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VOP VOP( (shot) 가

, VOP ) VOP 가

, VOP 가

, ,

, ( )가 가

. 가 ,

1 가 가

가 . GOV 가 가 GOV

, 가 가

, 가

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VOP

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, 가 가

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, 가

VOP

VOP ,

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1

2  
가

VOP

VOP

가

1 MPEG-4

2 VOP

3 1 VOP

4 1 VOP

5 VOP

6 1 VOP

7 2 VOP

8 2 VOP

9

10 2 VOP

11 3 VOP

12 3 VOP

13 3

14 4 VOP

15 4 VOP

16 5 VOP

17 5 VOP

18 5 VOP VOP

19 6 VOP

20 6 VOP VOP

21 7 VOP

22 7 VOP

23 8 VOP

24 8 VOP

25 8

26 8 VOP

27 8 VOP

28 9 VOP

29 10 VOP

30 11 VOP

31 12 VOP

( 1)

1 ISO/IEC JTC11 SC29/WG11/N1796

MPEG-4

가 VOP

MPEG-4

MPEG-4

MPEG-4

[ Video Object(V0) ]

1, V0

[ Video Object Layer(VOL) ]

, VOL

[ Group of Video Object Plane(GOP) ] , GOV

가 [ Video Object Plane(VOP) ] , VO

, VOL

VOP , VOP VOL (= ) . GO  
 VOP 2 , 2 VOP(VOP1 , VOP2 )  
 VOP 8 ( 1/2 2  
 ) , VOP 1, VOP 0  
 VOP VOP 가 ,  
 VOP가 1 , VOP 가  
 , MPEG-4 1 MPEG-4 , VOP  
 VOP ISO/IEC JTC1/SC29/WG11/N1796 VOP  
 3 1 VOP , 110 VOP , 111  
 , 113 , 115 , 118 , 122 , 124 , 12  
 6 , 128 , 129 가  
 VOP (110) VOP (7)  
 (111) (113) (128) , VOP (7) , VOL, GOV VOP (7)  
 VOP 가 15 / , VOP (110) 30 / , VOP (7)  
 1 VOP , 1 VOP VOP VOP 16 x1  
 6 VOP (110) VOP 16 x 16  
 (111) (112) (126) (112) (109)  
 (113) (115) (118) (113) (109) (122)  
 (123a) , (114) ,  
 (109)  
 (115) (122) (114)가 (123b)  
 (109) (115) (116)  
 (128) 가 (129) (116)  
 (128) (118) (117) MPEG-4 (117)  
 (119) (120) (109)  
 (119) (12)  
 6) (120) 가 (129) (120) 가 (121) ,  
 가 (129) (116) (120) 가 (125)  
 (122) (124) 가 , 가  
 (126) (126) 가 (125) (112) (114)  
 ) (119) VOP (125) , 1 VO , 2 VOL  
 4 3 GOV , 4 GOV , 5 VOP (1) VO , 6 GOV , 7  
 VOP , VOL (2) VOL GOV  
 VOL (2) VOL GOV  
 GOV (3) VOL GOV (2) , GOV (6)가 GOV  
 GOV (3) VOL GOV (6) (5) , GOV (6)가 GOV  
 GOV VOP (4)

GOV (4) VOP , VOP (5)

1 VOP , 4 VOP VOP VOP가 , VOP  
 30 / 「00」 「01」 , VOP VOP 「11」 , VOP (7) VOP  
 , VOP 가 , VOP (8) VOP  
 가 VOP (5) VOP (modulo\_time\_base) (9) VOP (VOP-time-in  
 VOP (10) increment) (13) , 5 VOP가 (14) , 5  
 , 가 , VOP 1000 1 , MP  
 EG-4 VOP 1000 1 (12) VOP (7) (13) VOP  
 VOP (5) (14) , (10) (13) (9) , VOP  
 (14) VOP (10) VOP (7) 가  
 (13) VOP (9) VOP (14) VOP (7) (8)  
 (13) VOP (10) VOP (10) VO  
 P (12) VOP (14) (11) VOP (10) (126)  
 (11) , VOP 1 GOV VOP VOP 가 , ,  
 VOP VOP 가 , VOP 가 ,  
 , 6 VOL VOP (7) , VOL VOP (2)  
 , VOP (13) VOP (14)가 ,  
 1 ,  
 , 1  
 ( 2) 2 1 VOP 가 가 2 1 VOP  
 2 1 VOP 가 , 1 VOP  
 VOP 가 가 1 1 VOP 가  
 , VOP 가 1 VOP  
 30 / , 15 / VOP , 1000 , 1001 V  
 OP , 1026 VOP (1000) VOP 1 VOP  
 (124) 2 (1000)  
 8 , 1002 VOL 2 , 1003 VOP (1000)  
 VO (1) VO , VOL VOL  
 (1002) VOL GOV (1002) (3) , VOP VOP  
 3 VOP (1026) , VOP (1026) 2 / 「000」 , VOP  
 5 / 「001」 , VOP 25 / 「010」 , VOP 30 / 「011」  
 , VOP ( VOP 10 / ) 「100」 VOP 가  
 , VOP , VOL VOP가  
 , 「101」 VOP 4

VOP 「0」 . 9 VOP VOL 가 「1」 , 가  
GOV (3) VOL GOV (1002) (1002) , GOV  
GOV VOP (6) GOV (6)가 GOV  
GOV (4) GOV (4) (1003) , GOV (6)가 GOV  
GOV (4) (1003) . 10 VOP (1003) . 10 VOP , 100  
4  
VOP (1026) , (1004) VOP (1001)가 가 VOP  
가 가 , VOP (9) , VOP VOP  
(10) (8) VOP (9) ,  
VOP (9) VOP (10)  
VOP (10) (11) VOP (11) VOP  
(10) (126) , 2 , VOL VOP VOP (1001)가 가 VOP  
, VOP VOP VOP 가 VOP 가  
, VOP , 가 , 가 VOP  
2 가 ,  
가 가 ,  
( 3 ) 3 1 VOP  
, MPEG-4 ( , VOP )  
, 3 (VOP ) VOP  
ISO/IEC JTC1/SC29/WG11/N1796 , 3 VOP 1  
3 VOP 가 3 VOP 1  
11 3 VOP 1  
2 ,  
, 151 , 152 가 , 153 , 154 VOP  
, 155 , 156 , 157 , 158 , 159  
, 160 , 161 , 162 , 164 , 165  
, VOP (150) (151) ,  
(153) 가 (151) (152)  
(155) , (154) (157) (158)  
(154) (156)  
(159) (164) (165) (153) (158)  
(160) (161) (162)  
(160) MPEG-4 (162) VOP (164)  
12 , 52 VO 3 , 53 VOL (151) , 54 GOV , 58 VOP , 51  
3 (151) GOV (54) GOV , 55 VOP VO

