

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl.⁷
H03M 13/00
H03M 13/15

(11)
(43)

10-2004-0075954
2004 08 30

(21)
(22)
(86)
(86)

10-2004-7011355
2004 07 22
2004 07 22
PCT/US2003/001995
2003 01 22

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WO 2003/063364
2003 07 31

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(71)
(72)
(74)

10/055,076
92648
,2 , ,
08536
,
46032

2002 01 23
46
934
13970

(US)

(54)

(410)가
(440)가
(930)

,
(410, 420, 430, 440, 450)
, - (940)

(430)가
가

,
(930, 940)

(420)가
(450)가
(640, 650)

,
,

, 'INTRA-DECODER COMPONENT BLOCK MESSAGING' 2002 1 23
 10/055,114 (PU020002) , 'CHIEN SEARCH CELL FOR AN ERROR-C
 ORRECTING DECODER' 2002 1 23 10/055,470 (PU020001)

가 , 가 / , , (r
 edundancy) 가 / ,
 (field) 가 .
 / (Reed-Solomon) .
 (非) (非) .
 (非) (burst) ,
 (form) 가
 (parity), 가
 (shift)가
 가 ,
 , () , ()
 , () , ()
 (version)

- 1 .
- 2 .
- 3 .
- 4 - .
- 5 - .
- 6 - .
- 7 - .
- 8 - .
- 9 (Chien) / (Chien/Forney) - .
- 10 - .
- 11 - .

1 , , / (100) 가

가 , 가 , 가 ,

R) 가 3dB (BER) 30dB (SNR)

BER 27dB SNR 30dB SNR

() SNR 가 SNR SNR BER BER

(110) (115) (125) (120) ,

2 , / / 가 / ()가

:() , / (CD), (DVD), , () , () , V.pcm, ADS

(340) , (340) 가 (Trellis Cod

ed Modulation; TCM)(365) (370) .

4 - (非) 8 , 1 - (非) (非)

가 가

(Galois)

1 , $q=p^m$ GF(q) , q , p , m . q

(n,k) k n 가

$T \quad 0 \leq T \leq t$, n $t=(n-k)/2$ T , n-k

가 가

(410)

(410)(, n-k

) , 가

2^n 가 2^{n-k}

(410) , s(x) S(x) α 가

α^{n-k} s(x) , α^{n-k} R(x)

(410) , α^{n-k} , R(α) R(α^{n-k}) S

S(2t)]. , n-k=2t , 2t : [S1 S2 S3... S1

α^2 S2,

(410) (420) t

ssey (Euclid) Berlekamp - Ma

(420) () (430) (440)

(430) (root)

(Chien) , (430) (440) (440) t
 (Forney) , (440)
 가 ,
 (450) , 0
 (450) (460) (460) 0
 Out) (454) (452) (450) LIFO (Last In, First
 LIFO (454) , 가
 LIFO (450)
 가 .
 5 - S(x)가 (510) (510) (520)
) S(x) , Key : $\Lambda(x)$ $\Omega(x)$

1

$$\Lambda(x) [1 + S(x)] = \Omega(x) \bmod x^{2t+1}$$

- , 가 (GCD)
 $\Lambda(x)$ 가 , 가
 , 0 , 가 i , 0 :

2

$$\sum_{j=0}^t A_j \alpha^{-ij} = 0, \quad \text{where } i = 0 \dots (n-1)$$

, i j 2 , 0 . 0
 , 0
 (t+1) j (n
 0 n (i , 0 1) , 0
 , '0' '1' n '1'
 (n-1)
 modulo) , α^{-i} α^{-254} α^{-2} α^{-253} α^{-i} (-i modulo n) = (-i
 modulo 255)

$\Lambda(x)$ Y_i $\Omega(x)$. , .

3

$$Y_i = \frac{\Omega(x)}{\Lambda'(x)} \quad \text{for } x = \alpha^{-i} \text{ where } \alpha^{-i} \text{ is a root of } \Lambda(x)$$

$\Lambda'(x)$. $\Lambda(x) = \alpha^4 X^3 + \alpha^3 X^2 + \alpha X + \alpha$
2 가 . , $\Lambda'(x)$.

