

(19) (KR)
(12) (B1)

(51) Int. Cl.⁷
G11C 8/00

(45)
(11)
(24)

2003 09 03
10-0396228
2003 08 19

(21) 10-2001-0017577
(22) 2001 04 03

(65)
(43)

2001-0095256
2001 11 03

(30) 2000-103241 2000 04 05 (JP)

(73) 가 가 5 7 1

211-8668 가 가 가 1753

(72) 5 7 1 가 가

5 7 1 가 가

(74)

:

(54) D L L

DLL (; delay locked loop)

1 2 , 1 , 1
, 1 n (n 1) 1 2
1 2 1 1
2 1 1

10

1 DLL 가
 2a 2g 1
 3 DLL 가
 4a 4e 가 가 ,
 5a 5e 가 가 ,
 6a 6g 가 가 , 3
 7a 7e
 8a , 8b 8c
 9 DLL
 10 1 DLL
 11 10
 12a 12h 10

1 : DLL 2 :
 3 : 4 :
 5 : 가 6 :
 7 : 9 :

DLL(; delay locked loop) ,
 CPU 가 , 400MHz
 RAM 2.5ns DRAM 1.25ns D
 DRAM ,
 가 , DLL 가
 , DLL 가 가 ,
 가 ,
 DLL 1 (201), (203) DRAM (202) DRAM 1 (203-1)
 (203-2, 203-3) (202) (202) (202-5), (202-1),
 Y- (YDEC; 202-2), I/O (202-3), (202-4), (202-7) X- (XDEC; 202
 -6) (202)
 (S1) DLL (201) (S1)
 (203-2) (203-3) (203-1)
 (C1, C2) (C1) (203-2),
 (203-3) (202) (202)
 202-5) (RE') (203-2) (202) (202)
 -4) , 2a 2g 1 DRAM 2b
 (203-1) (203-3) (203-3) (C2)
 (S1) 2c , A 가
 2e (202) 2d (203-2) , 2a (S1)
 , 2f (C1) 2g A

DRAM , I/O (202-3) (202-4) (202-4)
 DRAM (202-4)
 202-1) 가 가 2d (RE') 가 (RE')
 가 가, 가
 DRAM 0.5ns 2 (RE') 가 가
 1 (S1) 가
 3 2 3 2 DLL (101), (102) (105) DLL (101) (102) (103) (104) (105)
 가 (102) (1011) (102) (1011) (102) (103) (RE'; 106) (104) (105)
 (RE'; 106) DRAM t1 (RE'; 106)
 3 2 4c t1 (S1; 1011) DLL (101) (S1; 1011) (36) (S1; 1011) (102)
 가 (104) 가 (Rclk) (S1; 1011) (107) 4e (102)
 11) (104) (104) 4e (107) (107) t2 4e (106) (102)
 (104) (105) t2 (104) (107) (108) t2 (106) t2
 4e (106) 4e (108) 가 2 (105) (106) t2
 5a 5e (Rclk) (108) 가 (Rclk) (102) (102)
 (S1; 1011) (S1) (104') (102) (102)
 5e (104') (105) (104') t2 (106') 5e
 (108') (106') (106')
 t1 (S1) (106') t2 (106)
 (s1; 1011) (105) t2 (104') (105) (104) 가 (104) (S)
 가 가 t3 (104) 가 (105)
 가 1; 1011) (104) 가 (104) 가 (105)
 2 2 6a (Rclk) 가 DRAM 6e, 6f 6g
 6b, 6c 6d (Rclk) (Rclk)
 6a (Rclk) (RE'; 106) 가 (RE'; 106)
 6b A (110) (106') t3
 5e (106') 6e (106') (110)
 t3 (R
 clk) 가 (110)

A B
가 B 가 (110)
가 가 가
7e 가 (RE'; 111) (111)
(1111) (111)
7d 가 (RE'; 111) 가 7e 가 (111)
8a 8c 8b 8c 8c
8b 가 가 가
8a 가 (115) 1.25ns 가 (115') 가
0.15ns 가 가
가 가
9 가 DLL 3 11-261408 DLL
(311) 가 가 1 1/4 가 가
가 가 가
) DLL (DLL
DLL DLL
DLL 가 DRAM
, DLL 1
2 n(n-1) 1 2 1
1 1 1 2 1 2
1 1 1 1 1
1 2 1 1 1
2 1 2 1 1 2
1 2 n 1 2 1 n
1 2 1 1 n
가