P VOP (58) . VOP (58)

(51) VOP (150)

가 VO (53) , VOP (52) , 가 VOL (54) , VOL 가

VOP VOP (55) , VOP (55)

VO (52) (51) . VOL VO (53) (51) , VOL (54) (51)

GOV GOV (58) . VOP (55) (51)

VOP (153)

VOP , GOV VOP VOP , 200 VOP

03c (a), 201 VOP (b), 202 13 VOP (c), 203a VOP , 2

(a)(200) VOP , 203b VOP (b)(201) VOP , 2

VOP (c)(202) VOP , 204 VOP (a), 205

(b), 206 (c), 207 VOP (a), 208 VOP (b), 209 VOP (c), 210

, 211 (162) , VOP ( GOV, VOL ) 가

P VOP (a)(204) (a)(200) (c)(202) VOP (203a 203c) , VO

(c)(206) (210) VOP (a)(207) (c)(209) ,

VOP (211) 가 ,

(211) 1 30 (

)

VOP (a)(204) 1 5 ( , VOP (a)(207)가 5 / ).

VOP (b)(205) 1 10 ( , VOP (b)(208)가 10 / ).

VOP (c)(206) 1 15 ( , VOP (c)(209)가 15 / ).

(211) VOP (a)(204) (c)(206)

, 5 VOP (a)(204) 10 VOP

(c)(206) VOP (b)(205) , 15 VOP

, GOV VOP VOP 가 ,

, VOP VOL VOP ,

VOL VOP , VOL , 1

, 3 1 VOP 가 .

3

, 3

( 4) 4 3 VOP 4 VOP 가

4 VOP 2 VOP (151) ,

14 4 VOP , 59 VOP , GOV VOP (

54) VOP VOP (58) VOP (61) VOP VOP (62) .



, VOP (55) (56), (57) (60)

VOP (59) GOV (54) VOP (58) (62)

VOP (61) (60) VOP (60) VOP (62)

GOV (55) VOP (58) 30 / , (62) VOP 1

5 / 1VOP (60) VOP가 (60) , VOP 가 (62) VOP (60a) (5)

(60b) (60a) VOP (59) VOP

(62) 가 (56) VOP

VOP 가 (51) 가

(60b) (60a) (62)가 3 VOP 1 VOP 가

VOP (60a) 3 가 1 2

VOP GOV VOP 가 VOP 15

2 VOL (300) VOP , 1

4 , VOP 가

4

5

5 3 4 VOP 가 5

VOP 가 VOP 가 VOP (151)

5 VOP (1005) 16 3 VOP

17 VOL VOP , 1007 VOP GOV , 1008 VOP (1005) , 1006

VOP , 1011 VOP 가 가 (1009) , 1010

VOP 1 VOP 가 (51) VOP 가

가 VO (1006) , VO 가 GOV (52) , GOV 가 VOL (10

07) , VOL 가 VOP VOP (1008) (153) , VOP

(1008) VO (52) VO

(51)

, VOL (1006) VOL VOP (58) VOP (10

10) (210) VOP (1008) , VOP (51) VOP (58)

GOV (1007) (51) GOV GOV (1010) VOP (1008)

8) (1011) VOP (100

18 VOP (1008) . 1012 VOP (1) , (1012a),

(1012b) . 1013 , 1014 VOP , 1015

VOP (2), 1016 VOP (1016) VOP (1010)

(1)(1012) , VOP (1010)가 가 VOP (1013)

, VOP (1012a) (1010)가 (51) VOP 가 VOP (1)(1012) (1006) (1012b) (1012b) VOP (1009)가 가 1 (1012b) (1009)가 VOP 2 (1012a) , VOP (58) (1011) , VOP가 가 0h 10m 0sec 0 VOP가 m sec , VOP가 가 , (1009)가 , 가 (1009)가 VOP VOP VO (1009) P , 가 VOP VOP VOP (58) VOP (1009) (1009) VOP (1009) VOP (= 가 , VOP (1009) 가 ) VO P ( 2 ) VOP CPU , 가 , 가 , 가 VOP 가 3 VOP 1 VOP 가 3 가 0 , VOP (1012b) 가 3 VOP (1012a) (1012a) 3 가 1 2 가 1 2 VOP 가 VOP (1012a) 1 , 2 , VOP 가 가 1 (1013) , 가 (1013) (51) (1014) (1014) VOP (57) (57) (57) (51) (1010)가 가 (1014) VOP , VOP (1014) VOP (2)(1015) (1013) , VOP (2)(1015) (1014) VOP (1011) , VOP OP가 가 P , 가 (57) , 가 (57) (51) (51) , 5 , VOL VOP VOP VOP 가 , VOP VOP VOP 가 , VOP VOP VOP 가 , VOP 가 VOP가 , 가 , 가 , 가 ( 6 )

