) 1 () ,
) (N)가 , N=5가 ,
 가 8 (CK) 8 가 , 1/2
 (N)가 ,
 0 가 「1」 가
 8 가 (Difs) 「1()」 3 ,
 가 「0」 가 4 가 (Difs) 「0()」 ,
 , (Difs) 1 . ,

0 (Difs) 1
 0 가 . , (END) 1.5to (31) ,

2 (138) 32 , (Difs) (0
 31) 32 (INOf IN31f)가 / (138)
 (101) 가 「1100 . . .」 .

1 (#1) 10 (15)
 2 (#2) 1 2 21 (15)

21 22 , 21 (15) 1 (INOi IN31i)
 10 (15) (15)가 , 2 (INOf IN31f)
 (in0 in3)가 1 2

21 (15) 10 (15) , OR (CK)
 (in0 in3) . OR 2 AND (1562)
 . AND (1562) (1561; OSC)
 8f0 . f0 (CK) . (CK) 8
 (156) . 16 . AND (1562) (1561)
 (in0 in3) , (dr1 dr4)
 22 「1100」 , (in0 in1)가
 AND (1562)가 , (1561) (8f0) (difp)
 (in2 in3)가 AND (1562)가 , (1561) (8f0)

(difp) (1571 1572) (T) , , (T)
 MOSFET (dif) 가 . (dif) , FET가 /
 1 (D+) (dif) 가 . , 22
 가 , FET, 가
 가 (0+; 2V) , (0V) (0+)
 (, 2V)가 .

19 (13) 23 (FF) (Diis)
 (Difs) OR (Dis) (Dis)
 (138) 1 1 2
 (138) 1 (mapping) ,

(134) (135) (136) 1 가 . ,
(135) 1 (6).

, , 가 가 .

1 - 140826 24 1 (D+) 2 (D-)
(18 / 19) (18 19)

1 - 140826 24 (13) 1
(D+) () .

24V 24 (13) 1 (D+)
(11) (11), (12)
(P; P24 P0)

1 2 3 1 2 3 1 2
가 1 3 가 .

1 - 140826 (13) (135)
(139) (135)
(14) , m (m 1) 1 1
(139) (15) n (n 1) , 1 1
(16) (17) . 1
(局)

, (13) (11) CPU()

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(2) ()

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, (2) (2) , ,
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(parent station) ,

(child station) ,

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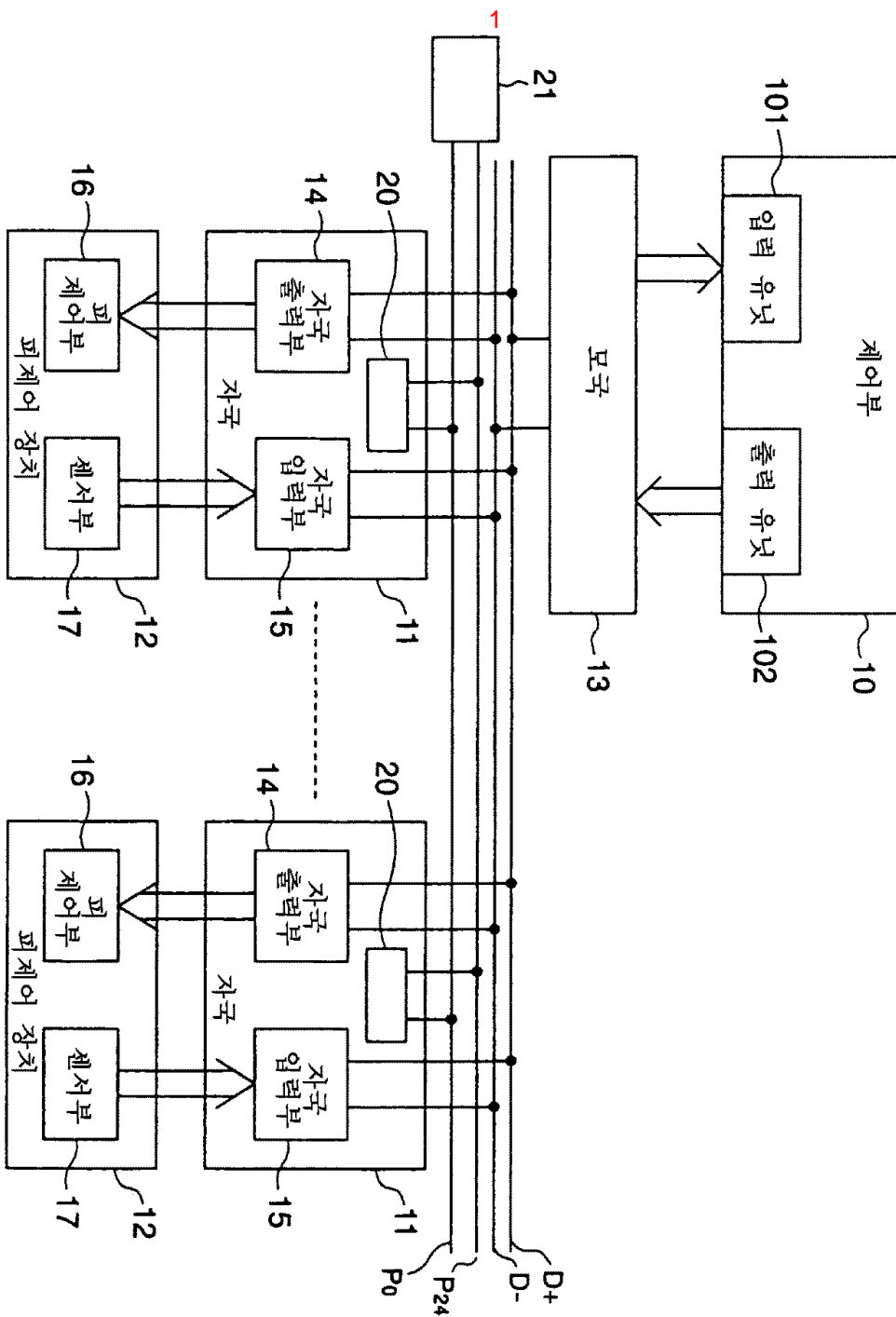
가

18.