DLL 1 2 n
 . DLL 1 2 1 2
 1 2
 1 2
 1 2
 1 2
 1 2
 1 2
 (a) 1 n (n 1)
 (b) 1 2
 (c) 1 (d)
 (a) (e) 1 n
 (f) 1 (g) n
 가 가
 DLL 가 DRAM
 10 DLL (1), (2) (3) . DLL (1) 10 (5), (6) (7) (9) (5) (12-1) (12-2) , 가 (16) (9) k (9-1, 9-2, ..., 9-k; k 1) 10 (9) (9) 2 (S1; 11-1) (9) (S2; 11-2) (9) 3 (S2; 11-2) (S 1; 11-1) (9-1, 9-2) (4) (5) (6) (4) (16) (5) 가 (16) (9) (9) (5) (S1; 11-1) (6) (6) (4) (S1; 11-1) (7) (7) (5) 가 (16) (23) (23) (5) 가 (4) (3) (S1; 11-1) (S2; 11-2) (4) (13) (2) 가 (2) (11) (3) , (2) DR AM (3) DRAM DLL (1), 11 (3) (2)

(2-5), (2-6) (3) (2-1), Y (3-1) (2) (2-2), I/O (3-2, 3-3) (2-3), (2-4), (2) (2-7) X

1-1) (S1; 11-1) (3-2) (S2; 11-2) DLL (1) (S1; 11-1) (3-3) (C1, C2) (C1)

(C2) (3-2) (3-1) (C2) (3-3) (3-3) (RE)

(S2) (C1) (2) (S1) (2)

12a 12h 11 DRAM 12a 12b

(S2; 11-2) (S1; 11-1) (9) 2 (S2; 11-2) (S1; 11-1)

12c 12d (C2) (3-1) (3-1) 12g (C1)

12d (C2) (3-2, 3-3) (S2; 11-2) 12e (3-3)

RE (2) 가 12f (S1; 11-1) (2)

(3-2) 12g (C1) 12b (S2; 11-2)

12h 가 A (2) (9)

가 (9) (9) (4) (9)

(S1; 11-1) (5) (9) (S1; 11-1) (2)

(S2; 11-2) (S2; 11-2) (S1; 11-1) (S1; 11-1)

가 가 (9)

10 (9) 3 가 n* L (S2; 11-2)

(L) 0.15/2ns 1 (9-3) (RE) 가

(S1; 11-1) 0.15ns DRAM (9-1) 9-3

가 (9-1) 9-3

4a 4b (S1; 11-1) (S2; 11-2) (S2; 11-2)

) 2.5ns (S1; 11-1) 0.15ns (S1; 11-1)

4d (RE) (S2; 11-2)

S1; 11-1) t1 0.15ns 4c t1 (9-1, 9-2) t1 (4)

(S2; 11-2) (S1; 11-1) 가 5a

j (9-j) 가 (9) 가 (S2; 11-2)

가 t1 가

5e (9) j

(=t1) (S2; 11-2) 가 j

4b (36) (S2; 11-2) (RE) (35) 가 (S1; 11-1)

(104) (S1; 11-1) 가 3

(9) (105) 가

DLL 가

(S2; 11-2) DLL (1) (1) (S1; 11-1) 가 가

가 , DLL , ,
 , DRAM , 가 , DLL , ,
 , DLL 가 , , 가 가 , ,

(57)

1. 1 2 , 1 n , 1 (n 1) , 1 2 ;
 1 , 1 2 1 ;
 , 1 2 1 ;
 DLL .
2. 1 , 1 , 1 ;
 2 , 1 2 , 1 1 n , 1 1 ;
 2 2 , 2 2 DLL .
3. 2 , 2 , DLL 1 n
4. 3 , DLL .
5. 3 , DLL .
6. 3 5 , DLL .
7. 3 5 , DL
8. 3 5 , DLL .
9. 3 5 n , DLL .
10. 1 , 1 2 , DLL 1 ,
 1 DLL ; , 2 1 ;
 2 2 ;
 , .