6 VOP 6 VOP  
가 가  
VOP  
19 6 VOL (1006) VOP (1008) 5  
VOL (1017) VOL (51) , VOP (1010) VOP (101  
8) , VOP 가 (1018) ,  
3 VOP 가 「100」가 VOP ) VOP (58) VOP (1018) ,  
0」, 「011」가 VOP ) VOP (58) VOP (1018) 「000」, 「001」, 「01  
20 VOP (1018) . 1025 VOP (210) , 1019 VOP  
(3) , (1019a), (1019b), (1019c) . 1020 , 10  
21 VOP , 1022 VOP , 1023 . , 1024 VOP  
VOP (1025) VOP (1010) VOP (58)  
VOP (1010)가 VOP (58)  
010)가 가 VOP (3)(1019) , VOP (58)  
12) (1010)가 VOP (58) VOP (1)(10  
, VOP (1010)가 VOP (58)  
VOP (3)(1019) (1019a) (51) VOP 가  
VOP (1018) (1019b) 가 1 VOP, 2  
VOP (1019c) (1023) (1019b) (1023) VOP  
OP (1023) (1020) , 가 2 VOP 가 1 V  
(1021) (1024) VOP (1021) VOP  
VOP (1024) VOP (1020) , 가 2 VOP 가 1 VO  
P (1021) VOP (57) (57) (51) VOP  
(1020) VOP VOP 가 VOP  
(1021) 2 VOP VOP 1 VOP VOP  
(1020) 1 VOP VOP (1022) VOP V  
OP 6 VOP , VOP (1021) VOP  
1 VOP 가 「10」, 1 VOP VOP 가 「000000」(  
, 1 VOP 1.0 ), 2 VOP 가 「10」, 2 VOP  
VOP 가 「100000」( , 2 VOP 1.5 ) , VOP 2 /  
( 3 0.5 가 VOP 0.5 1 「000」 ) , VOP (1010)  
, VOP (58) , VOP 가  
VOP (1022) VOP (1009)가 VOP (210) ( (1  
1019c) (1009)가 VOP 2 , 1  
( 1 ) (1019c) (1019b) VOP (1022) V  
OP VOP 가 VOP VOP가 가

(1009)가 , 가 .  
VOP , VOP VOP (10  
09) 가 , 가 VOP VOP VOP (58) VOP  
(1009) VOP (1009)  
, VOP (1009)  
VOP  
VOP (= VOP )  
(1009) 가 , VO  
P ( 2 )  
(1019c) (1009) VOP 2 / , VOP (1022)  
VOP 2 4 / VOP VOP 1 VOP 가 가  
(1019b) 2 가 0 (1019c) VO  
P 가 VOP (1019b) 2 가 1  
1, 2 VOP  
(1013) , 가 (1013) , VOP (1014) VOP  
51) (1014) (57) (51) VOP (57)  
, 6 , VOL VOP VOP 1 VOP 2 VOP가 가  
, VOP VOP , VOP VOP VOP  
VOP VOP VOP 가, VOP VOP  
, VOP 가 , VOP가  
가 VOP 가 VOP가  
, VOP 6 , 가  
가  
( 7)  
7 1 VOP 7 VOP 가 VOP  
VOL , VOL VOP  
, IEC standard publication 461 for "time and control codes for video tape recorders"  
(MPEG-2 , MPEG-4 VOP  
) , 가 ,  
7 VOP 1 VOP (124)  
21 7 VOP 4  
1 . VO (1) VO 가 VOL  
(2) VOL (2) VOL  
GOV (18) GOV (3) GOV  
(3) VOL GOV (2) GOV  
GOV VOP (6) GOV  
(4) GOV (5) , GOV (6)가 GOV  
4) GOV (3) GOV (4) GOV , GOV (6)가 GOV  
(5) , VOP

VOP (5) VOP (126)( 3 ) , ,  
 , (126) 7 , MPEG-4 VOL 가  
 , 7 , VOP 가 가 가  
 , 7 VOL 가 22 VOP (301) VOP  
 , 가 (18) , VOP  
 , 7 VOP 가 , VOP  
 , VOP 7 ,  
 ( 8) 8 VOL VOP  
 , 8 VOP 8 VOP (302)  
 , 23 2 VOP (302) VOL  
 , 가 (302) , 303 VOL  
 24 (51) VOP (150) , VOL  
 가 VO (52) , GOV 가 VOL (54) , VOL (303) ,  
 303) , VOP 가 GOV (55) , VOP (55) ,  
 VOP (153) ,  
 VO (52) VO (303) , VOL  
 (51) . VOL (51) , VOL  
 (64) . GOV (54) (51) , VOL  
 , VOP (55) (51)  
 (153) , VOL  
 VOP , VOL VOP 25  
 , 400 VOP (a), 401 VOP (b), 402 VOP,  
 (c), 403a VOP (a)(400) VOP , 403b VOP (b)(  
 401) VOP , 403c VOP (c)(402) VOP , 404  
 (a), 405 (b), 406 (c), 407 (a), 408  
 (b), 409 (c), 410 , 411 VOP ( GOV,  
 (156) (162) , VOP ( GOV,  
 VOL ) 가 (a)(400) (c)(402) VOP (403a 403c) ,  
 VOP (a)(404) (c)(406) , VOP (410) (a)(407) (c)(40  
 9) (410) VOP , (411) (a)(407) (c)(409)  
 , 가 , , ,  
 , (a)(404) VOP 01:00:00 , 01:00:00 ( ):  
 ):( ):( ) (b)(405) VOP 01:00:10  
 (c)(406) VOP 01:01:00  
 , (410) (411) 가 01:00:00  
 , (a)(404) (411) , (b)(405) (411)  
 (411) 10 , (c)(406) (411)  
 1 ,

, VOL VOP 가 ,

, 26 VOL VOP , VOP

, 27 VOL 가 , VOP VOL VOP

VOP VOP VOP

, 8 VOP VOP , 1

, 8 VOP 가 .

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( 9) 9 MPEG-4 ( 1 ) VOP

( 2 VOP ) , . .

, MPEG-4 (20) VOP가

1 , 5 "1" "0"

가 , 5 "111110"가

MPEG-4 GO

V GOV 가 , GOV 가 , MPEG-4

9

9 VOP (124)

28 9 (124) 500 VOP

, 19 , 20 , 21 , 22

, 501 VO 가 VOL

(2) GOV VOL (2) VOL

GOV (3) VOL GOV (2) GOV

GOV (3) GOV (6) GOV

(5) , GOV (6)가 GOV

GOV (3) GOV (4) GOV (4) (5)

VOP (500) VOP (8) VOP (500)

, (19) (20) (501) VOP (500)

, (20) 가 (20) 가

, (21) (22) 가 ,

가 (22) 가 가 2 가 ,

, (19) 4 , (21) "

10" (20)가 "1111111110" , 2 , "10" (21) "

VOP (500) (22) (501) VOP (8) (22)

VOP (10) (10) (501) VOP (11)

VOP (10)

(26) 9 , . . . 2 ( . . .