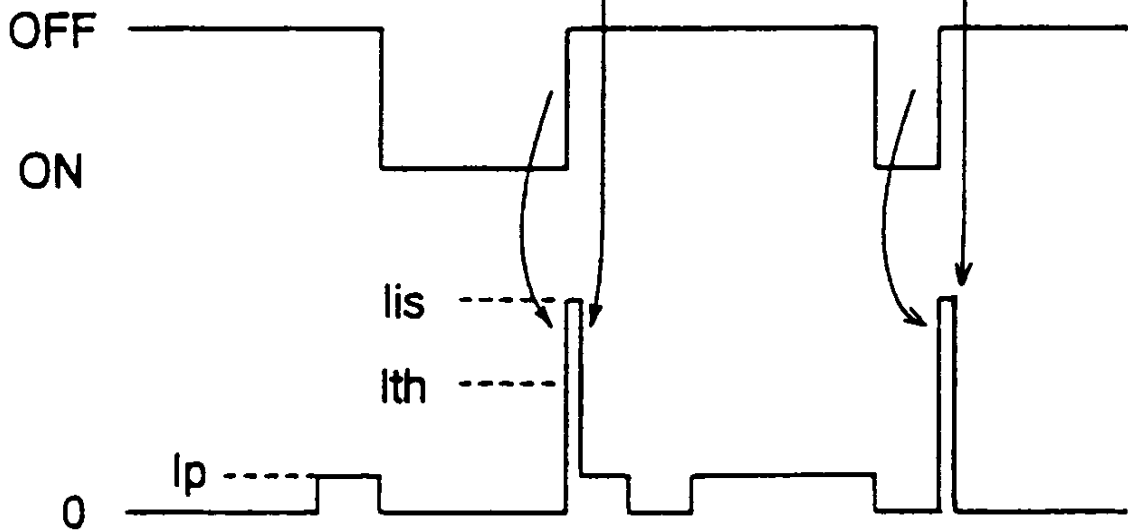
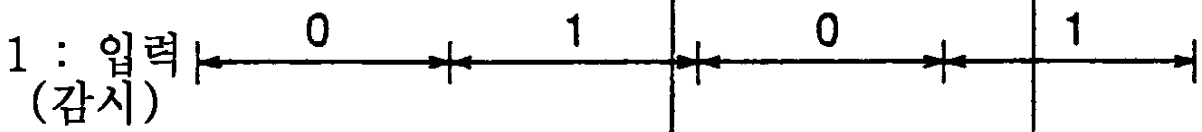
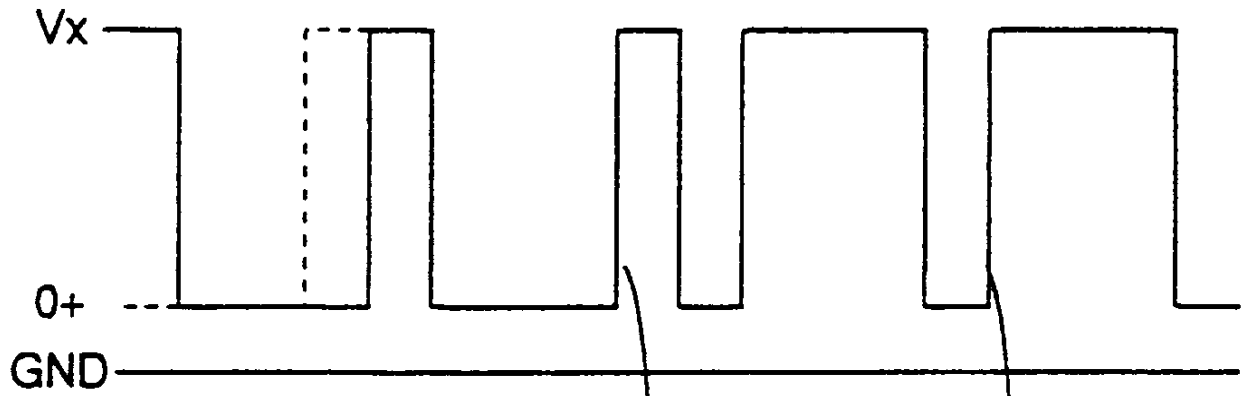
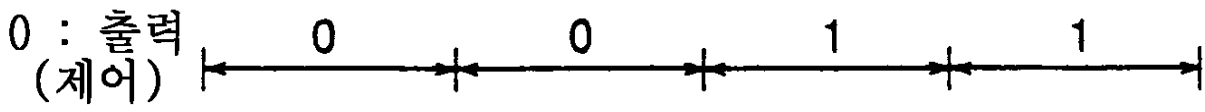
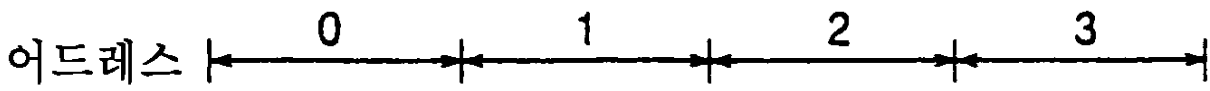
11 12 ,

19.

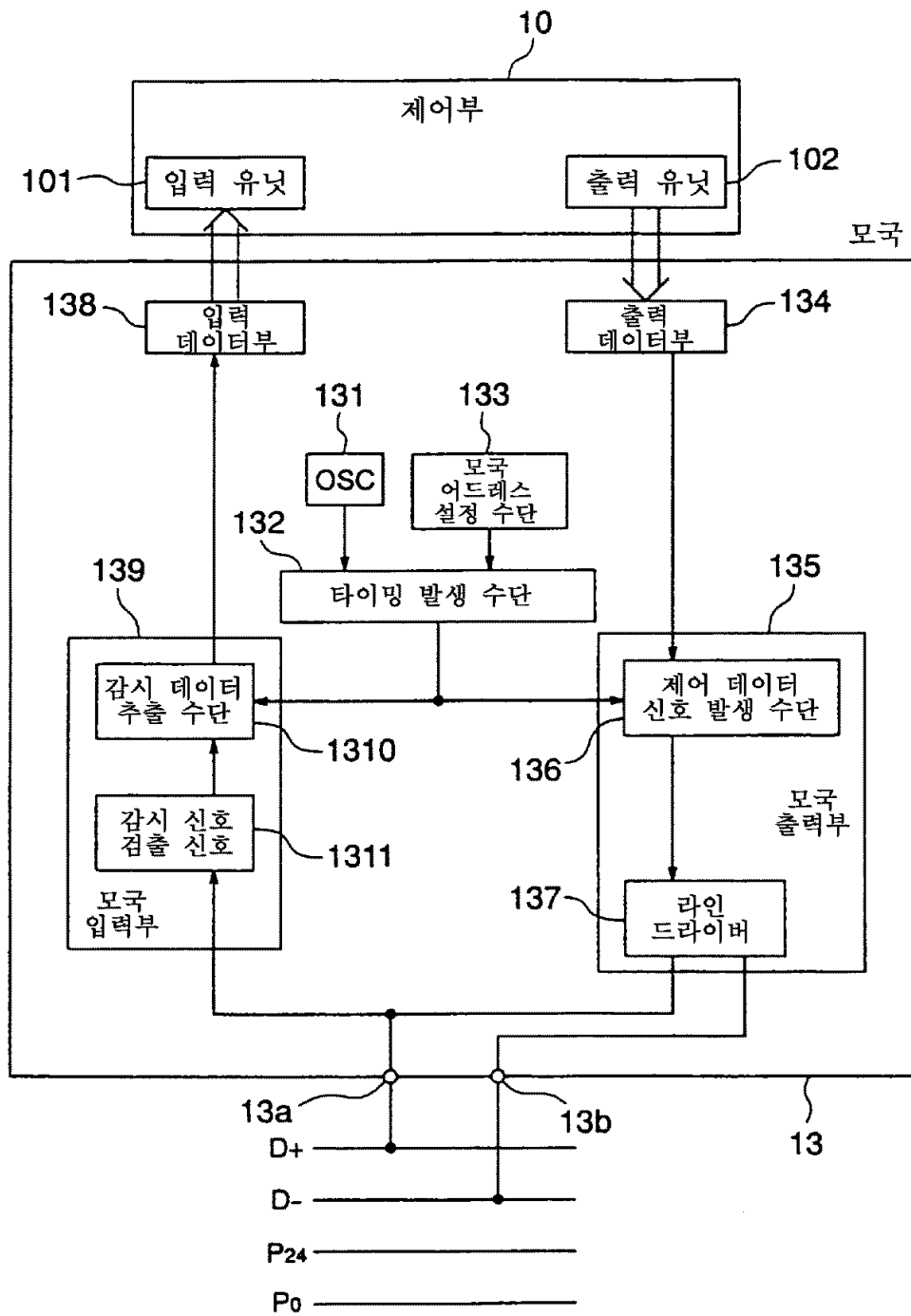
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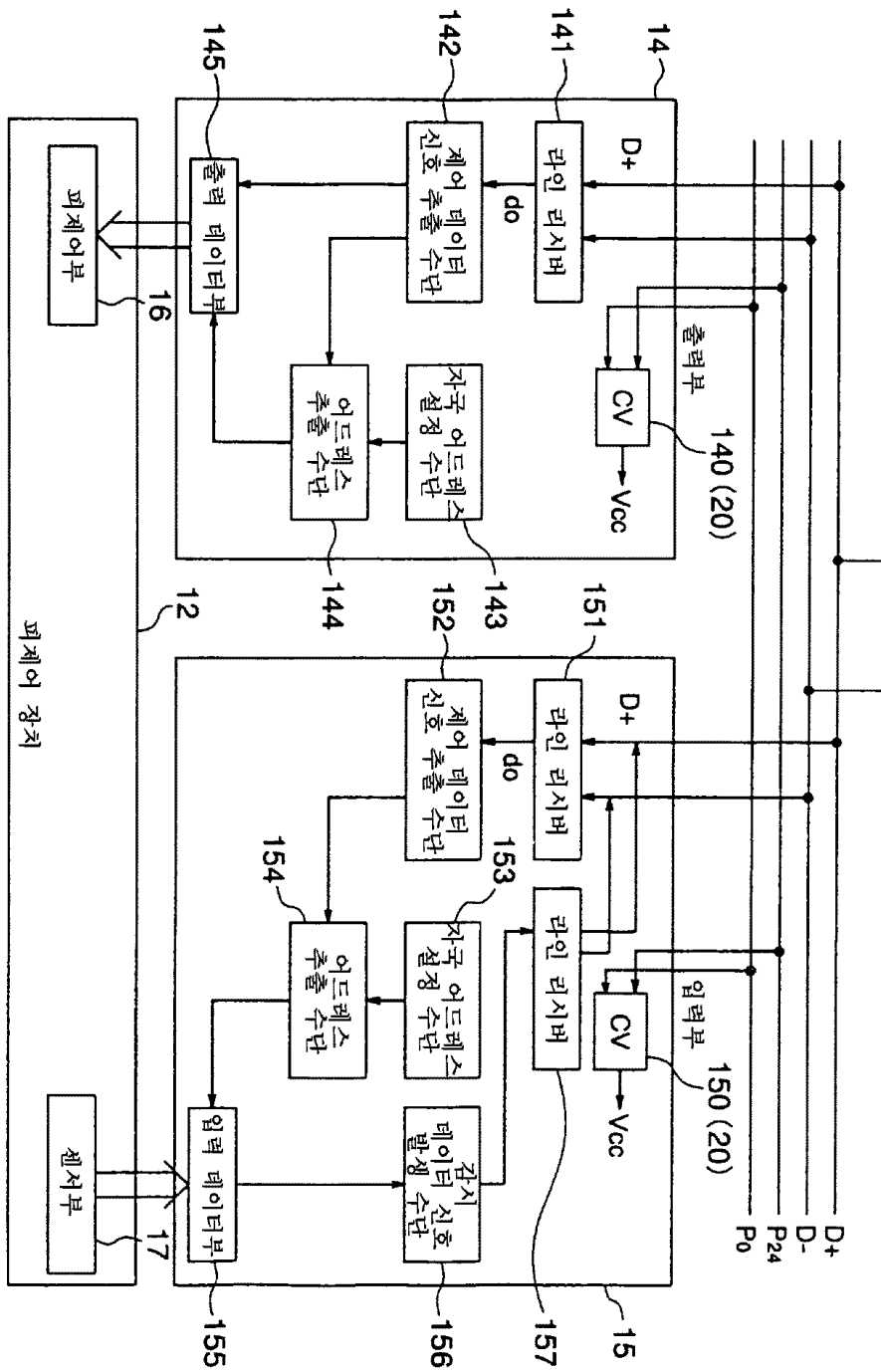
2