10 11.

,
,

10 12.
DLL

11

,
,

1 2
1
;

1 2
1

;

12 13.

,

1

,
,

1 ;

1 2

1

2

13 14.

,

2

, 1 2

14 15.

,

14 16.

,

(a)
(b)
(c)
(d)

17.

1

;

1 1 n

(n 1) ;

1

;

1

2

,

1

2

,

1

17 18.

,

(a)
(e)

1

,

;

(f)

1

n

,

1

18 19.

,

(f)
(g)

1

1

19 20.

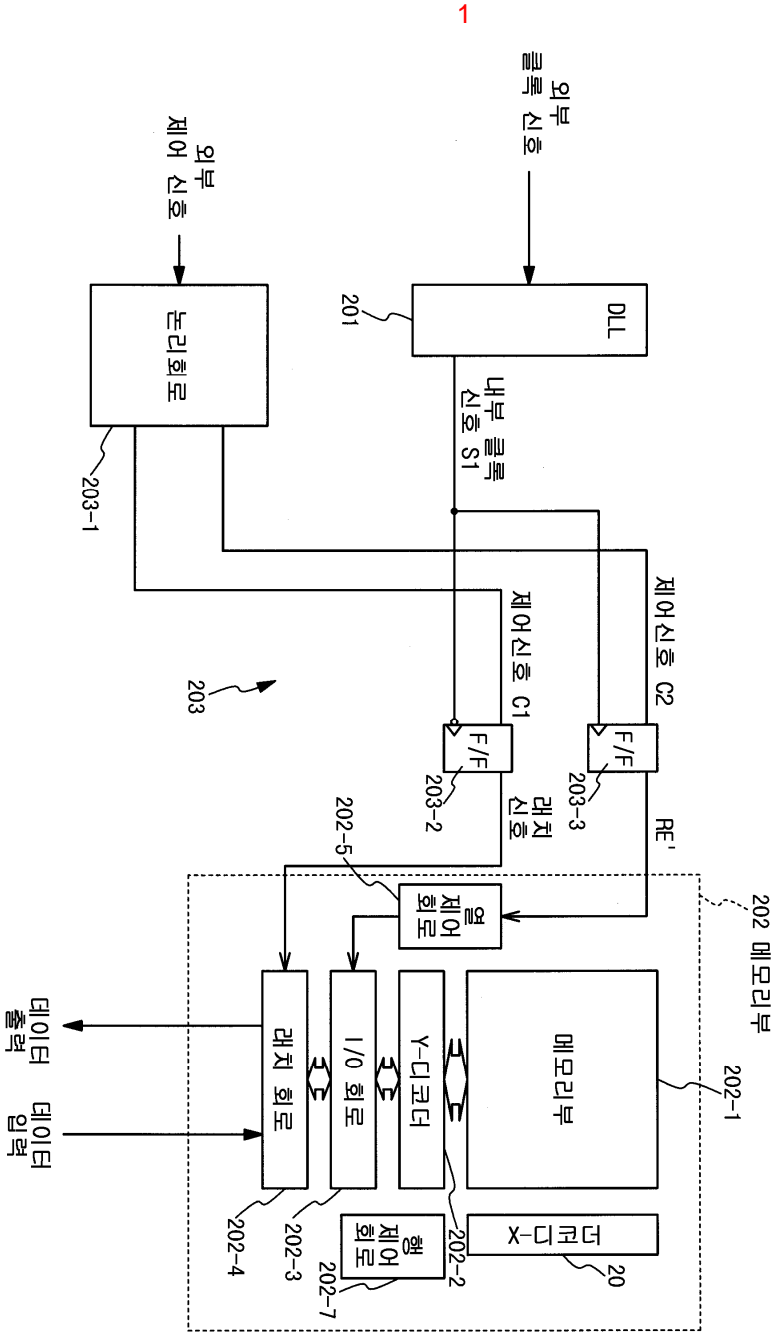
,

19 21.

