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(73) 가 가
1 1 1

(72) 가
가 가 가 - - 1가 가

가
가 가 가 - - 1가 가
/ADRS

가 가 가 - - 1가 가

가 가 가 - - 1가 가

(74)

:

(54)

, ,
가 .

(11) (12),
(14),

(20), (16),
(19), (18),
AND

1

, , , ,

1 1

2 1 PD (29)
3 1 (30)
4 1 FCLT (31)
5 1 (19)

6 1 , (power down entry) , (power do
wn exit)

7 DRAM

8 DRAM

9 |

10

11 2 DRAM

12 DRAM EXTCLKT

13 11 PD (101)

14 11 (102)

15 11 C FCLT (31C)

16 11 , C

17 11 가 - (non-active)
가 , ,

18 STBD

19 18

20 18 (jitter) 1
가 ,

21 18 (22)

22 18

<

11 :

12 : ()

13, 15 :

14 :

16 :

17 :

18 :

19 :

20 :

21 :

22 :

23 :

24 :

25, 26, 27, 28 : AND

29, 101 : PD

30, 102 :

31, 31T, 31C : FCLT

DRAM (double data rate synchronous DRAM)

DRAM

가

(,

(,)

,

)

, ,

, ,

가 가

, 가

,
가

가

가

18

(特願平) 11 - 35946

Backward Delay)

STBD (Synchronous Traced

	(11),	(12),	(13)
	(14),	(14)	(13)
(15)	(16),	(17)	(14)
			(16)
	(16)		(14)
	(14)	(18)	(18),
	(19),	(20),	(PT, bPT)
(21),	(18)	(12)	(22)
(23)			

, (14) N (13) , (18) N (17) , (18) N (16)
 (17) , (18) N .
 (N - 1) (15) .

, , (14), (16) (18) STBD
 19 18 . , 19 , 18

, 19	, EXTCLKT (11)	
EXTCLKT , (11)	, CLKSINT . (11)	
Trc , 19	CLKSINT , EXTCLKT	Trc
. (11)	CLKSINT , (12)	(19)
	(16)	.
	(23)	

$$\begin{array}{ccccccccc}
 & (19) & , & \text{CLKSINT} & , & 19 & , & \text{CLKSINT} \\
 & , & \text{Wp} & & \text{PT, bPT} & . & & \text{PT, bPT} & \text{W} \\
 p & , & (20) & & \text{Tdr} & , & (\text{Trc} + \text{Tdr}) & . & , (\text{T} \\
 & & & & (12) & & & (14) &
 \end{array}$$

(12) , (11) Trc , (20) Tdr
 (Trc+ Tdr) . , (12) FCLINT , 19
 , (11) CLKSINT (Trc+ Tdr) , (14)

(14) , (13) , PT가 "L" (前段)
 , , PT가 "H" .

(12) FCLINT 가 , PT가 "H"
 $\{ - (\text{Trc} + \text{Tdr}) \} , \text{FCLINT가 } (14)$.

$$\begin{array}{ccccccccc}
 (18) & , & & (14) & & & & (17) & , \\
 & & & & & & , & & (16) \\
 . & , & & (18) & & (17) & , & & , \\
 \text{가} & & & (14) & & (13) & & (17) & ,
 \end{array}$$

$$(15) \quad , \quad (15) \quad , \quad (16) \quad (15)$$

, (15) , (11) (17) CLKINT (23) (16) CLKINT2
 (15) .
 PT가 "H" , CLKINT2가 "H"
 (17) "H" CLKINT가 .
 , .
 數) N 18 , , 가 | N (14) (13) (段
 . , (18) | (18) N+1 (17) 가 (S)
 . (R) (16) N (15) .
 , .
 (13) 가 (15) , .
 , .
 (14) (16) CLKINT , FCLINT가
 (14) { - (Trc+ Tdr)} , (15) , 19
 STCLKT .
 STCLKT , , (20) , Tdr , 19 ,
 INTCLKT .
 , EXTCLKT INTCLKT total ,
 total .
 1

$$\Delta \text{total} = \Delta \text{msr} + \Delta \text{prp}$$

1 , msr 가 (14) (13) INTCLKT
 , prp .
 , EXTCLKT (11) Trc, CLKINT가 (12) CLKINT
 (Trc+ Tdr), FCLINT가 (14) { - (Trc+ Tdr)}, STCLKT가 (20) Tdr
 가 (16) , 1 msr, prp .
 . .

2

$$\Delta \text{msr} = (\text{Trc} + \text{Tdr}) + [\tau - (\text{Trc} + \text{Tdr})] = \tau$$

3

$$\Delta \text{prp} = \text{Trc} + [\tau - (\text{Trc} + \text{Tdr})] + \text{Tdr} = \tau$$

, total 2 , INTCLKT EXTCLKT 2 , 3
 EXTCLKT .

, (22) , STCLKT bPT , (18)
 bPMT , (12) FCLCLLT

, (23) , (11) QAT CLKSINT가 "H"
 CLKSINT QAT (11) AND (25) CLKSINT가 (24) , CLK
 (24) 2 AND . I

, (24) , CLKSINT가 "H" , CLKSINT가 "L"
 "H" , (11) QAT . AND (25) (24) QAT가 "
 H" QAT가 "L" , (11) CLKSINT CLKSINT2 (24)

, , 2 가 . , , 가
 (BANK) ,
 (Active Power Down Mode), (Non - active)
 (Standby Power Down Mode)

CKE가 . CKE가 "L" . 가 (), "
 H" ()

, (11) CKE , CKE , CKEIN

, , , , ,

L" "H" , (II) , CLKSINT EXTCLKT , "

, (11)가 "L" PT가

, (11) , (12) (14)
 , (17)

, (11)가 , , ,
 (17)가 , , ,
 , 가 , , ,

, 18 , (18) (17) (21) , CKEIN

,

(21)

,

(12)

,

(14)

,

가

,

(18)

,

가,

,

(18) 가

,

(21) 가

,

(18)

,

(18)

,

(18)

,

가

,

(11) 가

,

"H"

,

가

,

(21) 가

,

"H"

,

"H"

,

(18) 가

,

(18)

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(18)