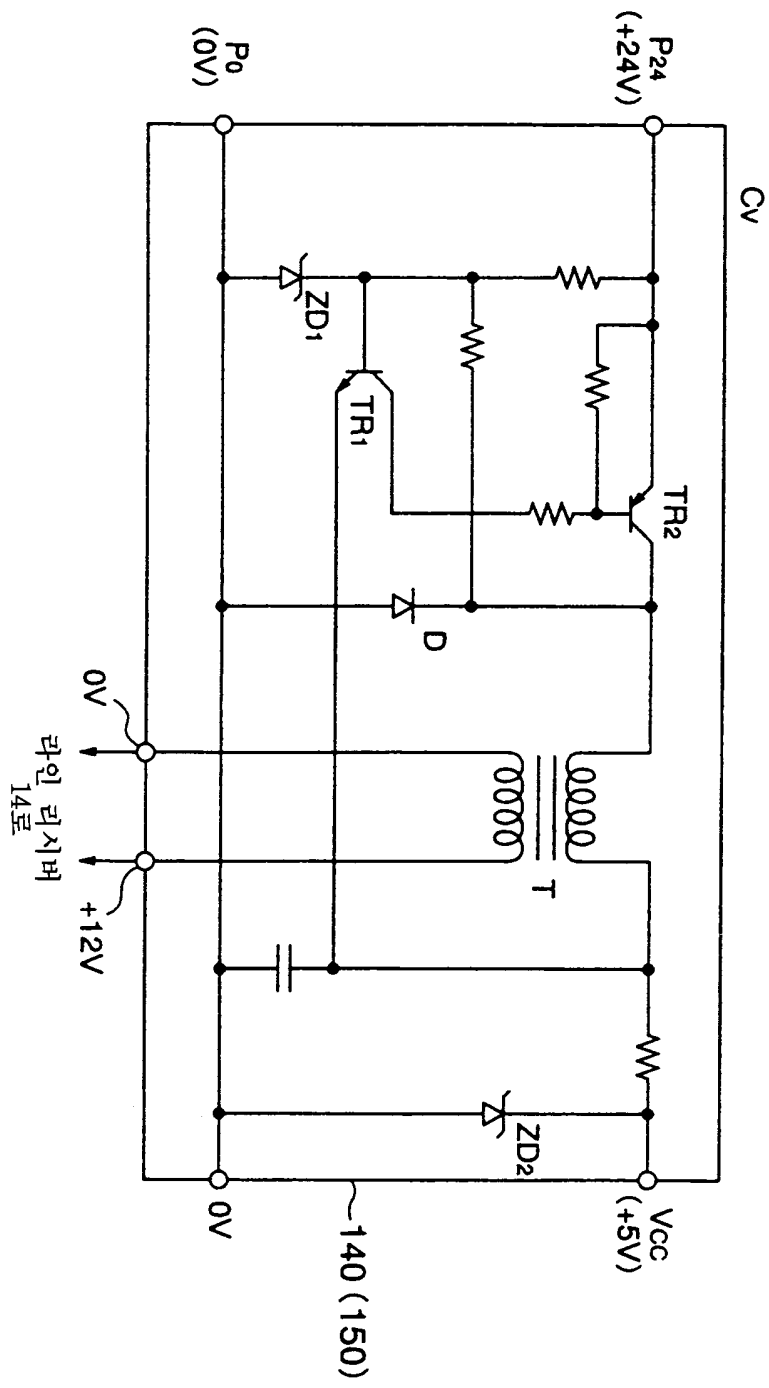
3

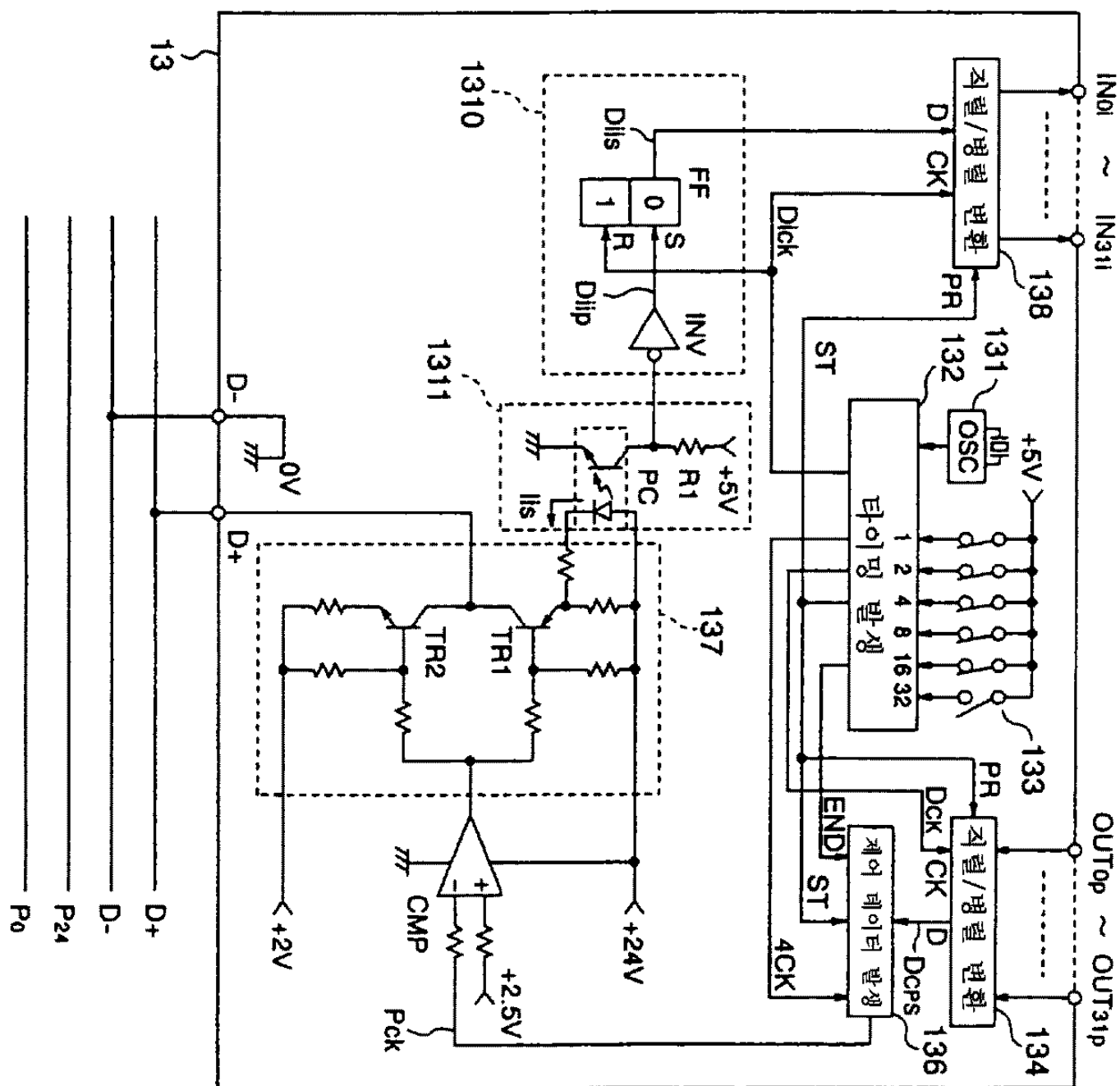


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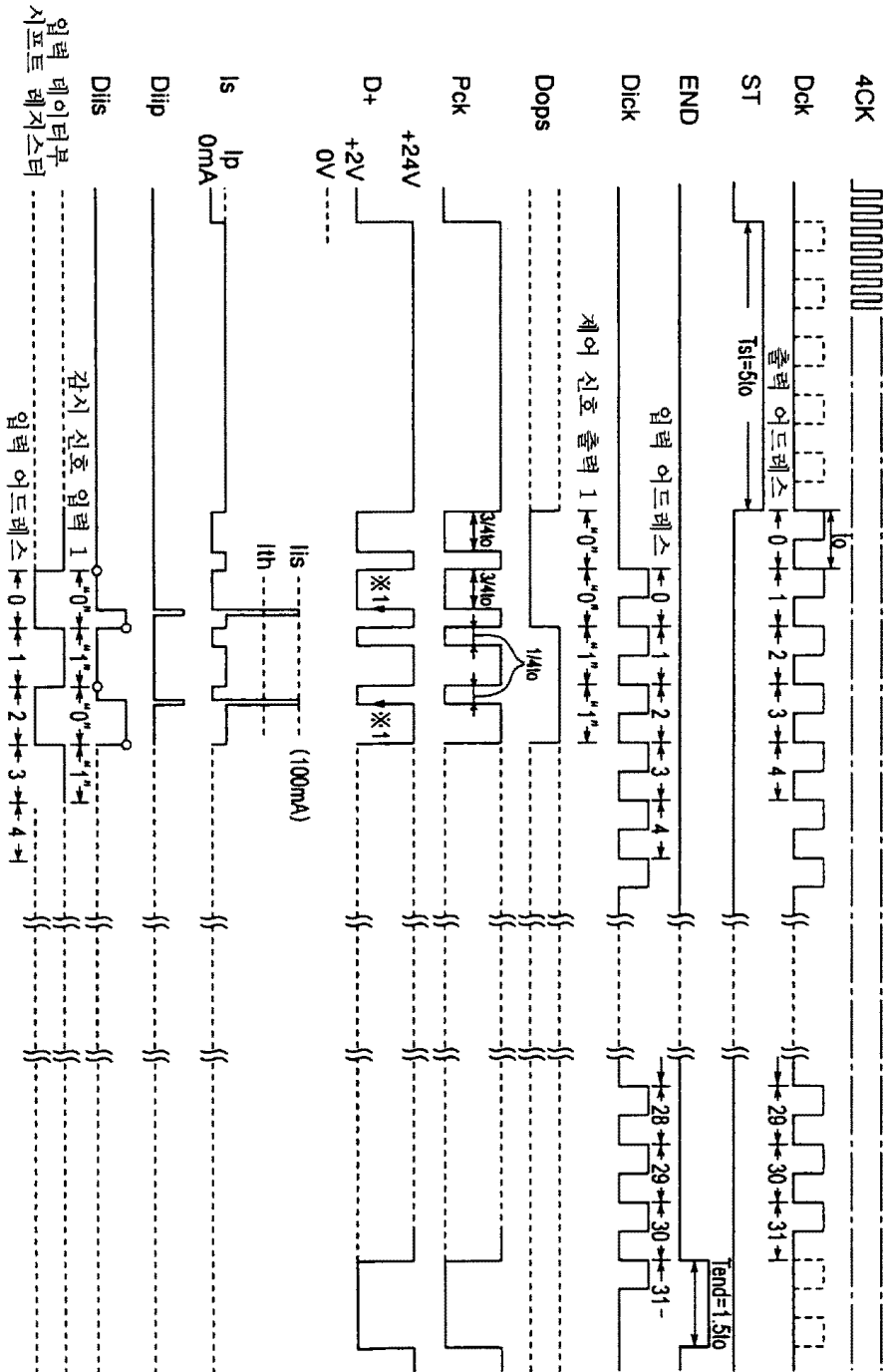