4

$$\begin{aligned} \Lambda'(x) &= 3\alpha^4 X^2 + 2\alpha^3 X + \alpha \\ &= (\alpha^4 + \alpha^4 + \alpha^4) X^2 + (\alpha^3 + \alpha^3) X + \alpha \\ &= \alpha^4 X^2 + \alpha \end{aligned}$$

X (幕) , X ()

$\Omega(x)$, Ω_0 , $\Omega_1 \times \alpha^{-1}$, $\Omega_2 \times \alpha^{-2}$, ... $\Omega_t \times \alpha^{-t}$.
 $\Lambda'(x)$

(numerator)
 , 가 α^3 , α^{-3} .

5

$$\alpha^{-i} = \alpha^{(-i \bmod n)} = \alpha^{(-3 \bmod 255)} = \alpha^{252}$$

가 , 가 , / (53)
0) . , , 0
 , 0
 , 0 AND , (,
 , / (530) , 0
(540) , 0 (540) (550)
(550) (540) LIFO (542) (544) LIF
O (542) , 가 , LIFO ,
(540) 가 .

가
(delivery pipeline)
(4 5
XOR
6
A(610) B(620) (630
가
A(610) 가 A(610)
B(620) 가
'Ready-to-Send'(RTS)
(650) B(620)
가 B(620)
가 A(610)
'Ready-to-Receive'(RTR) (640)
가,
(IP) (
core) 가 가
7
(410), (420), (430), (440), (450)(
(452) LIFO (454)), (460) , 4
(, RTS RTR) /
가 (410)
(420) RTS RTS (710) , RTR RTR (712)
(420) (430) RTS RTS (718) , R
TR RTR (720) (440) RTS
RTS (724) , RTR RTR (726) (440)
(450) RTS RTS (730) , RTR RTR (760)
(410) RTR (740) ,
(450) RTS (760)
가 가
가 (450) RTR RTS
(460)((750)) 가
가
(, 가),
(410)
(430) (44
가
(440) RTR (420) RTR (720,726)
(430) (440)

7

가 RTS RTR (410) 가 (420) RTS RTR

(load)

가 (latency)

()

8

(810)

1(CW1) t₀ C

W1 CW1 t₄ t₁ CW1 t₂ CW2 t₈ 2(C

W2) t₄ CW2 (t₈-t₀)

(820)

3(CW3) t₆ t₇

9

(910) (910) S(x)가

(920)

Λ(x) Ω(x)

(930)

Λ(x) (930) 가

가 i 0 :

6

$$\sum_{j=0}^i A_j \alpha^{-ij} = 0, \quad \text{where } i = 0 \dots (n-1)$$

(930) i j 0

가
(940)
, 0
AN
D
(
0
)
(940)
(950)
, 0
(950)
(960)
(950) LIFO (952) (954)
(954) LIF
O (952) 가 LIFO
(95
0) 가
- t 2t . t
, t 가 / N
, 가 / t N
, / 'eXclusive OR'(XOR)
가 t
가 N
(930) 가 t
가 t 6-8
(940) (930)
(940)

/ ; 가 N ;
XOR 가
/ () XO
R) LIFO(Last In, First Out
XOR 가
LIFO
XOR N LIFO
() 가

10 (1000) $\wedge$ 가 :
가 10

$$x_i = \sum_{j=0}^i A_j \alpha^{-ij}, \text{ where } i = 0 \dots (N-1)$$

7 0 (1000) $\wedge$
t (t+1) (t+1) (t
(1000) (1010) (1020)
(1020) (1040) α^{-j} (1030)
가 , i j N , j 0 t 7
(j=1) 가 (sequence) α^{-1}

$$\lambda + \lambda \alpha^{-1} X + (\lambda \alpha^{-1}) \alpha^{-1} X^2 + ((\lambda \alpha^{-1}) \alpha^{-1}) \alpha^{-1} X^3 + \dots$$

$$, X^n \quad n$$

$$\lambda + \lambda \alpha^{-1} X + \lambda \alpha^{-2} X^2 + \lambda \alpha^{-3} X^3 + \dots + \lambda \alpha^{-(N-1)} X^{N-1}$$