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(18)

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가

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가

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가

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1

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가

,

(16) 가

,

(15) (1

,

20

,

가

,

(14)

,

(13)

,

STCLKT 가

,

1

,

(17) 가

,

{ - (Trc + Tdr) }

,

(17)

,

20

,

(17) 가

,

(17)

,

(22)

,

50%

,

(22)

,

50%

,

(22) , 20

,

(17) ,

,

(22)

,

(12) (17)

,

FCLCTLT

,

가

,

가

,

(22)

21

, S1 , bPT가 STCLKT가 "H" , STCLKT가 "H" 가
 가 STCLKT가 "H" (18) , S2 , STCLKT가 "L"
 bPMT , , ,
 S1 S2 , S3 FCLINT가 "H" 가 STCLKT 가
 H" 가 . STCLKT가 "H" FCLINT ,
 NT , S4 , (18) 가 bPMT , FCLI
 , S1 S4 , (18) bPMT
 , bPMT가 "H" , 가 (14)
 (17) , 가 "H"
 , bPMT가 "L" , 가 (16)
 (17) , 가 "L"
 , S5 (22) bPMT가, bPT
 , (12) FCLINT ,
 (14) ,
 , , 22
 ,
 (18) (17) , (11) CLKINT , (18)
 (21) (17) 가 , , (16) (15) , (15) ,
 1) (16) 가 (15) (11) CLKTINT (CLKTI)
 NT2) 가 STCLKT (22 STCLKTI).
 ,
 , (16) , { - (Trc+ Tdr)} , STCLKT ,
 , (15) 1 STCLKT bPT
 , , S1 , 「YES」 가 S2
 , FCLINT가 . , S3 ,
 (18) , (22 STCLKTI).
 21
 ,
 , 21
 , ,
 , (16) , { - (Trc+ Tdr)} , STCLKT ,
 , (15) 1 STCLKT bPT
 , , S1 , 「YES」 가 S2
 , FCLINT가 . , S3 ,
 (18) , (22 STCLKTI).
 2
 ,
 ,
 , 가 INTCLKT1 , 4

$$, \quad 18 \quad , \quad (23) \quad , \quad , \quad , \quad (16) \quad , \quad , \quad , \quad (11)$$

AT (24), CKEIN (11), "L" (II), (11) CLKSTINT
AND (25) (11) CLKSTINT (16) QAT가 "H" . , 2
(11) CLKSTINT CLKSTINT2 (16) ,

$$, \quad , \quad (11)$$

, (23) , 1 CLKSTINT
, QAT가 "H" , (11) CLKSTINT CLKSTIN
T2 .

, 가 , (14) 1 (17) (13) . , (11) CLKSTINT2 , (16) 1 (가) , (12) , (18)

, 18 ,
가 가 .

$$, \quad (11) \quad , \quad (12) \quad (14)$$

, , 가 , 가 , 가 , .

, , 가

$$1 \quad ; \quad , \quad ; \quad 1 \quad ; \quad 1$$

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 2 ; 2 , 1 ; 1
 , 2
 2 , 1 , , ;
 3 ; 1 , , ; 1
 ; 2 , 2 , 가 2 ;
 ; 1 , , , 2
 가 , , , 1
 가 , , , 2
 가 , , , 1
 2 , , , ; 1
 ; | ; 1 , , ,
 2 ; 3 ; 3 ; 1
 ; 1 , 2 3
 , , , ,
 4 , 3 , ,
 , , , ,
 5 , 3 , , , 가
 , , , ,
 6 , 5 , , , 가,
 , , , , 가
 , , , ,
 7 , 3 , , , 가,
 ; 1 , , ; 1
 ; 1

| , (11), (12), (13)
 | (14), (14) (15) (16), (14) (16)
 | (13), (15) (16) CLKSTINT (16)
 | (11) (16) STCLKT PT, bPT
 | (19), (16) (18) (17) INTCLKT
 | (20), (18) (17) (21),
 | (18) (12) (22),
 | (23) 가 .

, (19) , PT, bPT , FCLT
 (31) GATEBT DMY PT DMY PT
 (14) .

(22) , (19) bPT (16) bPT
 (18) LKT , FCLCTLT STC
 (12) , (12) .

, (23) AND (25) 2 CLKSTINT 3
 AND (25) , (11) (30) (24) STBYYAT 가 . 3
 QAT , AND (25) AND (16) .

, 가 18 , (11)
 (12) AND (26) (1) 가 , (12)
 (14) AND (27) (2) 가 , (11)
 (19) AND (28) (3) 가 , 3 AND (2
 6, 27, 28) PD () (29),
 (30) FCLT (31) 가 .

AND (26) , (11) CLKSTINT , PD (29)
 GATEAT "H" 가 . , AND (26) , , AND (28)
 가 3 , "H" , 2 "H"

AND (27) , (12) , FCLT (31)
 GATEBT 가 .

AND (28) , (11) CLKSTINT , PD (29)
 GATEAT (1) (30) GATEAT 가 .

PD (29) , CKEIN () (11) CLKSTINT CKE
 GATEAT (1) .

(30) , 가 , 가
 b DOENB (1) , 가 , BKOR (2) ,
 BK0R , , , , bACTV(12) ,
 2) , STBYAT (3) STBYBT (2) DMOUTT , (11) CLKSTINT ,
 . .

FCLT (11) (31) , PD (29) GATEAT
 CLKSTJNT , GATEBT (4) .

(12) , (11) Trc , (20) Tdr
 (Trc+ Tdr) . , (11) Trc , (20)
 Tdr , INTCLKT ,
 INTCLKT 가
 (Trc+ Tdr) .

, CLCTLT (12) () , (22) F
 . .

(19) , AND (28) FCLT (3I) GATEBT
 , Wp PT, bPT DMY PT
 , Wp (Trc+ Tdr)

2 , 1 PD (29) . 2 2 NAND
 (4I, 42) 1 (43) . 2 NAND (41, 42) ,
 CKEIN , NAND (42) (43) (1I) , NAND (41)
 (41) . CLKSTINT . , NAND
 . GATEAT 가 .

3 , 1 (30) , , , , NAND
 (44) (45) , 가 bACTV
 N1 . .