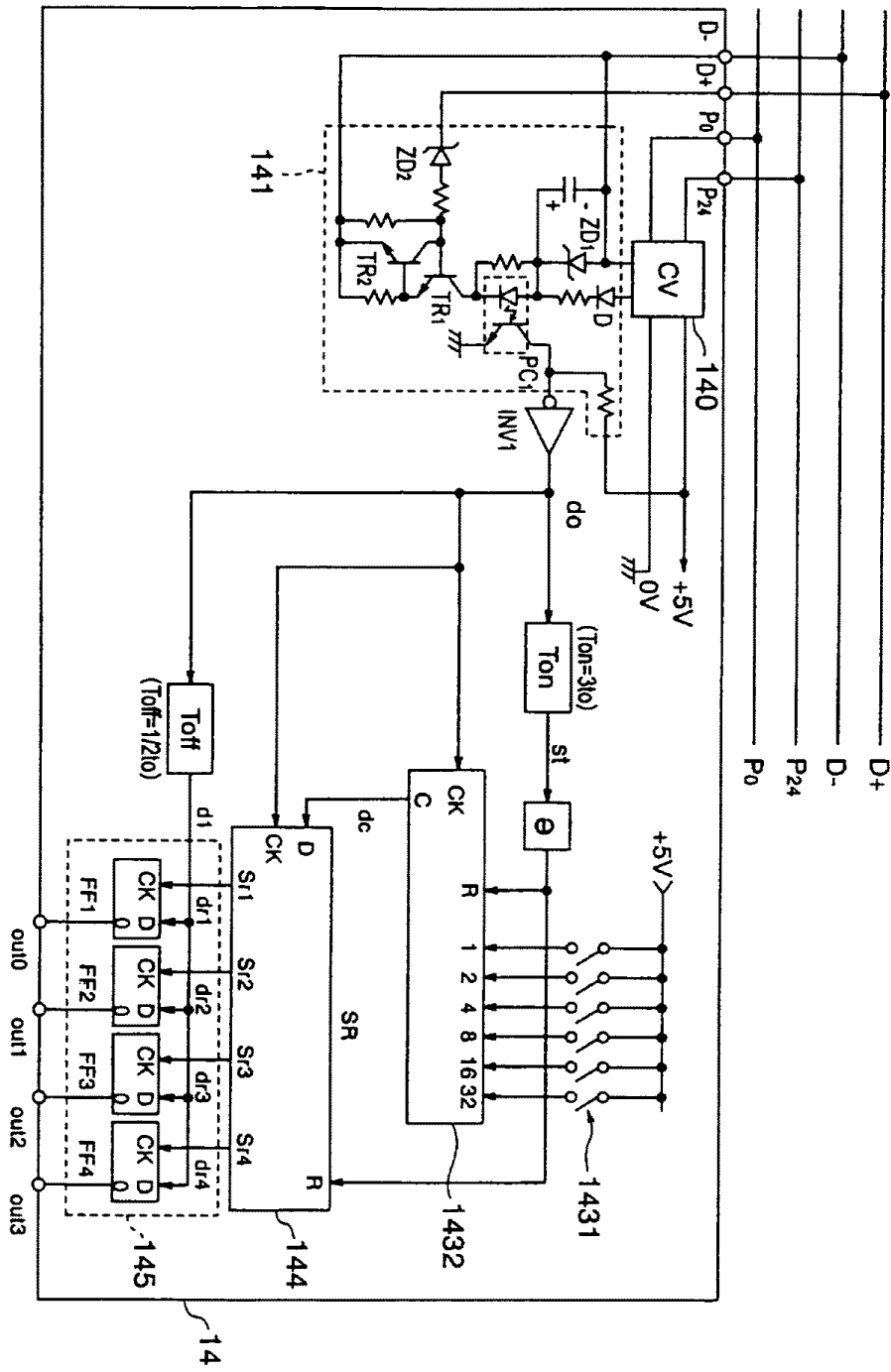
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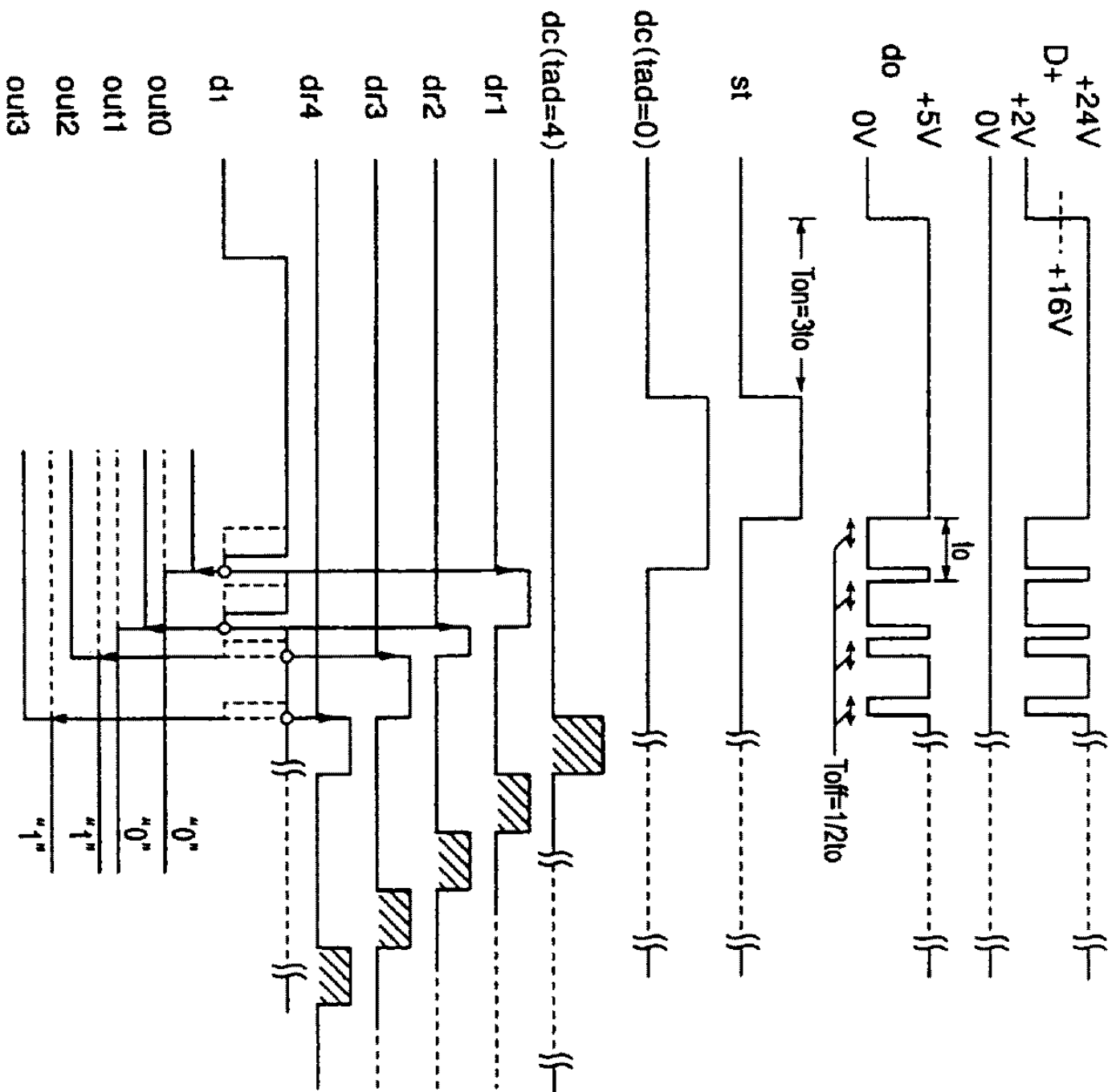