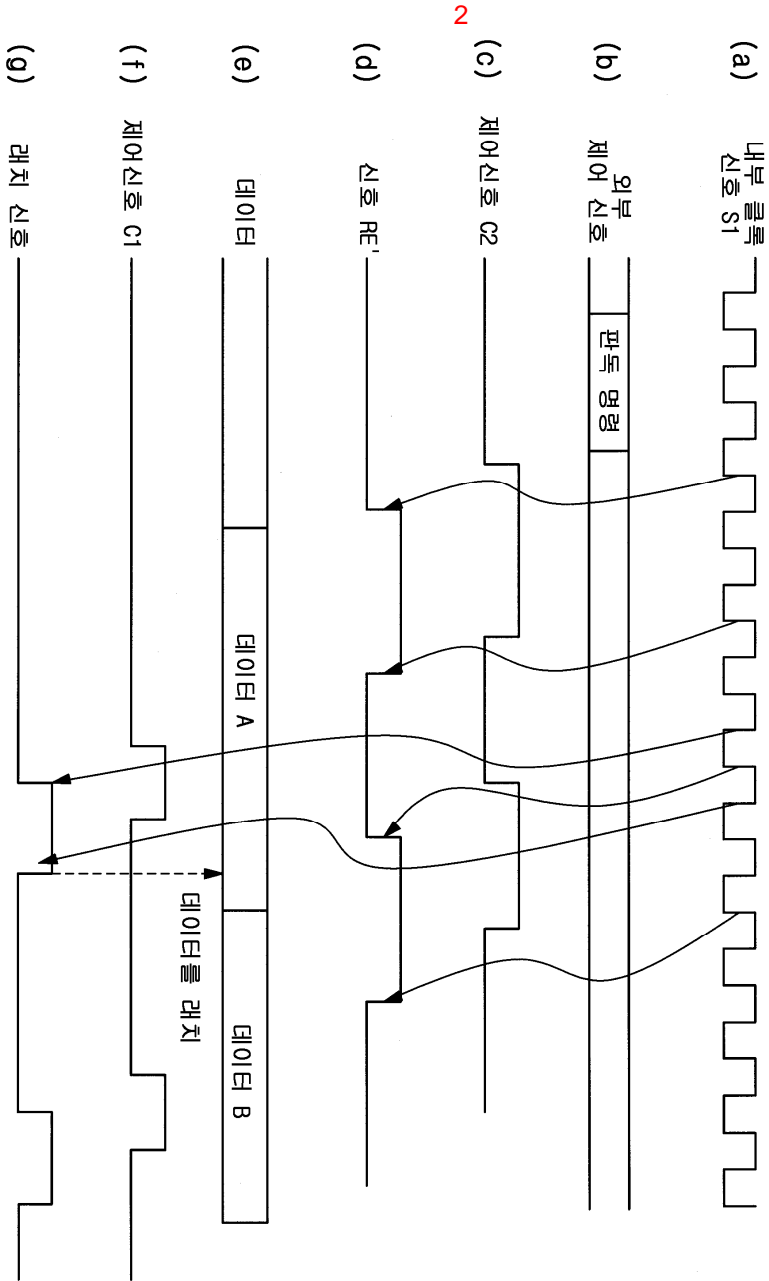
,

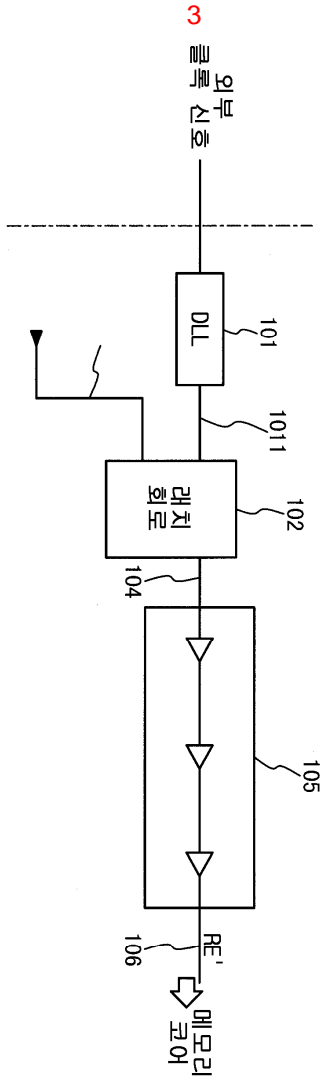
- 19 22. 21
- 19 23. 21

종래 기술