, ) , MPEG-4 , MPEG-4

2 가 가 .

9 , , 1

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, 1 , 가 ,

, ( 10) 10 9 , . . (501) VOP VOP

VOP 10 VOP (151) ,

29 10 (151) . 502 VOP ,

65 . . , 66 VOP , 67 . . , 69 ,

. . , 70 (51) VOP (69) ,

(70)가 VO (52) , 가 VOL

VOL 가 VO (53) , GOV 가 VOP (54) ,

가 VOP (153)( 11 ) (55) , (152) (153)

VOP (502) . . (65) (51)

. . (69) (69) (70) (70) , (67) ,

VOP (66) . . (69)

. . (67) (210) 9 (

(70) . . .

9 ) 4, (69)가 "10", (70)가 "10" , "

10" . . "11111111" 가 "1111111110" . . 가 .

VOP VOP

VOP (66) . . (65) VOP (57)

) VOP (66) (153) , , (57) (57)

, 10 2 ( . . , MPEG-4

) . . 12 가 가 .

, 10 ,

, 1 , 1

2 , , ,

1 , ,

1 , 가 2

1 , 1 2

( 11) . .

11 MPEG-4 VOP VOP  
 11 VOP (124)  
 30 11 (124) . 503 VOP , 23  
 , 24 , 25  
 , 26 VOP (503) VOP (8) VOP  
 VOP (503) (23) (25) VOP  
 가 VOP (503) VOP (24) VOP  
 (23) VOP "1"  
 (26) (25)  
 VOP "11110"(10 :30), VOP  
 "111110"(10 : 62) "100000"(10 : 32)  
 "100000" "1" 1 2  
 , "1" 가 1 "10"  
 , "10" 2  
 VOP 5 VOP  
 6 1 2  
 "1" (503) (25)  
 (26) VOP (10) (10) (25)  
 (503) VOP  
 (1)  
 11 , MPEG-4  
 , MPEG-4 가 가  
 11 , 1  
 1 2  
 1 1 1 1  
 ( 12) 12 11 (25)  
 VOP VOP  
 VOP VOP (151)  
 31 12 (151) . 504 VOP ,  
 71 12 , 72 , 73 VOP , 7  
 4 , 75 (71) (51) (75)  
 VOP (504) (72) , VOP (73) (75)  
 VOP (504) (72) VOP (75)  
 ) , 2 , "1" "1" VOP  
 (74) VOP (74)



. . . "10",  
 . . . "11110" 가 . 2  
 . . . VOP . .  
 . . . "10" . "11110"  
 "1" 1 "1" 가 , . . "111110" 2 ,  
 1 "1" 가 , . . . VOP  
 . . . VOP  
 , 「 "1" VOP , 8 「 VOP VOP . . ,  
 VOP VOP 가 ,  
 2 VOP (504) . . (74) VOP VOP . . 가  
 , VOP . . , VOP VOP . . 가  
 VOP (504) VOP (73) . . (71)  
 VOP  
 (57) , 12 , . . .  
 . , MPEG-4  
 8 가 가 .  
 , 12 ,  
 , 1 , 1 ,  
 2 , ,  
 , 1 ,  
 1 , 1 가 , 1  
 , 1 2  
 ( 13) .  
 1 12 , , 1  
 가 , 1 12  
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 가 , ,  
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 가 , ,  
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 ( 14) , ,  
 1 13 , 2 , 1  
 가 1 2 , 1  
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 가 2 , 1 , 2  
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1 14

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가

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가

1 14

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2

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가

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2

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가

[ 1]

VOP 비율	VOP 비율 정보
30매/초	01
15매/초	10
정지 화상	00
가변	11

[ 2]

차분 비트열에 포함되는 "1" 비트의 수	차분 모듈로 · 타임 · 베이스
0	0
1	1 0
2	1 1 0
⋮	⋮
n	1 1 ..... 1 0

  
 "1"이 n비트 계속

[ 3 ]

VOP 비율	VOP 비율 정보
2매/초	000
5매/초	001
25매/초	010
30매/초	011
상기 (2매/초, 5매/초, 25매/초, 30매/초) 이외의 고정 VOP 비율	100

[ 4 ]

VOP 비율	VOP 비율 정보
2매/초	000
5매/초	001
25매/초	010
30매/초	011
상기 (2매/초, 5매/초, 25매/초, 30매/초) 이외의 고정 VOP 비율	100
정지 화상	101

(57)

1.

VOP

2.

3.

가 가

4.

5.

6.

VOP

7.

8.

6 ,  
가 가 ( 가 ) ,

9.

8 ,  
가 ,가

10.

6 ,  
가 가 , 가  
가 가

11.

6 7 ,  
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12.

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13.

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14.

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2 1 , 1  
가 1 , 1  
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15.

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2 1 , 1  
1 , 1 1 1 1  
1 , 1 1

16.