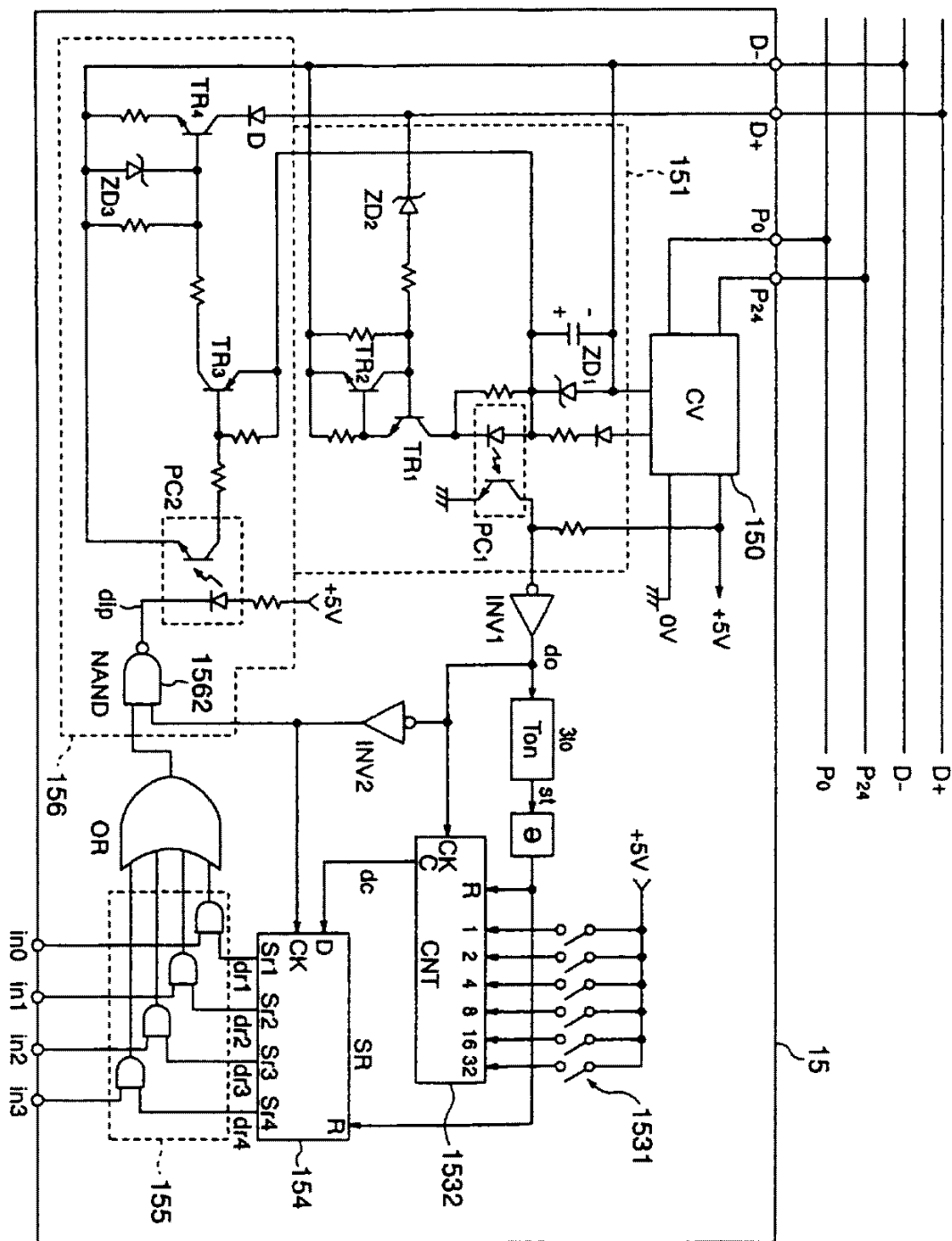
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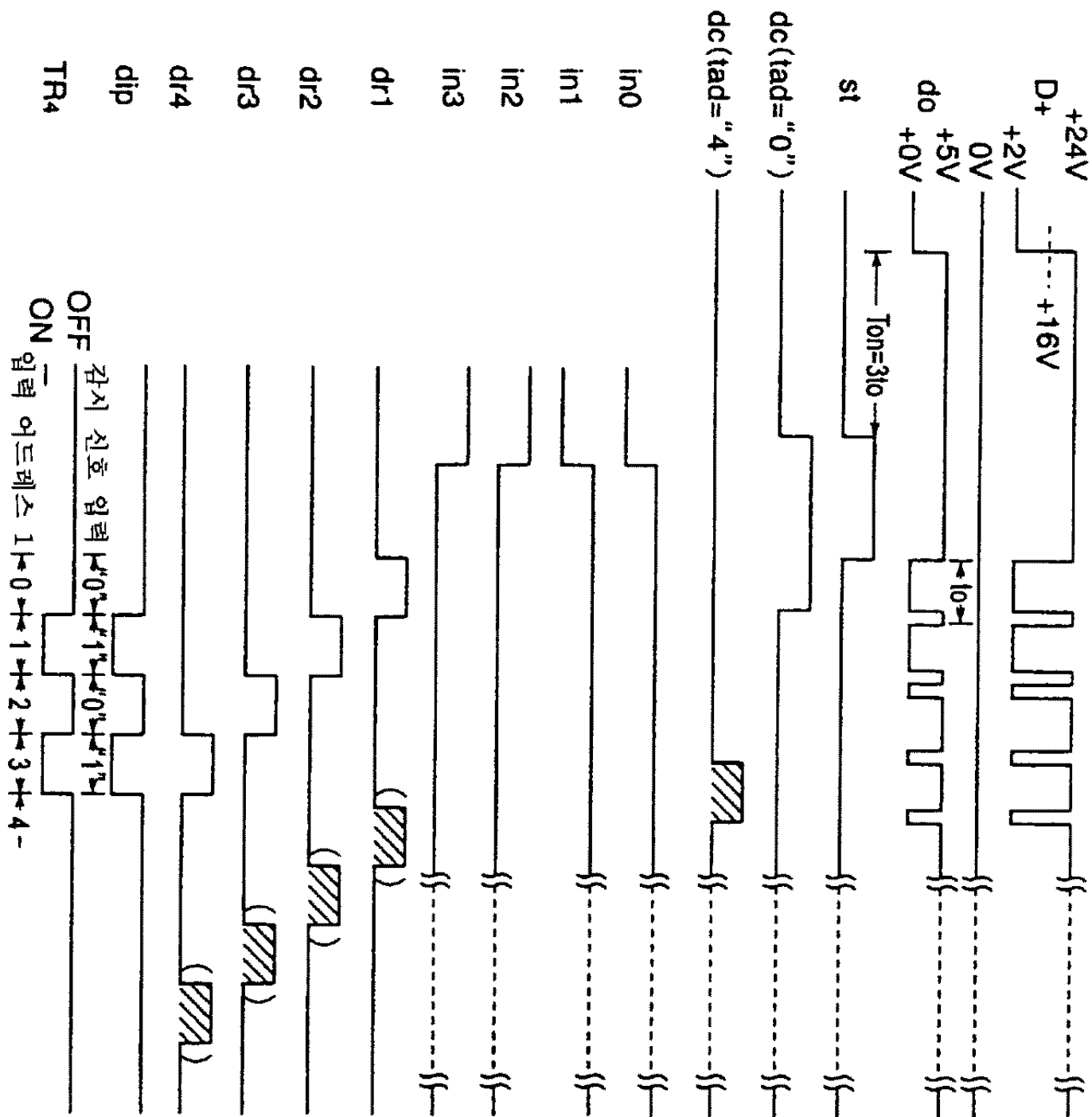