N1 , , , , b DOENB
 가 BK0R 3 NOR (46) .

, 2 2 NAND (47, 48) , , , , (1
 , NAND (47) NOR (46) N2 , NAND (48)
 2) DMOUTT . , NAND (47) (49) ,
 STBYBT 가 . , NAND (47) (50) ,
 (50) 2 1 (LC)
 , STBYAT 가 .

, (50) CLKSTINT 2 CLKINGT b CLKINGT . ,
 CLKSTINT (51, 52)

4 , 1 FCLT (31) , 2 NAN
 D (53, 54) , , , NAND
 (53) PD (29) , G
 ATEAT , 2 (55, 56) 2 NAND (57) GATEAT가 . , NAND (57)
 CLKSTINT . , NAND (57) NAND (54)

, NAND (54) PDBT1 , 3 NAND (58) 1 , PDBT2 ,
 NAND (58) 1 (59) (60) , NAND (58) , 1
 (30) , STBYBT가 , , NAND (58) (61)
 , (61) GATEBT가 .

5 , 1 (19) , , NAND (62)
 1) CLKSTINT (5) (63) , 1 AND (28) (1
 , (64) , NAND (65) , , N3
 (31) GATEBT (5) (66) , 1 FCLT N4

(N3, N4) NAND (67) , NAND (67) (68)
 bPT가 , bPT가 (69) PT가

, , , , CKE
 가 "L" , , , CKEIN가 "H" CKEIN
 , 6

6 a). , , (11)가 CLKSINT "H" "L" (,
 "L" , , , , , , , , , , , , , , , ,
 PD (11) CLKSINT "H", "L"
 GATEAT (29) , AND (26, 28) (23) AND (25)
 (24) GATEAT가 , , GATEAT (23) , (24) QAT "
 L" , AND (26) DMINT, AND (28) AND (25) CLKSINT
 2 "L" , AND (28) "L" PT "L" (6
 c, d, e).

, GATEAT FCLT (31) GATEBT "L"
 (6 f). , GATEBT AND (27) "L"
 GATEBT PT (19) , DMY PT , PT (14)
 PT (66) DMY PT , 5 (19) (64), NAND (65)
 h. , N4 , (68 69) PT N4가 NAND (67),

 PT (14) DMY PT) , (14) ,
 GATEBT bRSINIT (1) "L" (21) ,
 (18) (17) (6 l),

 , GATEBT가 "L" , AND (27) FCLINT "L"

 , AND (26, 28, 25, 27) "L" , AND
 GATEBT , (19)
 (21) (18) (14)

 , , CKE (29) CKEIN가 "H"
 , PD , GATEAT가 "
 H"가 (6 j). , CLKSTINT "L"
 PD (29) , (11) GATEBT가 "H"가 , AND (26, 28) "L"
 CATEAT "H" , (1l) (6 k, 1).

 , GATEAT가 "H" , (23)
 (24) 가 , (11) 1
 AND (25) 2 (6 m).

 , FCLT (31) , AND (26) 가 (11)
 x가 , GATEBT "H"

 , , x , 4 (56) FCLT (31) , CATEAT
 , , (59) NAND (57) (60) CLKSTINT 가
 DBT2 PDBT1 P

 GATEBT가 "H"가 , (21) (18)
 (12) DMOUTT , GATEBT가 "H"가 , ADN (27) 가
 , , FCLINT (14)

 , (12) (12) AND (26)
 (12) (6 n, , AND (27) ,
 (6 n, , DMOUTT ,) , (1

(14) , , (14) , , (18)
 AND (26) 가 , AND (26) "L"
 (12) , AND (27)
 (12) (14)

, , (14) (6
 o).

, x , 4 , GATEAT 가 "
 H" , , (14) , (11) , CLKSTINT
 NAND (53, 54) PDBT1 "H" 가 (6
 p). (12) , AND (27) , AND (27) 가
 , PDBT1 가 "H" (12) , AND (27) , 4 ,
 PDBT2 가 "H" 가 (59)
 6 q). PDBT2 가 "H" 가 , GATEBT 가 "H" 가 (6 r), AND (27) 가

, , (12) ()
 () 4 , (60) , (12) AND (27)
 , , (12)

7 , , DRAM ,
 2 , , DRAM , ,
 (CL= 2) , , (DQ) , ,
 QS (, , 3 , , 3 , , 2
 3 , , 7 | "H" , , , ,
 가 . "H" , , , , (7 tPDEX)

$$tPDEX = (tRECEX + tGCTL) - tREC$$

D , tRECEX 1 (11) 가 , tGCTL 1 AN
 (26) GATEAT PD (29)
 , tREC (11)

H" , , 2 , ,
 가 , , , ,

, STBD . ,
, 가 . , 가 .
, 가 . ,
, . ,
2 . ,
, . ,
가 .

, "H" 가, (12) CLKSTINT "H"
, , 1 AND (26)
가

$$, \quad , \quad (12) \\ , \quad . \quad (12) \\ , \quad . \quad (12) \dagger$$

9 , . 가 (b)

DOENB가 "L") 가 - 가 , BKOR가 "L" (9 a), N2가 "L" (9 b). , 3 , (30) , , ST
NAND (47) "H"가 , (50) (49) C
BYAT, STBYBT가 "L" (9 c, d). , (50) C
LKINGT "L", bCLKINGT "H"

STBYAT가 "L" , 1 AND (28, 25)가 , AND (28)
"L" (9 e, f). PT , AND (25) CLKSINT2

, STBYBT가 "L" , STBYBT FCLT (31) NAND (5
8) "H", , 1 AND (27)가 , GATEBT가 "L" (9 g). GATE
BT , , , , FCLINT가 "L" (9 h). GA
TEBT , , , , PT DMY PT 1 (14) (9 i).
DMY PT가 , , , , (14)
가 .

, CATEBT , (21)가 bRSINIT "L"
(9 j), (18)가 () .
, AND (26)
(11) CLKSTINT (12) (9 k).

- , 가 bACTV가 "
L" (9 l), 3 (30) NAND (44) NI "
H"가 , OR (46) N2 "H"가 (9 m). bACTV
bACTV가 "L" N2가 "L"가 , BKOR ,
(9 n).