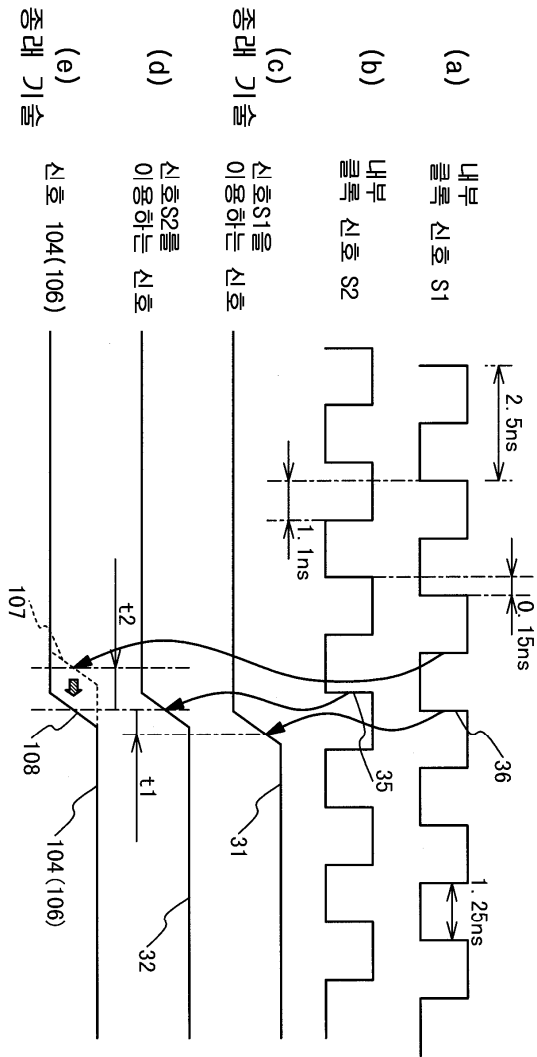


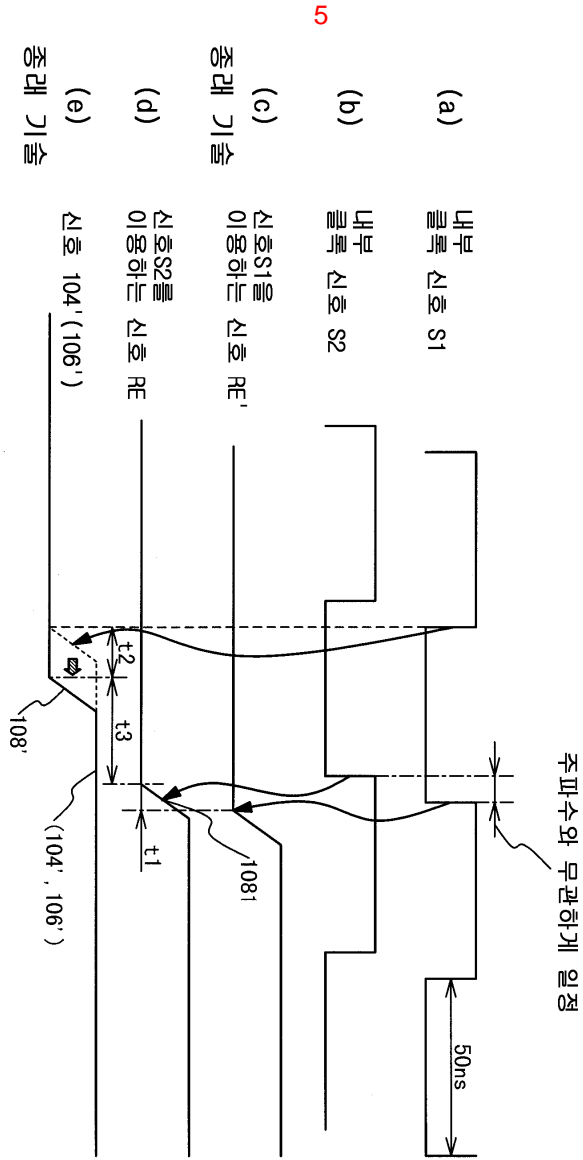
종래 기술