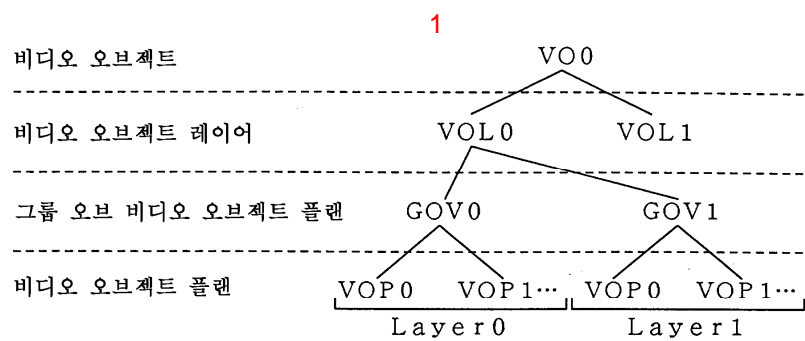
2 1 , 1  
 ,

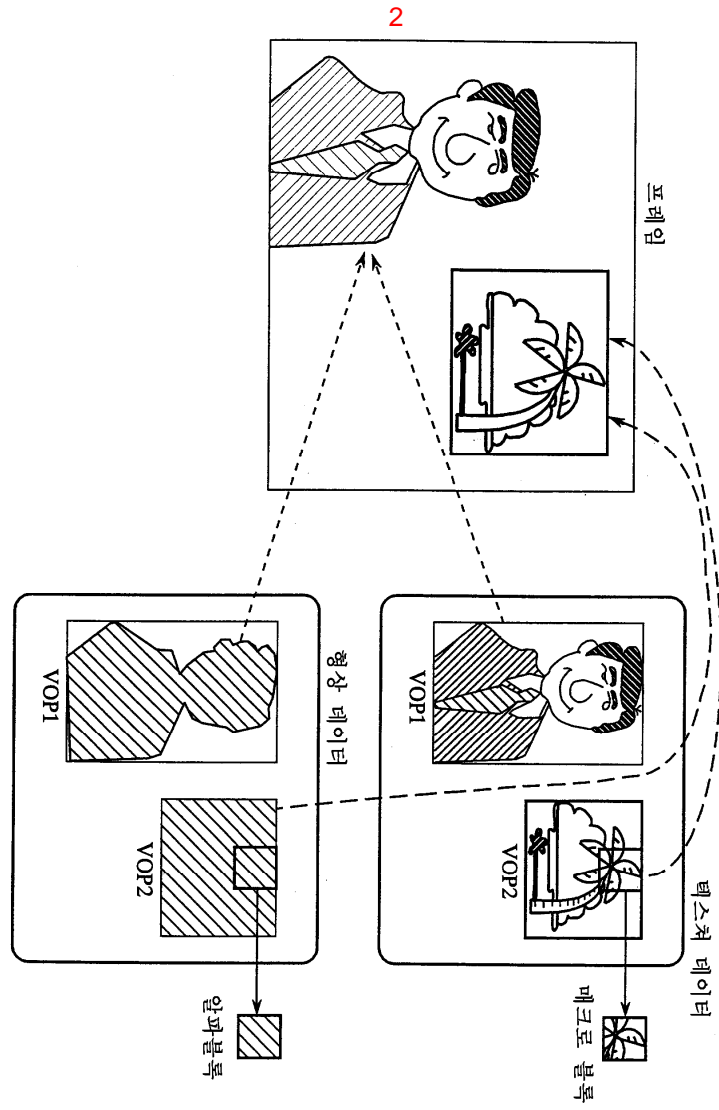
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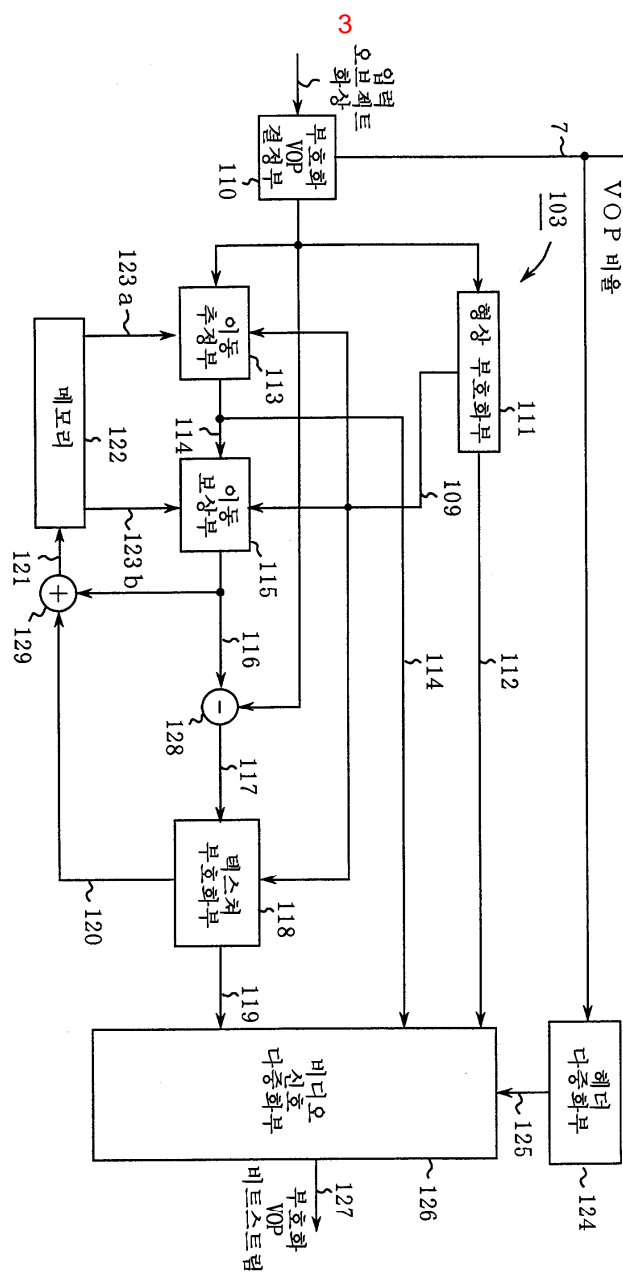
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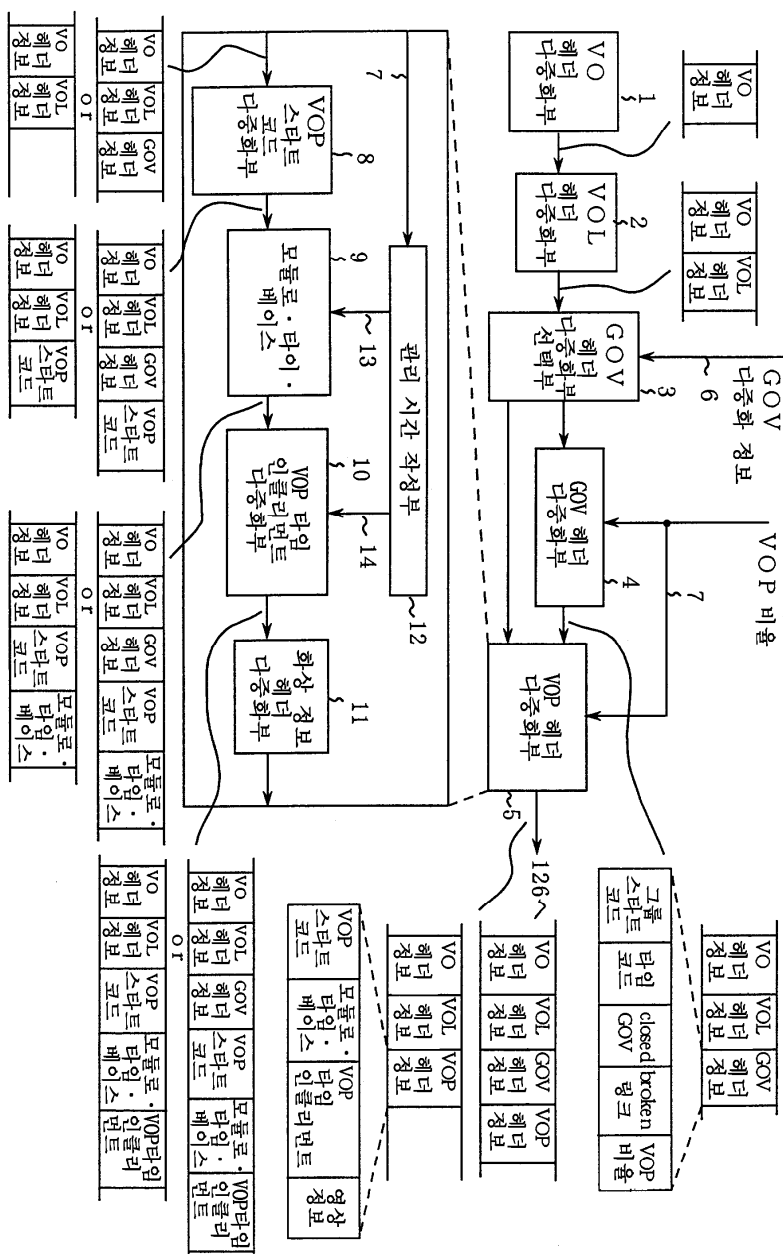
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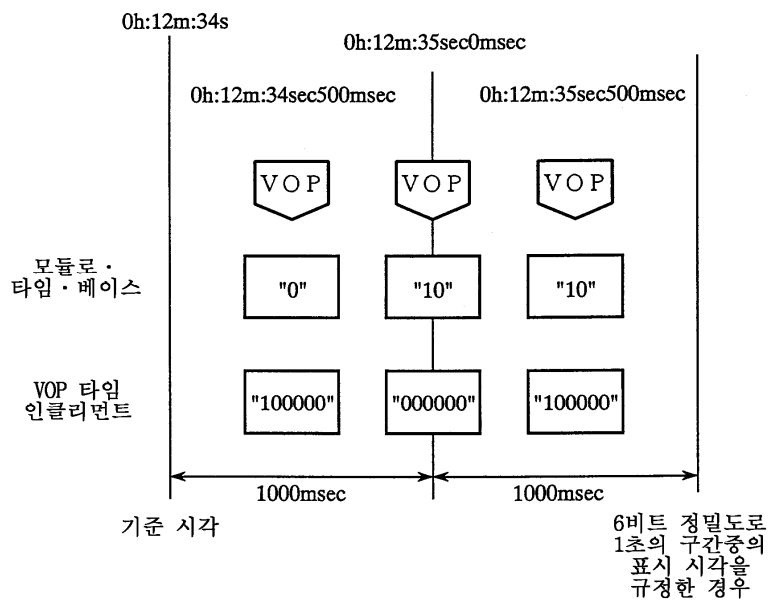