LIFO 가 LIFO
가 LIFO
/ IC 가 가 LIFO N
가 LIFO
11 (1100) ()
가 (8 9) 가

$$x_i = \sum_{j=0}^i A_j \alpha^{-i(N-1)} \text{ where } i = 0$$

$$x_i = \sum_{j=0}^i A_j \alpha^j \quad \text{where } i = 1 \dots (N-1)$$

9

10 (1000) , '0' -j(N-1) 11 (1100) , -j(N-1) 0 가 . (1120) , (1110) (1150) $\alpha^{-j(N-1)}$ (1130) (1140) α^{-j} (120) (j=1) 가 . :

$$\lambda \alpha^{-(N-1)} X + (\lambda \alpha^{-(N-1)}) \alpha X^2 + ((\lambda \alpha^{-(N-1)}) \alpha) \alpha X^3 + \dots$$

:

$$\lambda \alpha^{-(N-1)} + \lambda \alpha^{-(N-2)} X + \lambda \alpha^{-(N-3)} X^2 + \dots + \lambda \alpha^{-1} X^{N-2} + \lambda X^{N-1}$$

(1000) () 10 (1100) 11 () LIFO , LIFO , 가 11 /

C 가 (, RS(255,k) t = 1 16) VHDL Verilog (VHDL Verilog IC , FPGA(Field Programmable Gate Array) ASIC(Application Specific Integrated Circuit) 'S system on Chip' 가 IC ,

가 , (, t) , 0 , ,

/

(57)

1.

(910) ,

(920) ,

(930) ,

(940) ,

(940)

(940) (930) , 1 (940) 2

2.

가

3.

(950)

4.

5.

(920)

6.

(930) 1

7.

(940) 2

8.

7 ,

(940)

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(940) ,

(940) /

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13.

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(940)

(930) 1
(940) 2

16.

1

17.

2

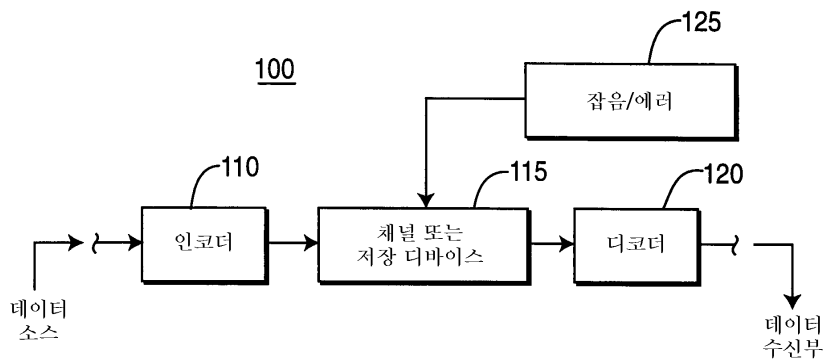
18.

19.