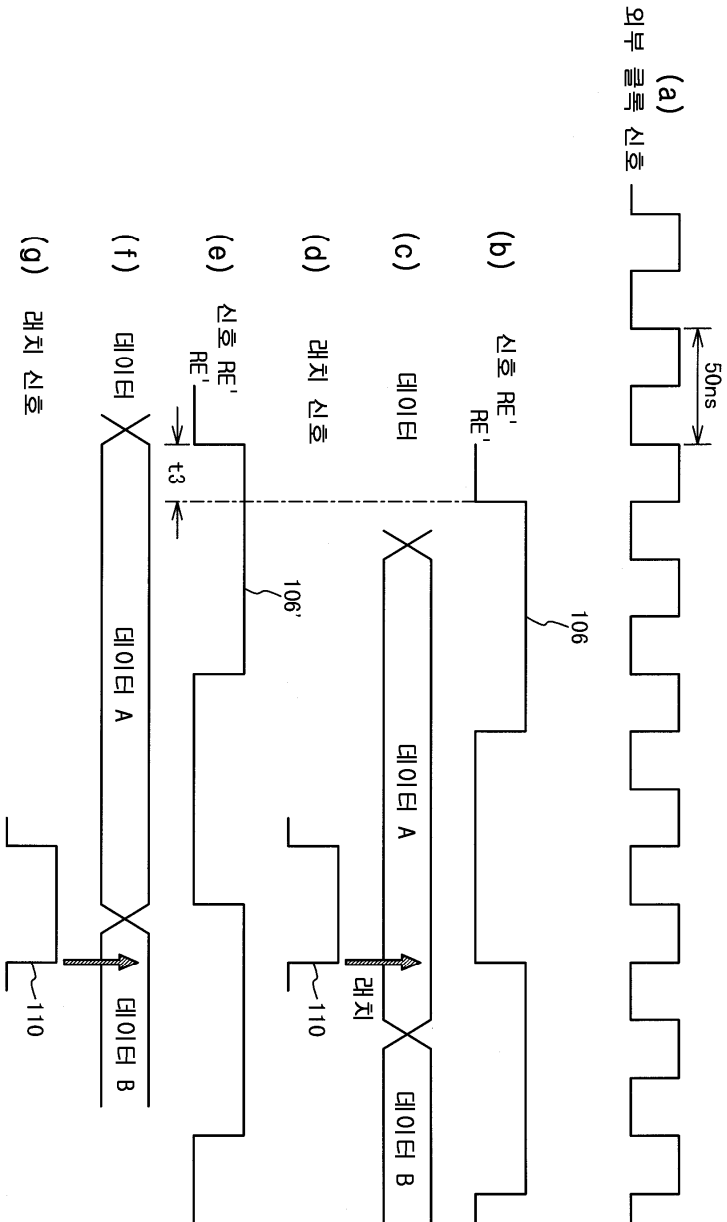


4

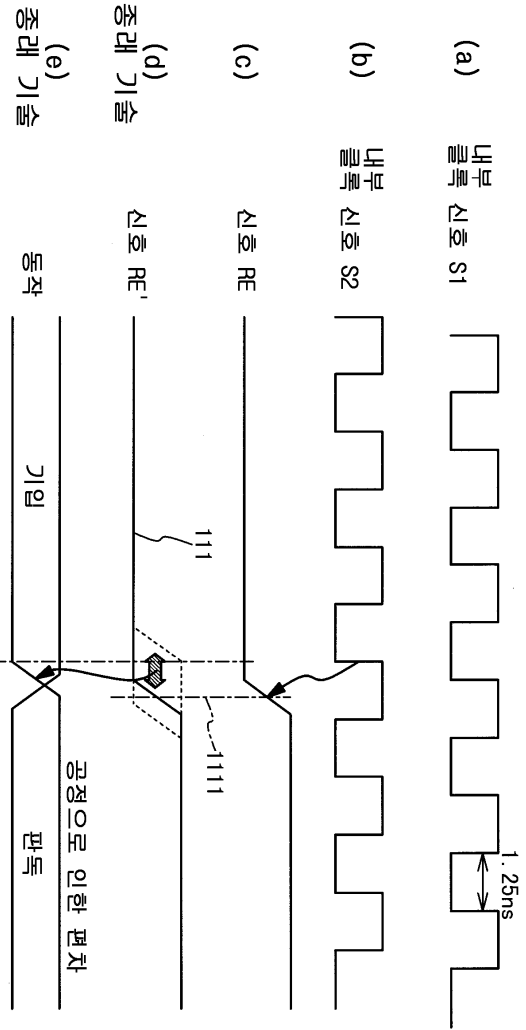




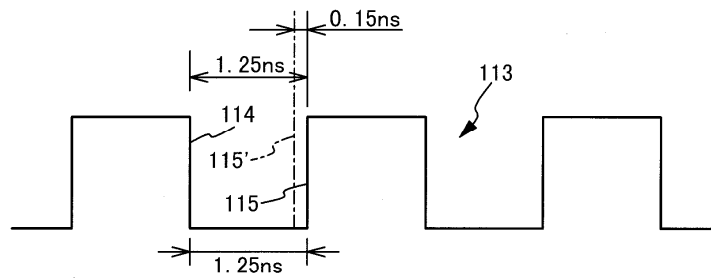