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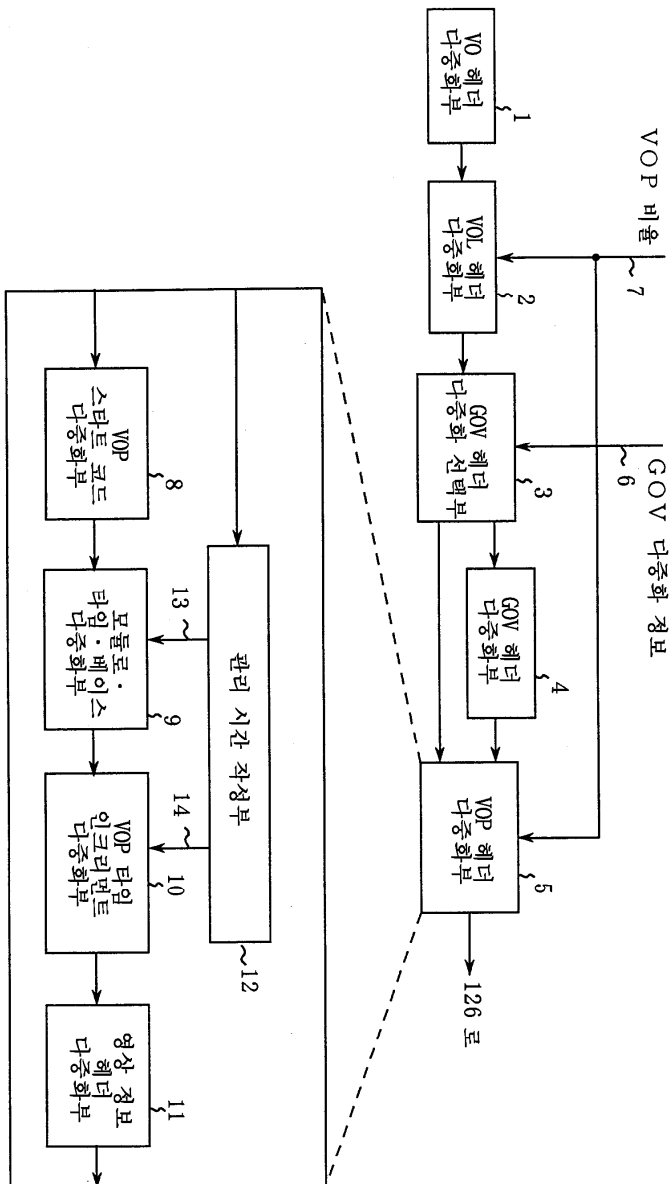