/

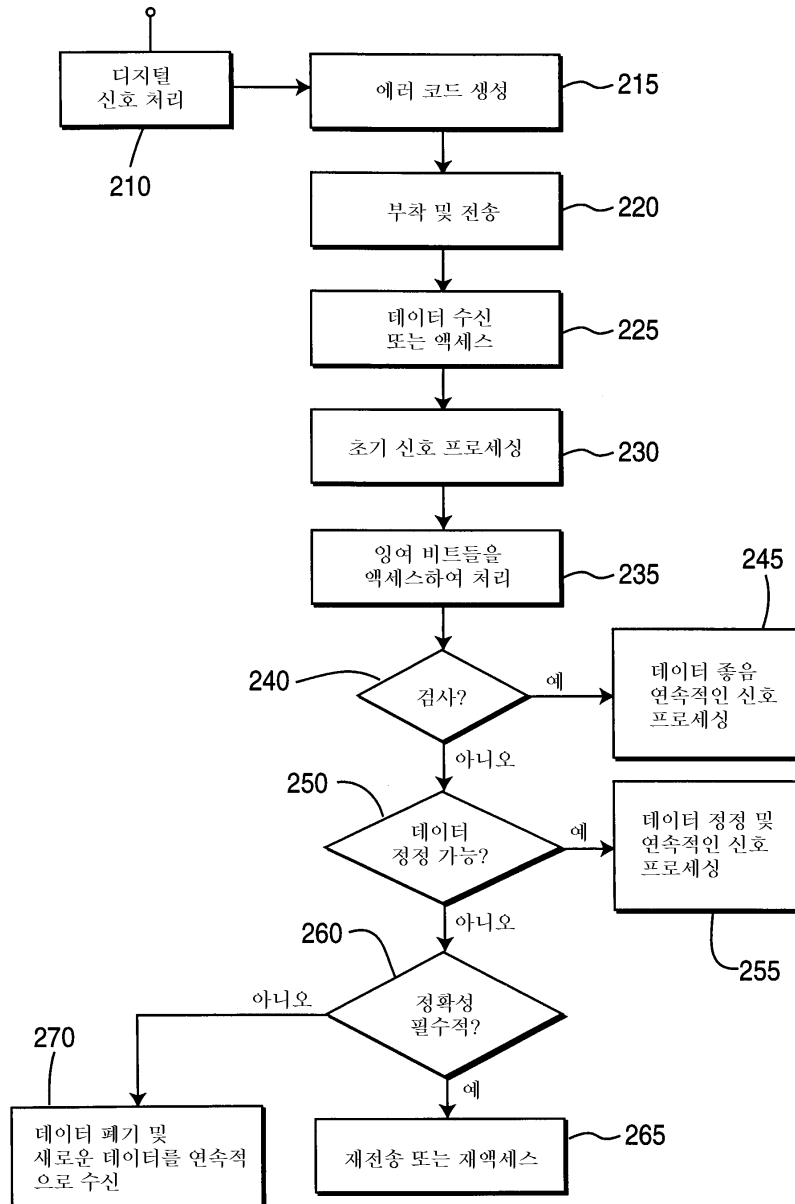
1

(종래 기술)



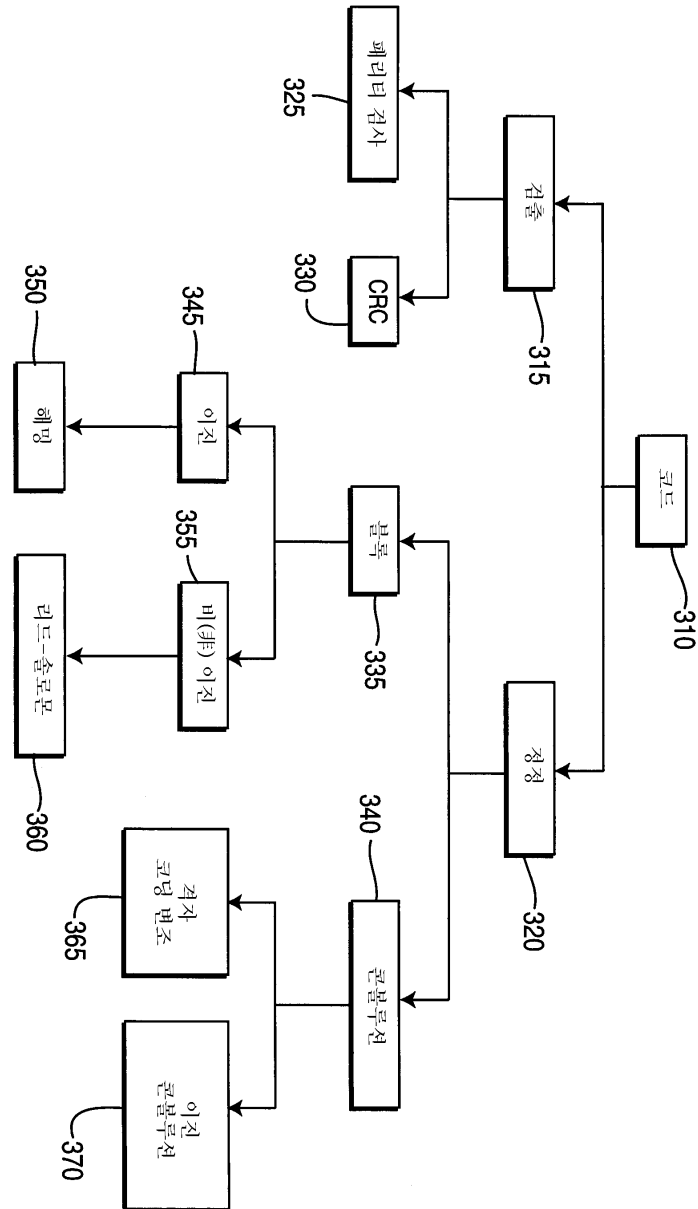
2

(종래 기술)