종래 기술



7

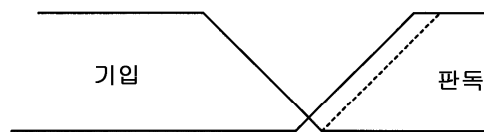


8a



8b

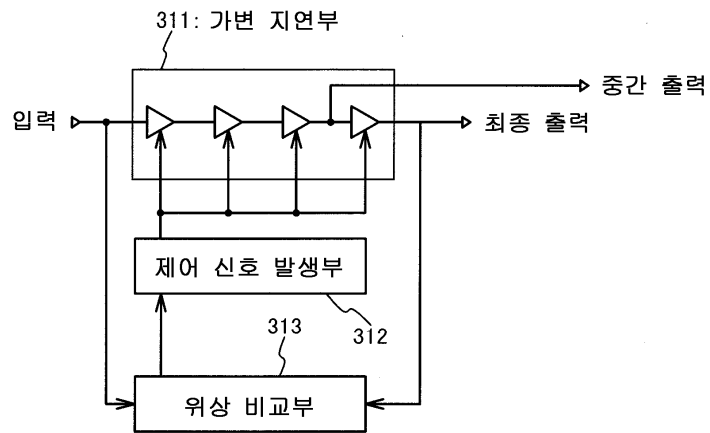
종래 기술