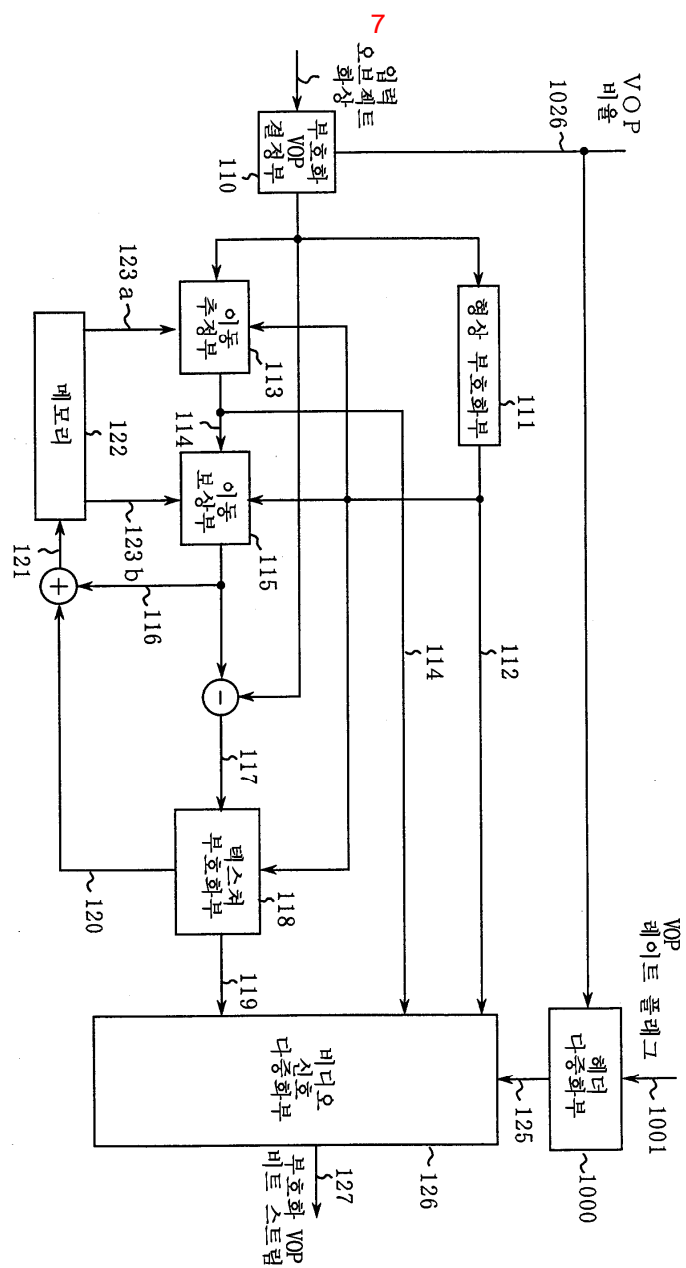
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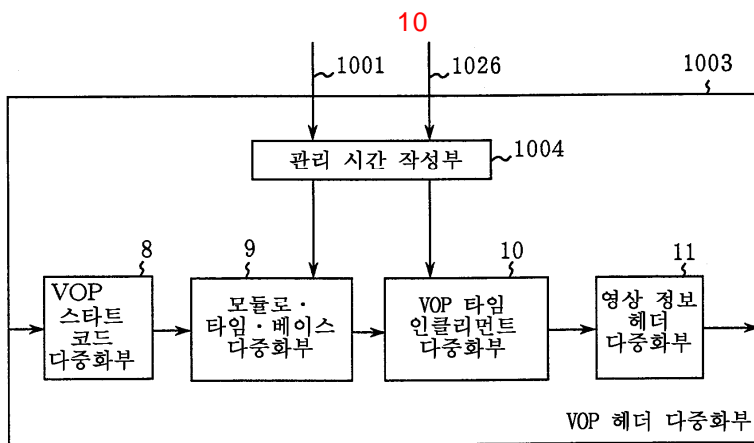
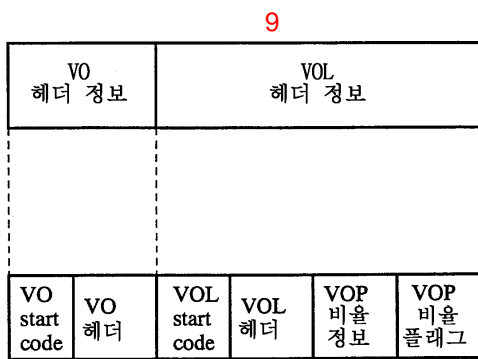
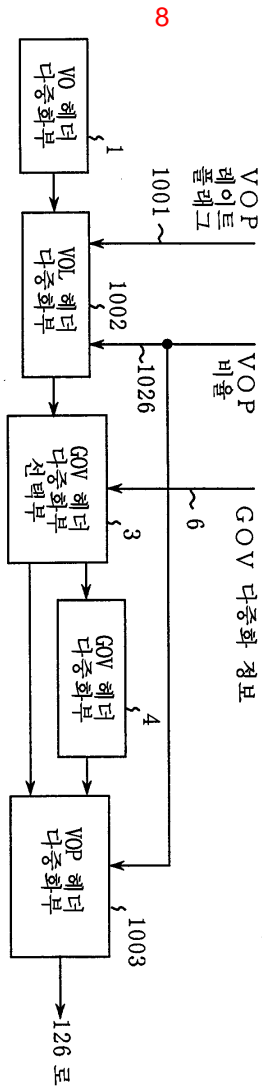