N2가 "H"가 , (14) , I AND
(27) (12) DMOUTT "L" DMOUTT
, (30) NAND (48) , DMOUTT가 "L"
, (30) STBYBT가 "H"가 (9 o),
FCLT (31) GATEBT가 "H"가 (9 p). GATEBT
가 "H"가 , AND (27)가 (9 q). , GATEBT
(21) (18) , , (18)
(9 r).

, AND (28, 25) , AND (27) , (I1) CLKSTINT "
L" (9 s). AND (28, 25) , AND (27) 가
, (11) CLKSTINT "H" , ,

, DRAM ,
가 . , , 가
BKOR
가 . , ,

, (bDOENB가 "H") , 가 - 가 (BKOR가 "L")
BKOR가 "L" , bDOENB가 "H" , 3 N2가 "H"
STBD , .
bDOENB가 "L" , N2가 "L" , STBD 가 . , ,

$$\begin{array}{ccccccccc} \text{가} & \text{가} & , & & . & & 2 & "H" & \\ | & & , & & , & & , & (II) & (12) \\ | & & (12) & & , & & . & & . \end{array}$$

, , STBD ,
 (19), (21) (22) 가 , SA
 D (Synchronous Adjustable Delay) 가 . , SAD
 , (11) (12) AND (26) AND
 가 , (12) (14) AND (27) AND
 AND 가 , PD (29), (30) FCLT
 (31) 가 .

9), (87) 2 1 (LC)

(LC2)가 .

NAND (44, 47, 48), (45, 49, 51, 52), OR (46), (50) (LC)
 , bACTV, BKOR, bDOEB, DMOUTT, CLKSTINT , T ST
 BYAT, STBYBT . 가 NAND (84, 85), (86, 88, 89), (87)
 (LC2) , STBYAT DNIOUTC , C
 STBYAC, STBYBC .

15 , C FCLT (31C) , , , 4
 FCLT (31) 가 , NAND (53, 54, 57, 58) , (55, 56, 59, 61)가
 , 4 , GATEAT GATEAC가, CLKSTI
 NT CLKSTINC가, STBYBT STBYBTC가 ,
 GATEBT GATEBC가 .

, T FCLT (31T) , 4 FCLT (31)
 , T EXTCLKT INTCLKT
 STBD , 1
 C EXTCLK INTCLKC STBD
 , .

EXTCLKT 가 EXTCLKT "H"
 가 , EXTCLKT "H"
 , C EXTCLK INTCLKC
 , T EXTCLKT INTCLKT

, , C , 16
 PD (I01) , (16 a), GATE
 AT "L" , , GATEAC "L" (16 b). , AND (26C, 28C, 25C)가
 , AND (26C, 25C) DMINC, CLKSTINC "L"가 , AND (28C)
 (19C) PT "L" (16 c, d, e).

, GATEAC , FCLT (3IC) GATEBC "L" (16 f).
 GATEBC AND (27C)가 , CFCLINC "L" (16 g).

, CATEBC (19C) , (14C)
 () PT DMY PT 1 (16 h), (14C)

i), GATEBC (18C) (21C) bRSINIC "L" (16

, (I01), CLKSTINT가 "L" (16 j), PD
 STINT "L", CLKSTINC "H" (16 k). CLK
 GATEAT 가 , CLKSTINC가 "L"
 AT "H" "H"가 (16 m).

"H" GATEAC AND (26C, 28C) (11) CLKSTINC
 (16 n, o). , GATEAC가 "H" , (23C)
 (24C) 1 CLKSTINC QAC가 "H" , AND (25C) 가
 , (11) CLKSTINC가 CLKSTINC2 (16 p).

, FCLT (31C) AND (26C) 가 (11) DMOUTC "L"
 x가 , (I2C) (21C)
 , GATEBC "H" , GATEBC , (16 q).

C STBD

17 가 - 가 , , 가
 17

, BKOR가 "L" 가 (17 a), (bDOENB가 "L") 가 - 가
 , (102) , N2가 "L" 가 (17 b). ,
 (50) (49) NAND (47) "H" 가 ,
 STBYAT, STBYBT가 "L" 가 (17 c).

, "L" STBYBT (102) STBYAC, STBYAC,
 STBYBC가 "L" (17 d, e). STBYAC가 "L" 가 (19C) AND (28C, 25
 C) 가 , AND (28C) PT, AND (25C)
 CLKSINC2 "L" 가 (17 f, g).

, STBYBC가 "L" , STBYBC FCLT (31C) NAND (5
 8C) "H", STBYBC GATEBC가 "L" 가 (17 h). C
 ATEBC , AND (27C) 가 , FCLIN "L" (17 i). , GATEBC
 , (19C) , PT DMYPC 1 (14C) (17 j).
 DMYPC가 (14C)

가

, GATEBC , (21C) 가 bRSINIC "L"
 (17 k), (18C) 가 () .

C), CLKSTINC, AND (26C) . . . , (11)

- , 가 (30C) bAC
 TV가 "H"가 (17 1), NAND (44C) N1 "H"
 가 , OR (46C) N2 "H"가 (17 m).

N2가 "H"가 , (I2C) DMOUTC가 "L" (I4C) , AND (27C)
 (30C) NAND (48C)
 , (30T) STBYBT가 "H"가 (17 n). ,
 (11T) CLKSTINT "L"가 , STBYAT가 "H" , (30T)
 STBYAT가 "H"가 (17 o). (12C) DMOUTC "H" (17 p).
 "L" , , T STBYAT , 14 NAND (84, 85), (86) (87)
 , T 가 , DMOUTC가 "L" , C STBYBC ,
 STBYBT "H"가 (17 q).

"H" STBYBC , FCLT (31C) GATEBC " " (17 s). , GATEBC , GATEBC가 "H"가 , AND (27C)가 (18C)
 (18C) (17 t).

, STBYBC가 "H" , (11C) CLKSTINC "L"가 ,
 STBYAC가 "H" (17 u).

, C STBD .

, , , , C T
 , , T

가 , , 가

(57)

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(後段) 1 ,
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(前段) 2 , , 2 , 가 2
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가 ,
2 ,
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4.