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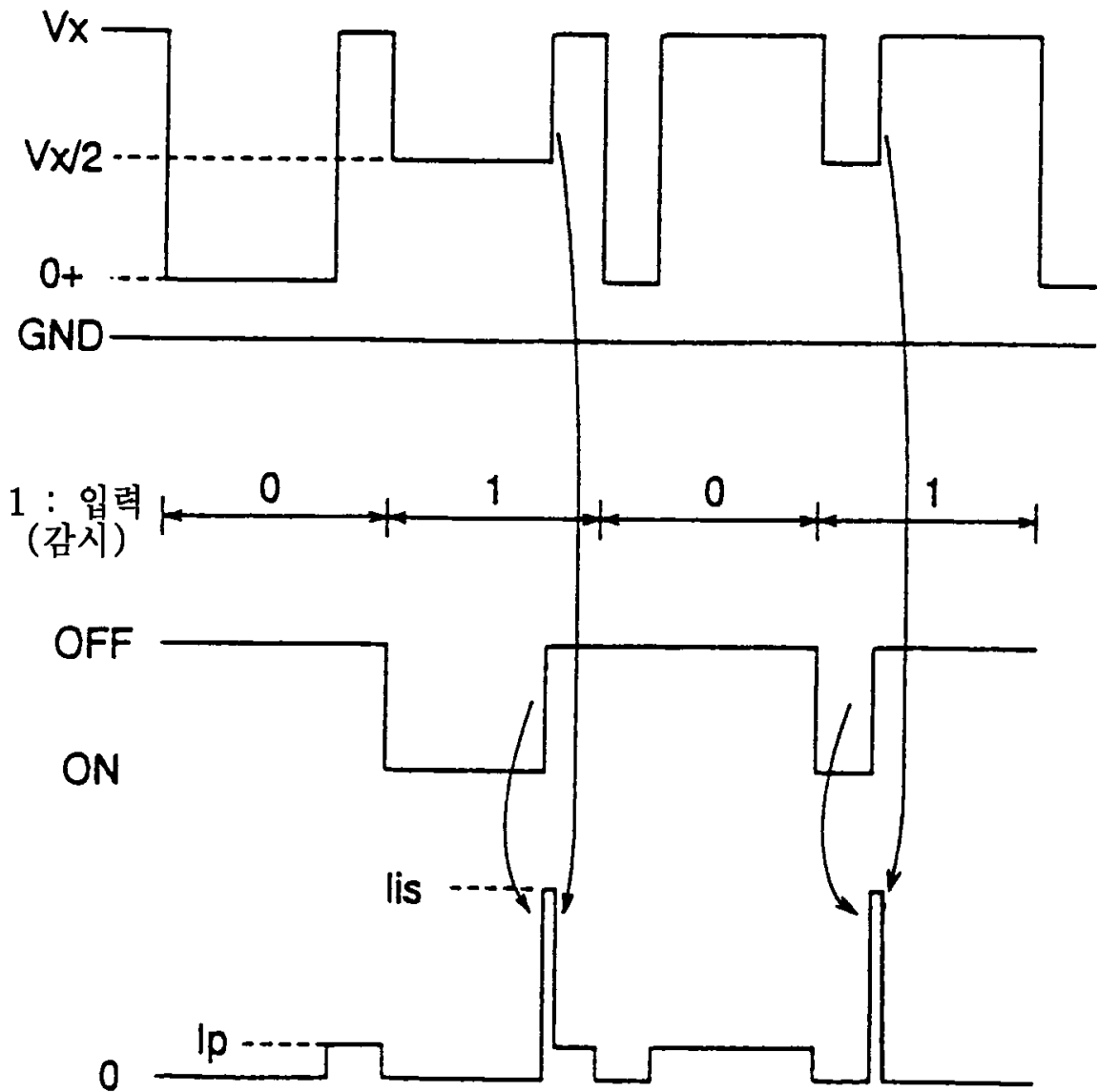
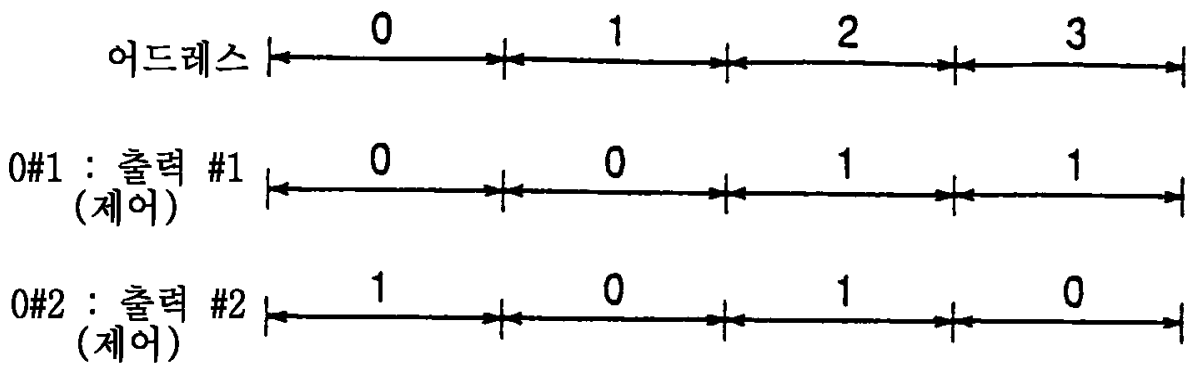