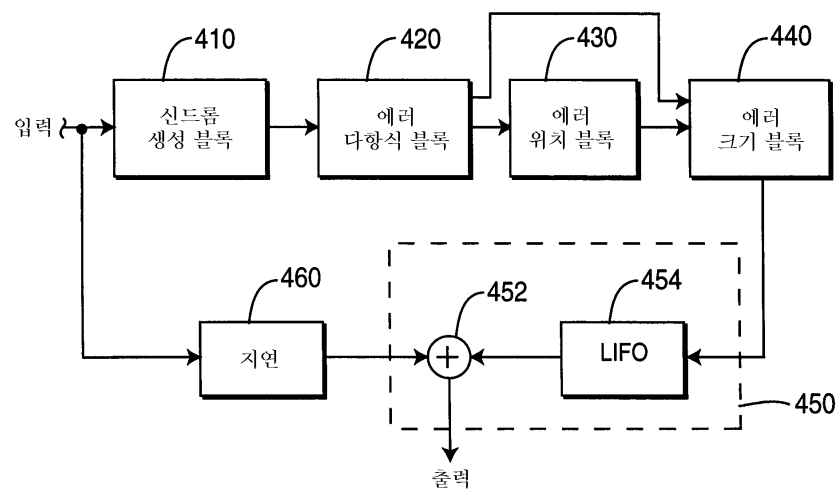
3

(종래 기술)

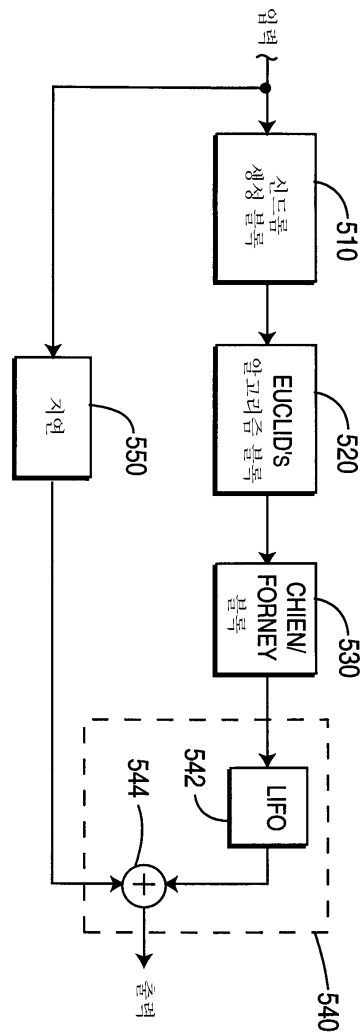


4

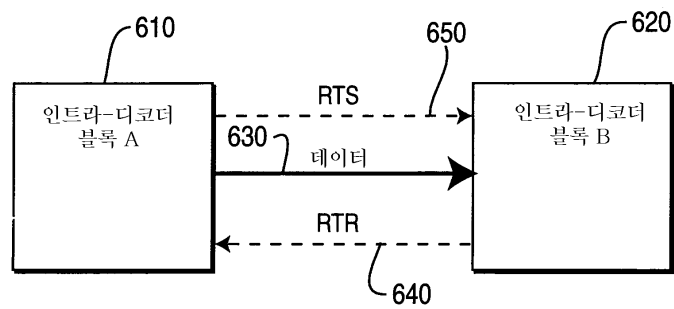
(종래 기술)