5.

3 , 가 가

6.

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가 ,

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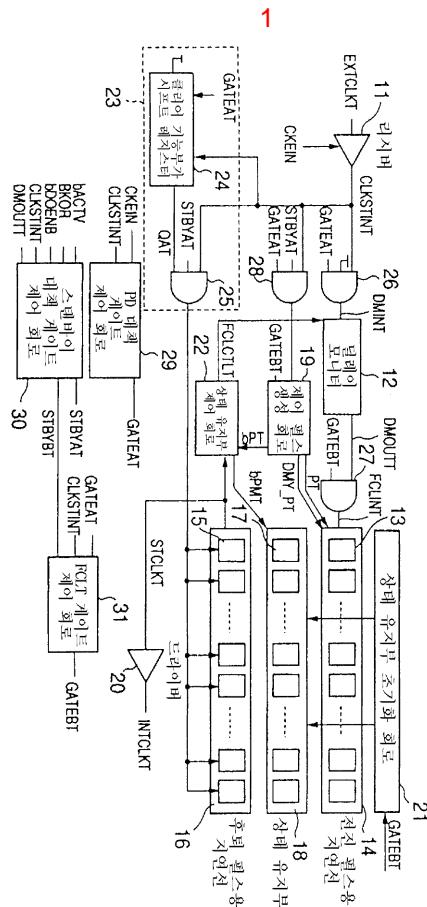
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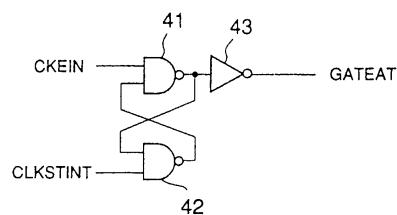
12.

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1 1 ;
1 1 ;
1 1 , 1 ;
2 1 1 ;
| | | , 1 ;

1 | , ;
| 1 2 ;
1 2 ;
2 2 ;
2 3 ;
3 2 , 3 ;
4 2 ;
2 2 , 3 ;
2 3 , 4 .

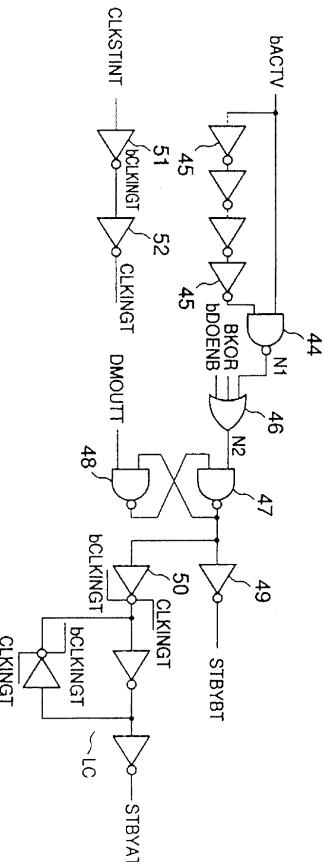


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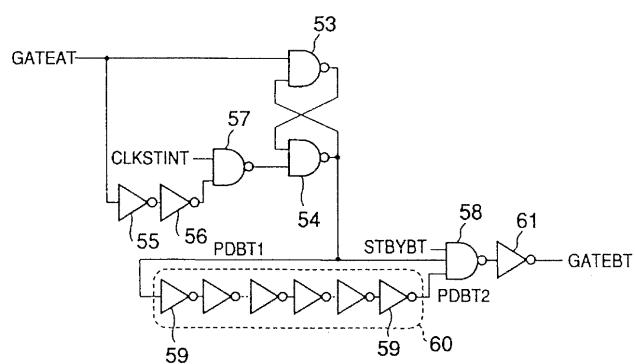
PD 대체 케이트 제어 회로