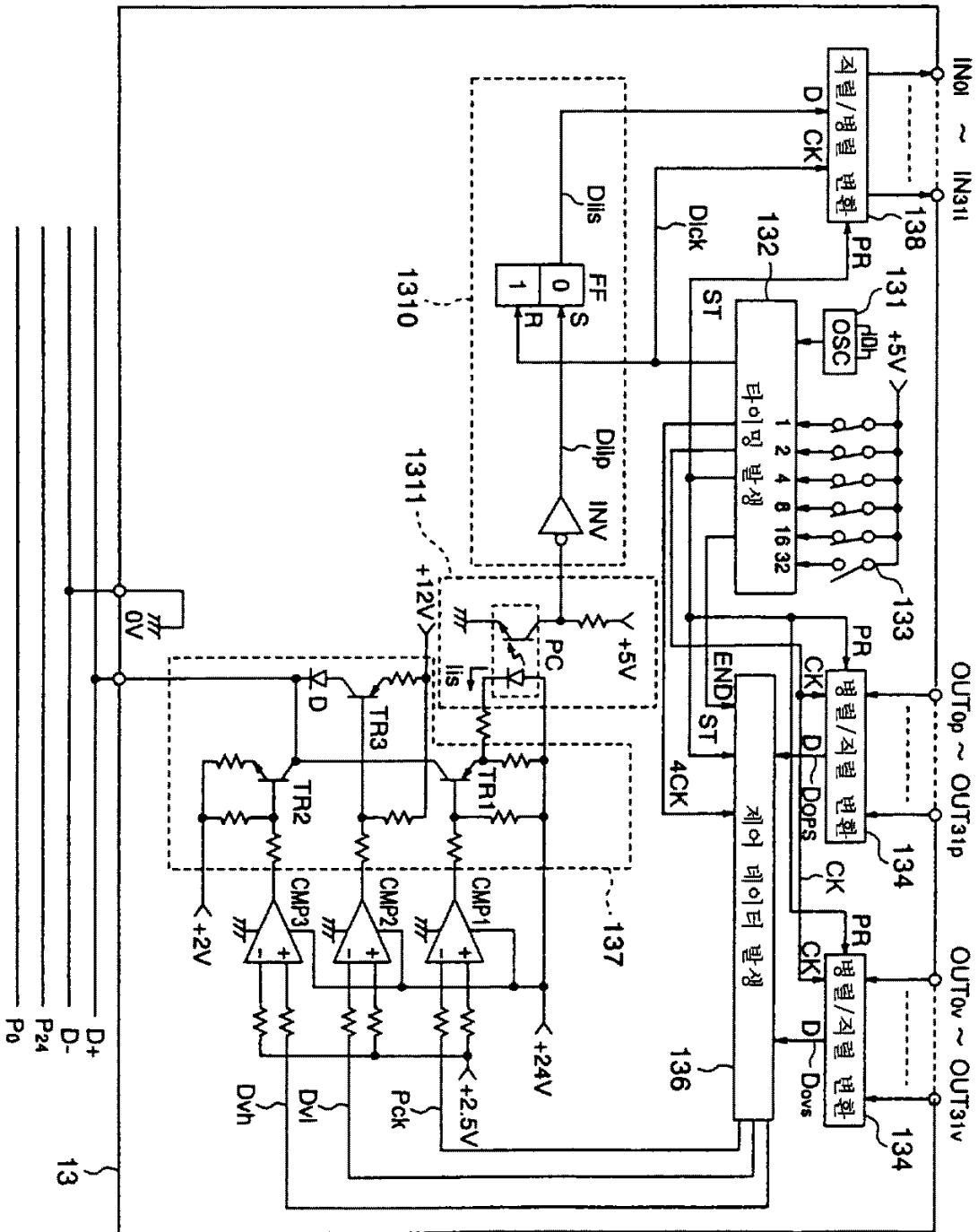


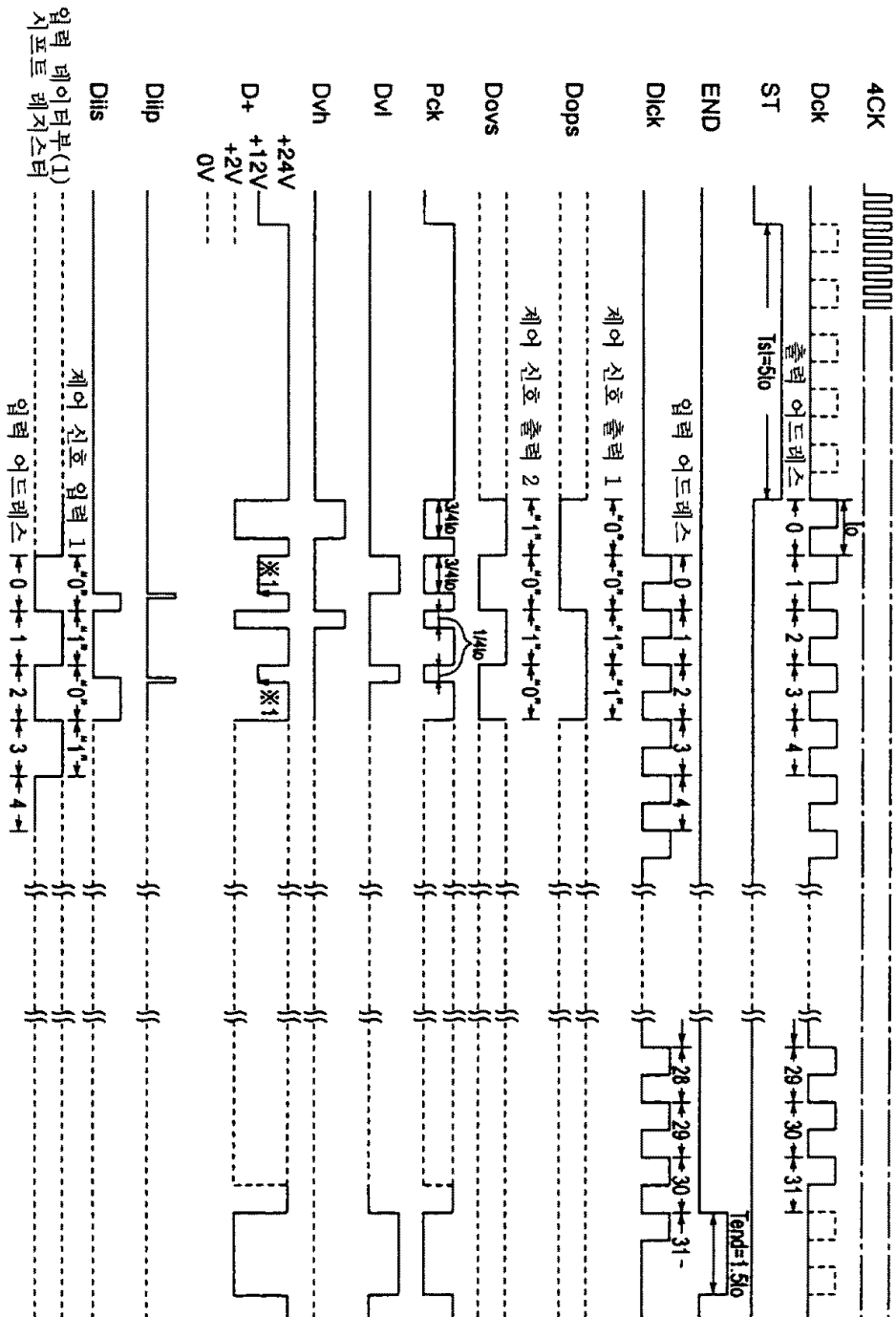


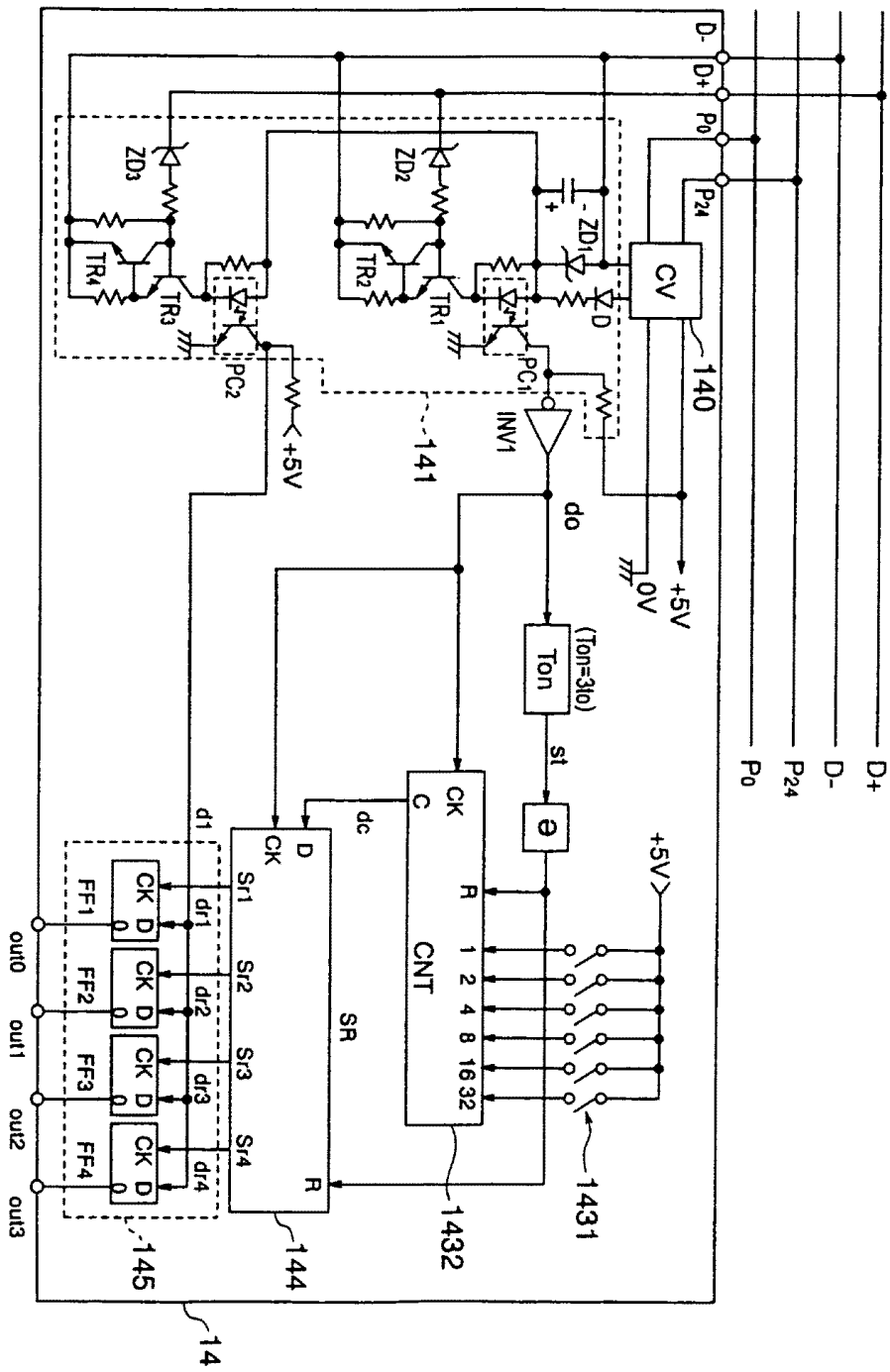
감시 신호	0 (TR4 OFF)	1 (TR4 ON)
전원 전압의 상승시의 변화 전류(is)	ip (자국 입력부의 회로 전류)	약 100mA (자국 입력부의 TR4의 제어 전류 (on 전류))