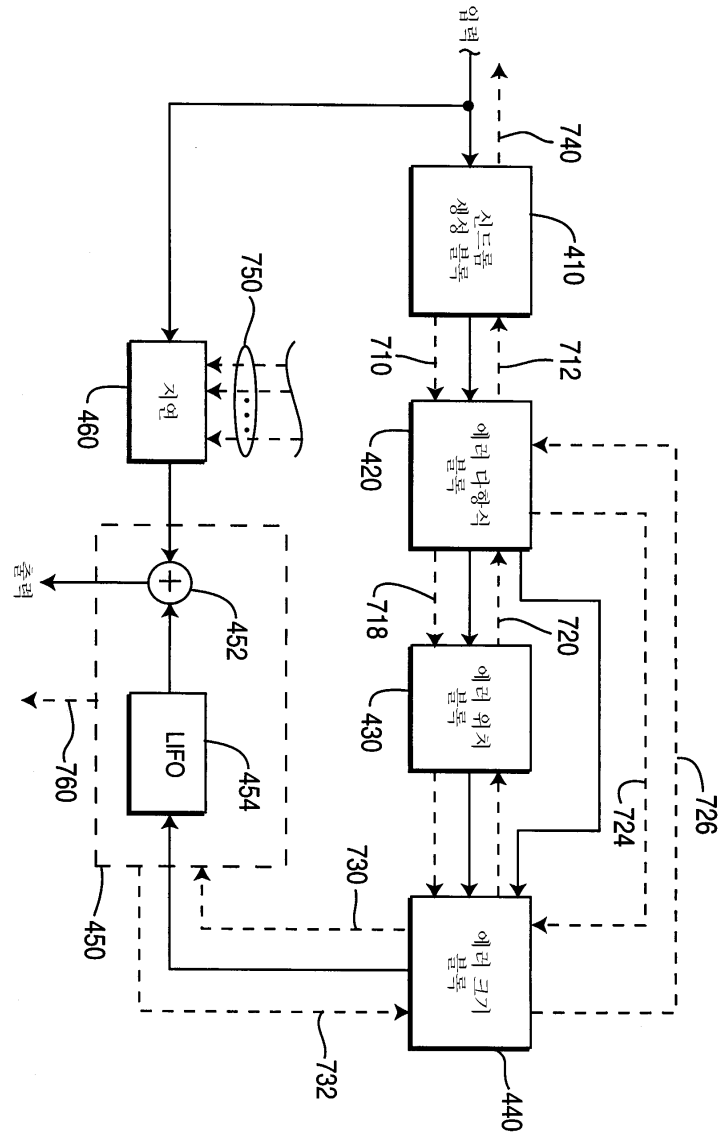
5



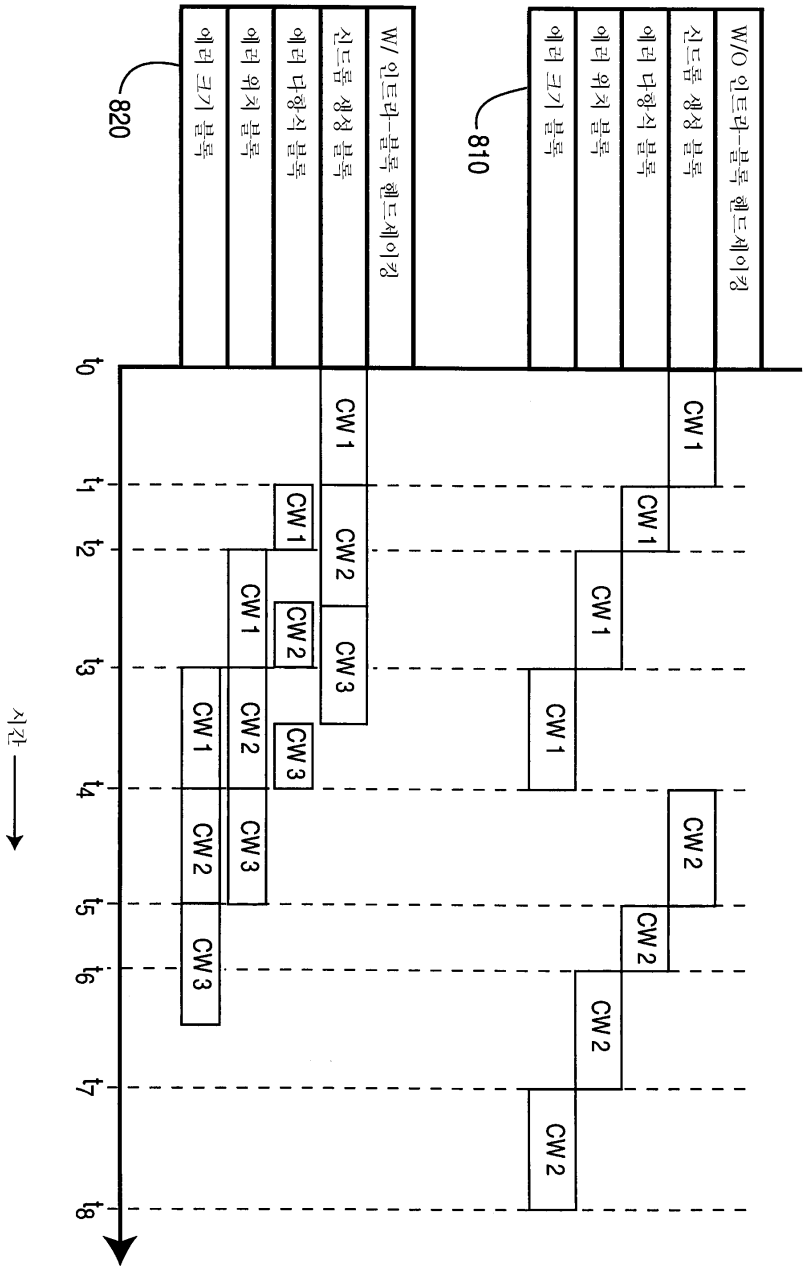
6