3



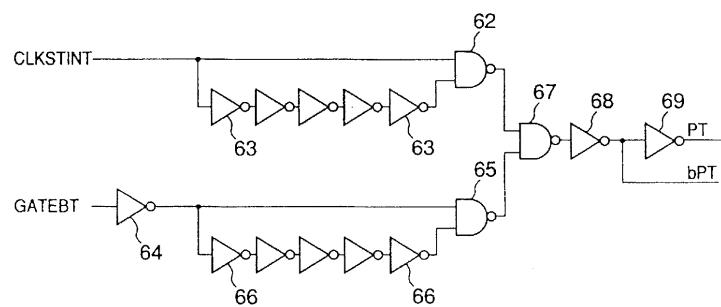
스텐바이 내 카 케이트 케어 회로 30

4



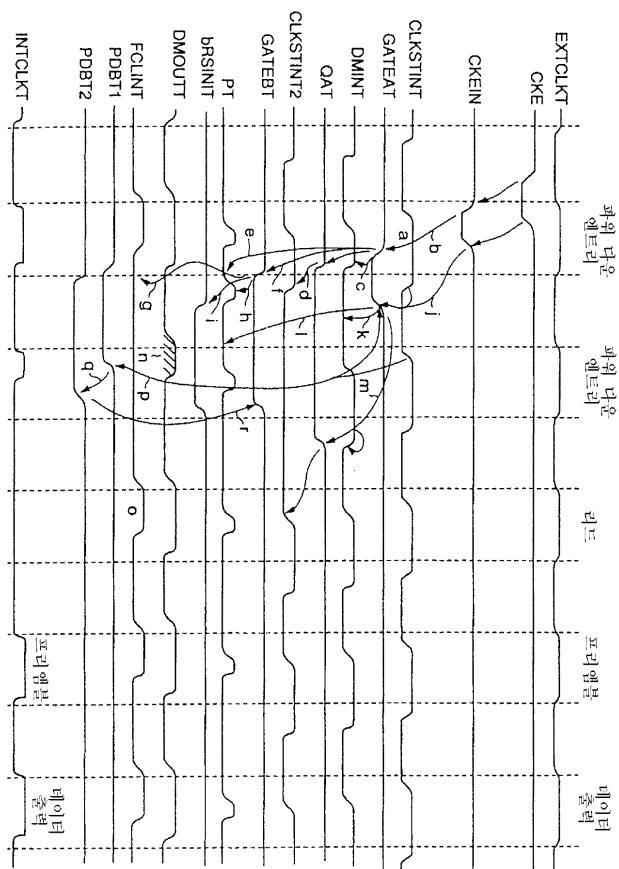
FCLT 케이트 케어 회로 31

5

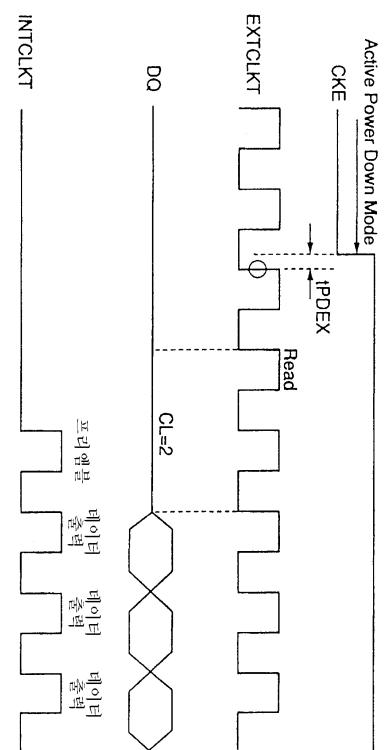


제어 웨이브 생성 회로

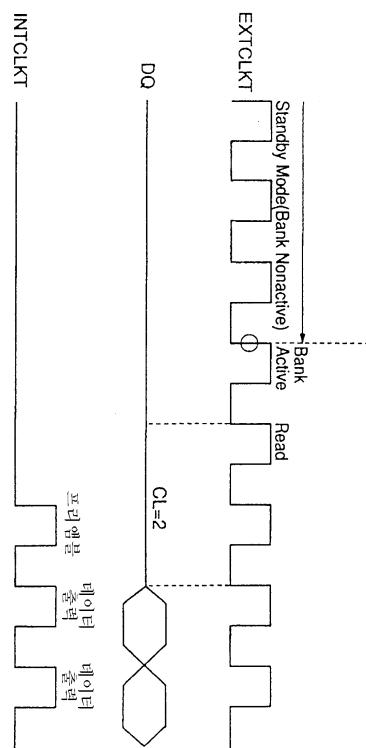
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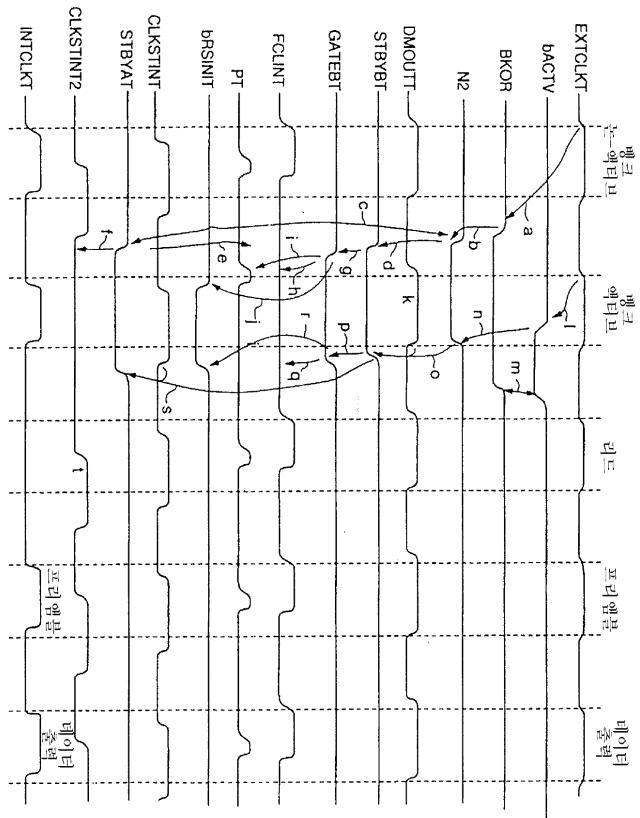
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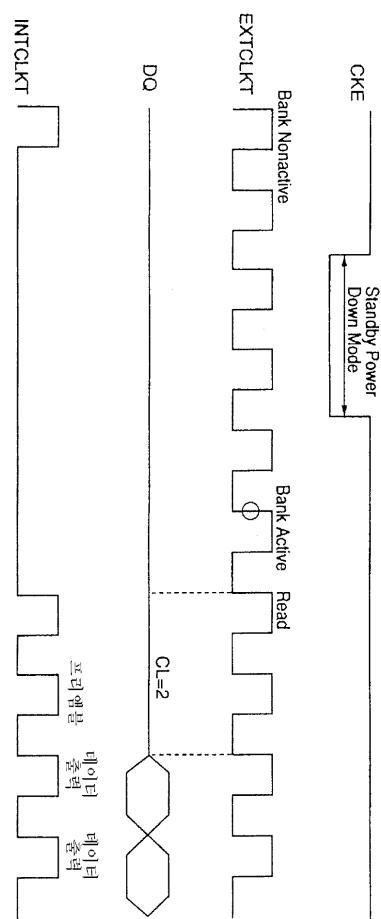
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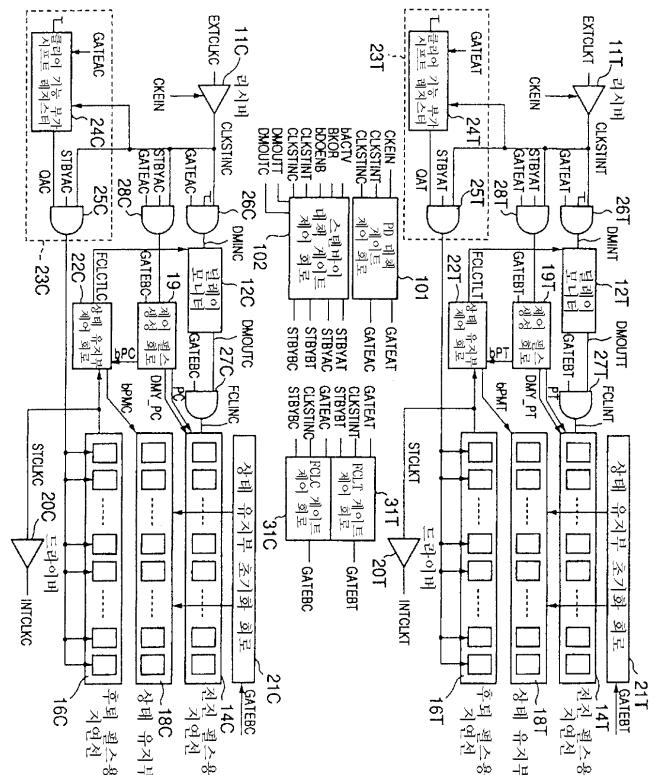
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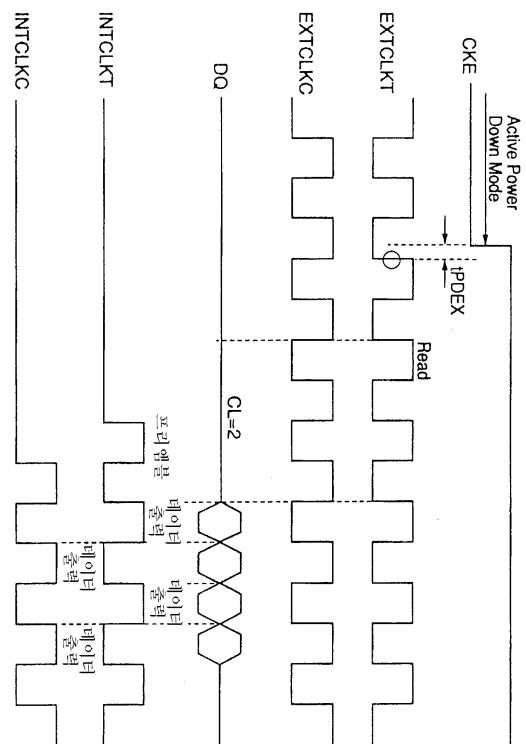
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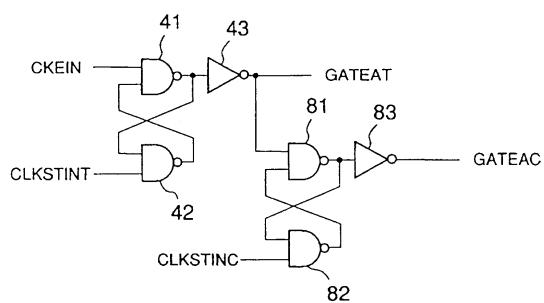
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12