100 > is > ip시의 전류 논리	0	1

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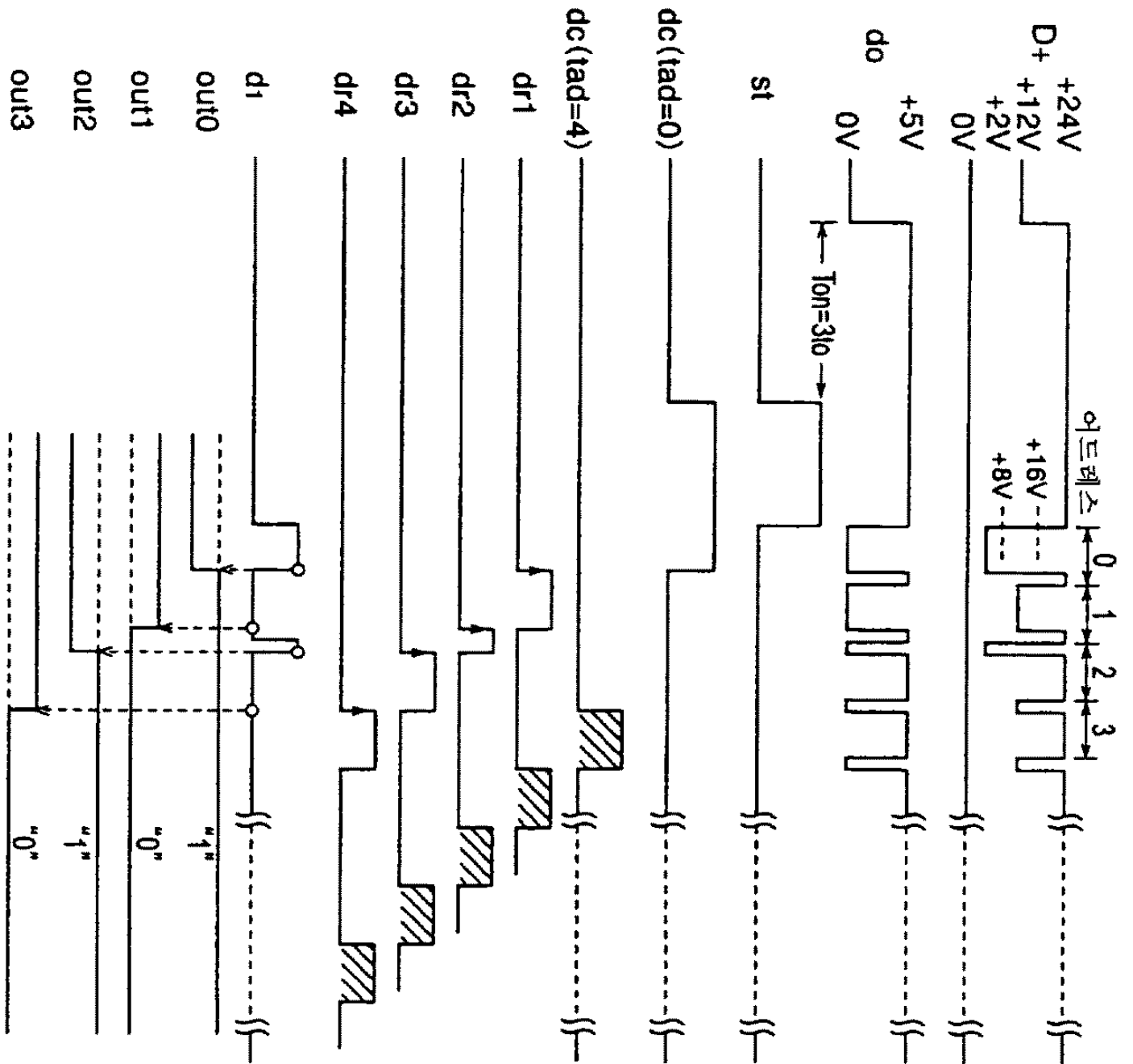








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