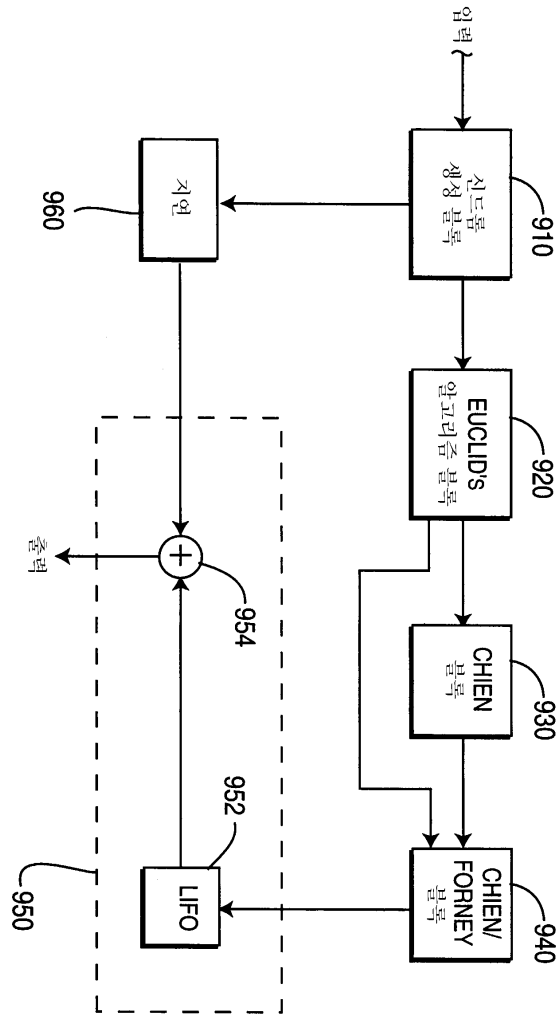
7



8

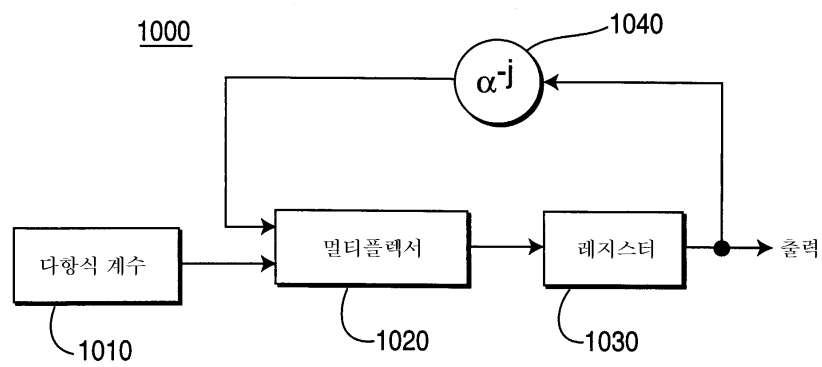


9



10

(종래 기술)



11