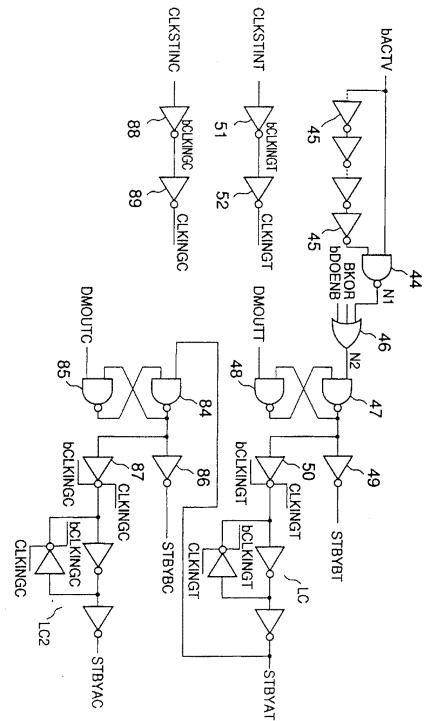


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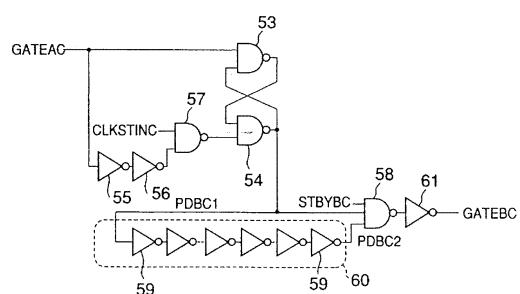
PD 대체 케이트 제어 회로 101