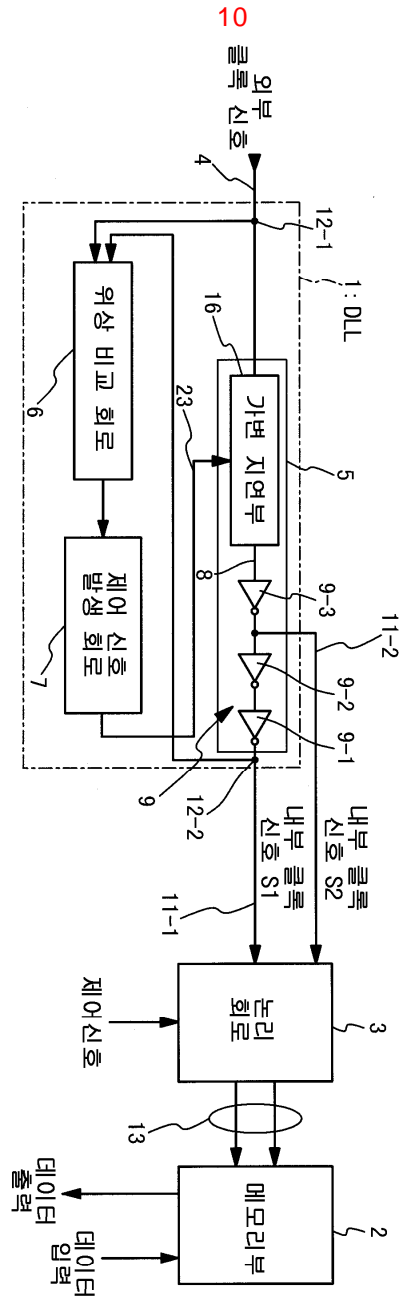


8c
종래 기술

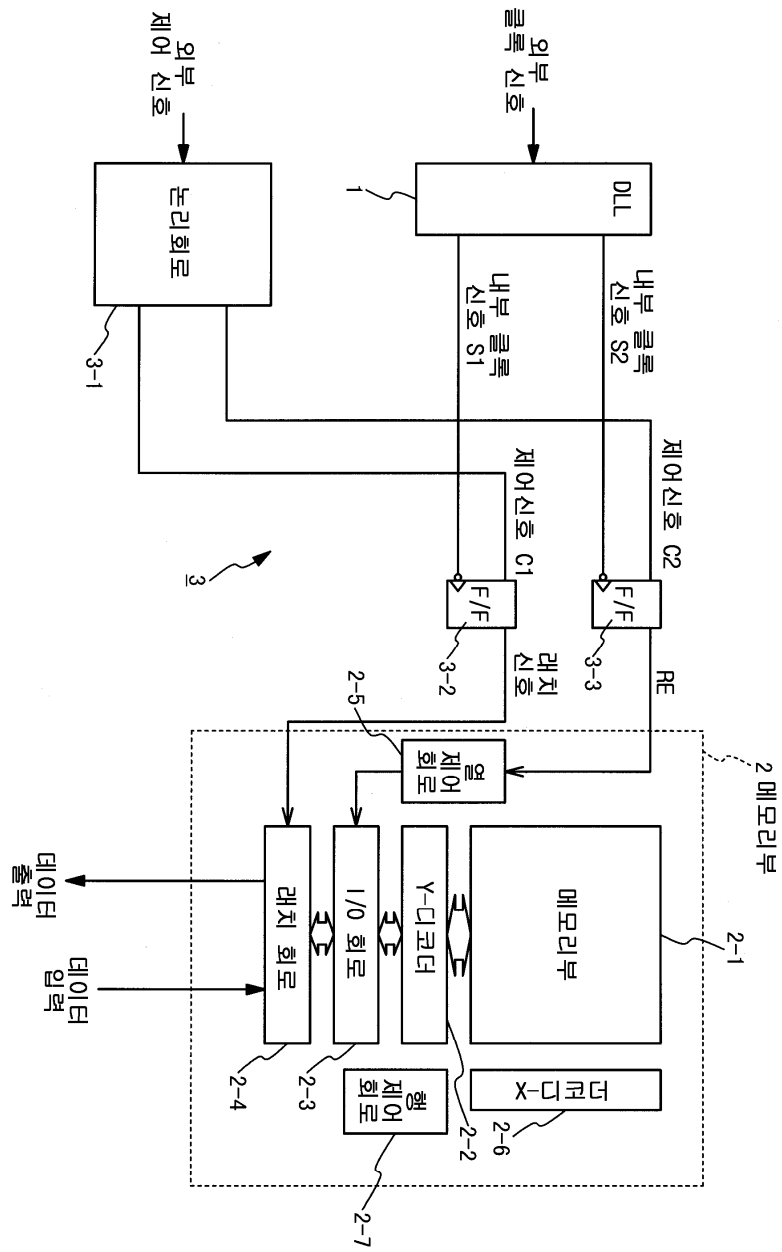


9
종래 기술





11



12