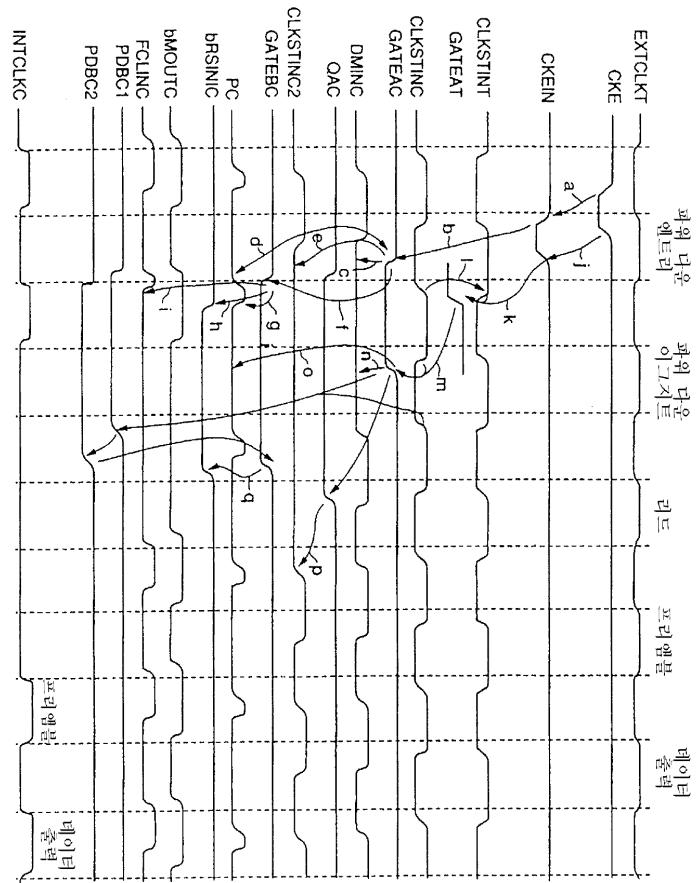
14

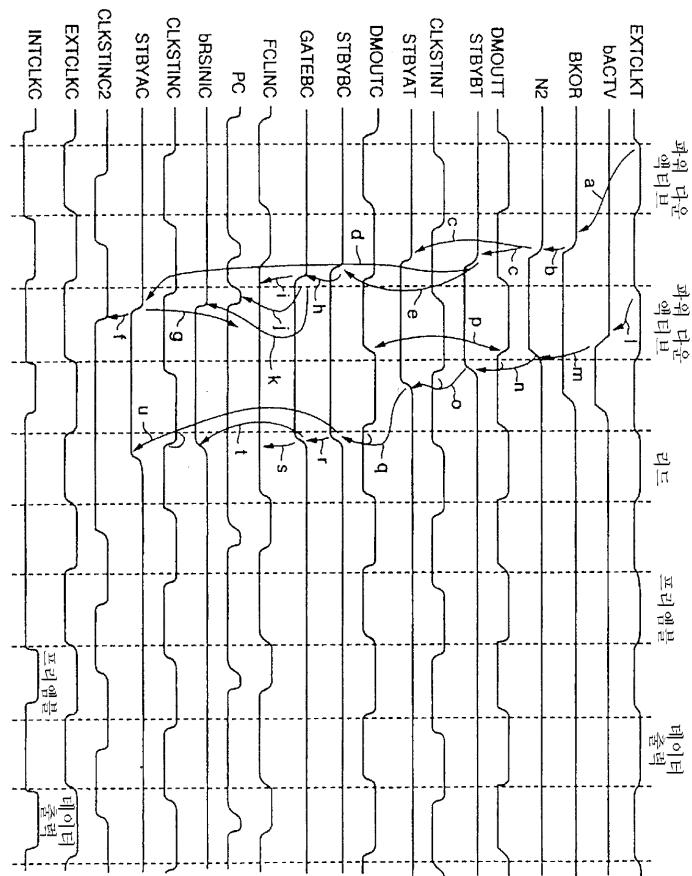


△(한국어) 대체 캐시트 제이 회. 102

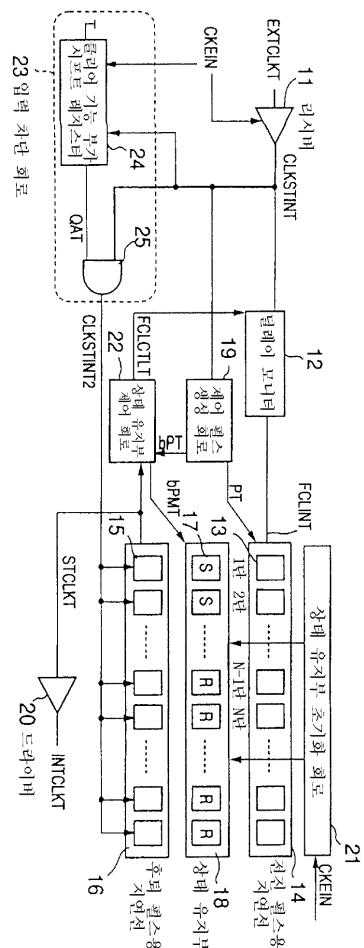
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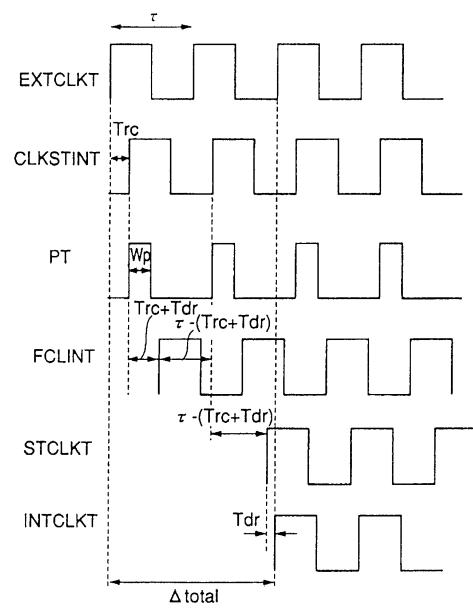


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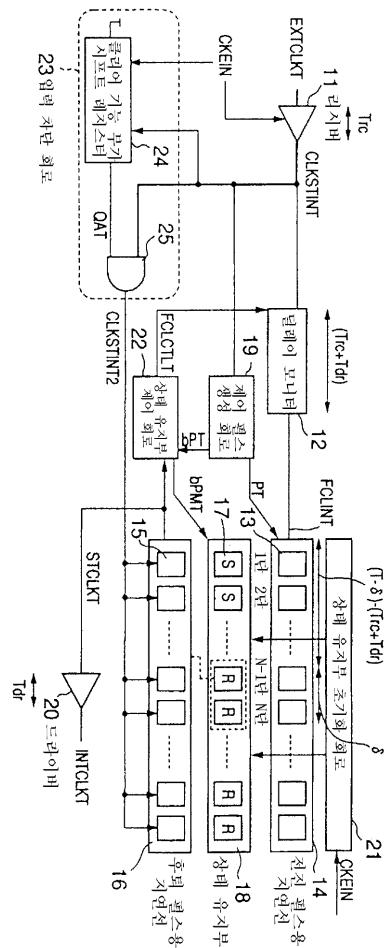


23 암 액 치단 회로

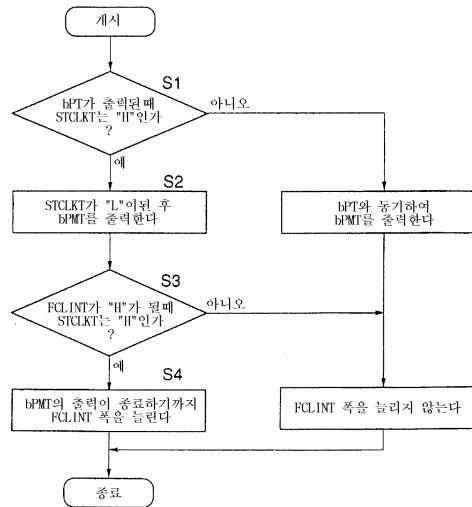
19



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22