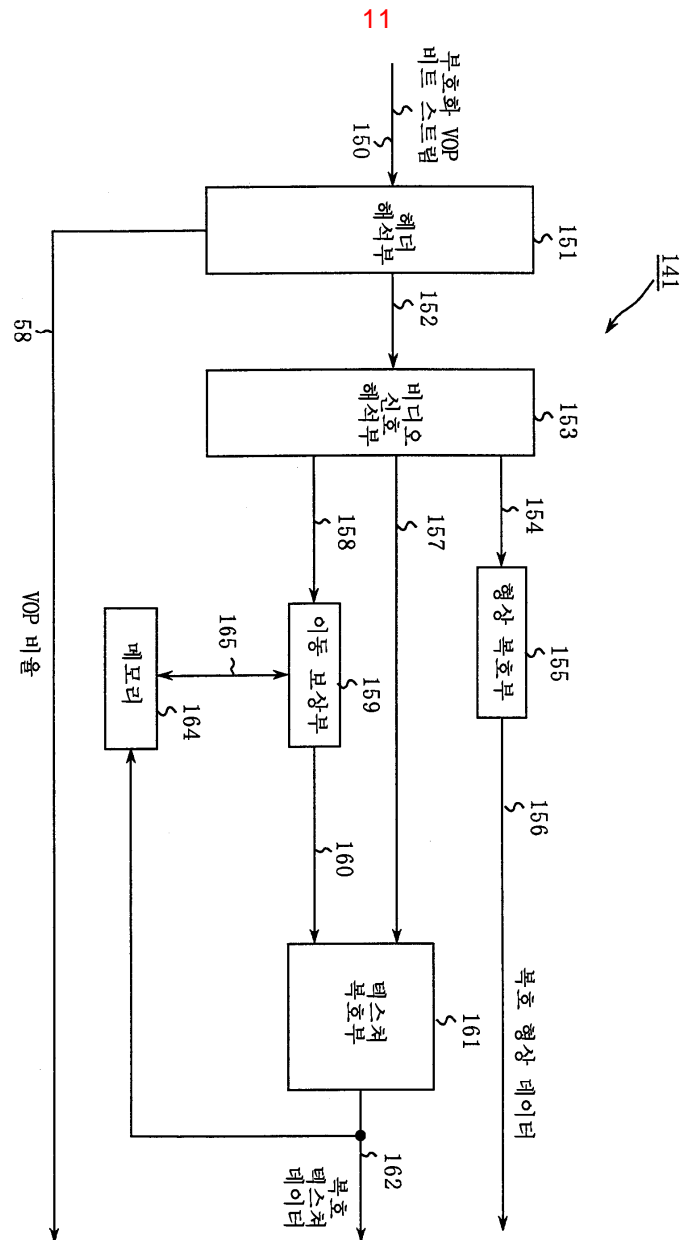


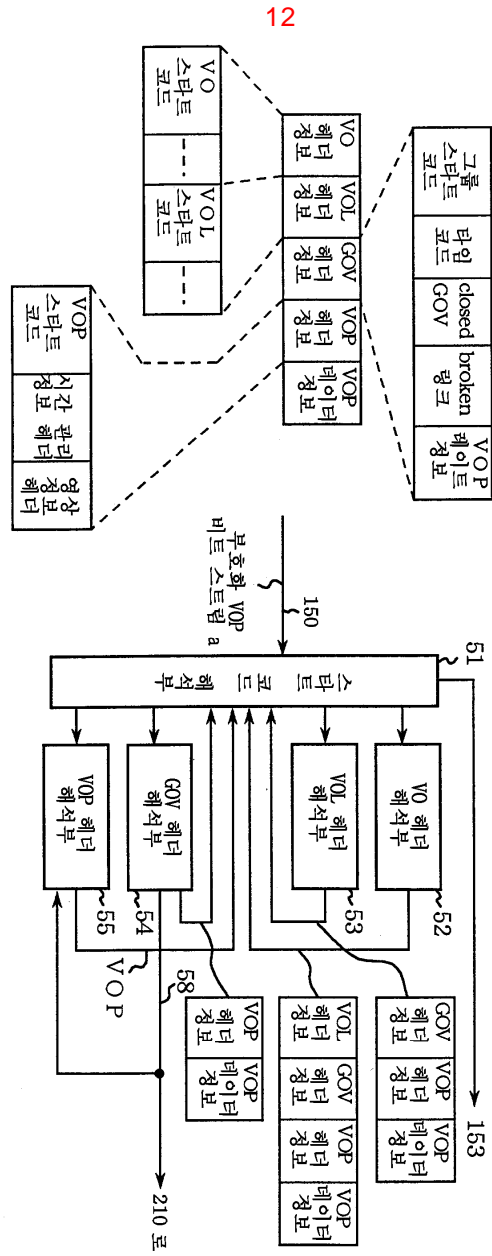
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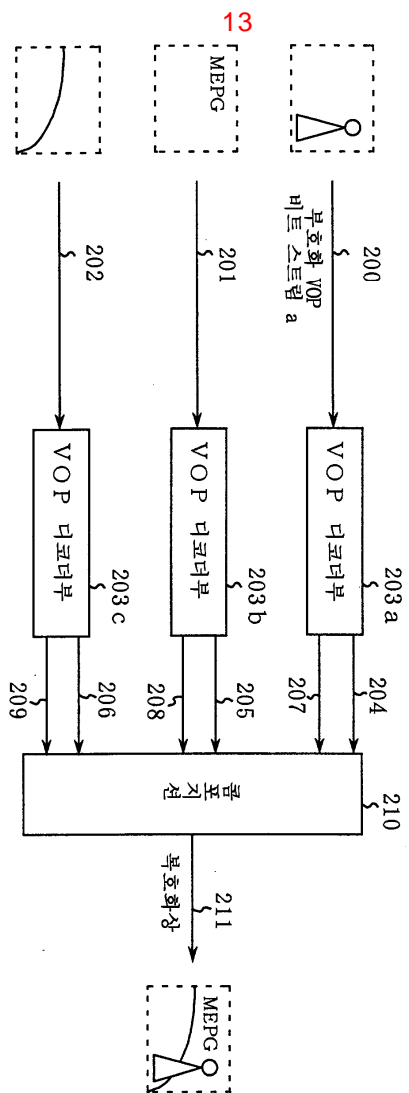


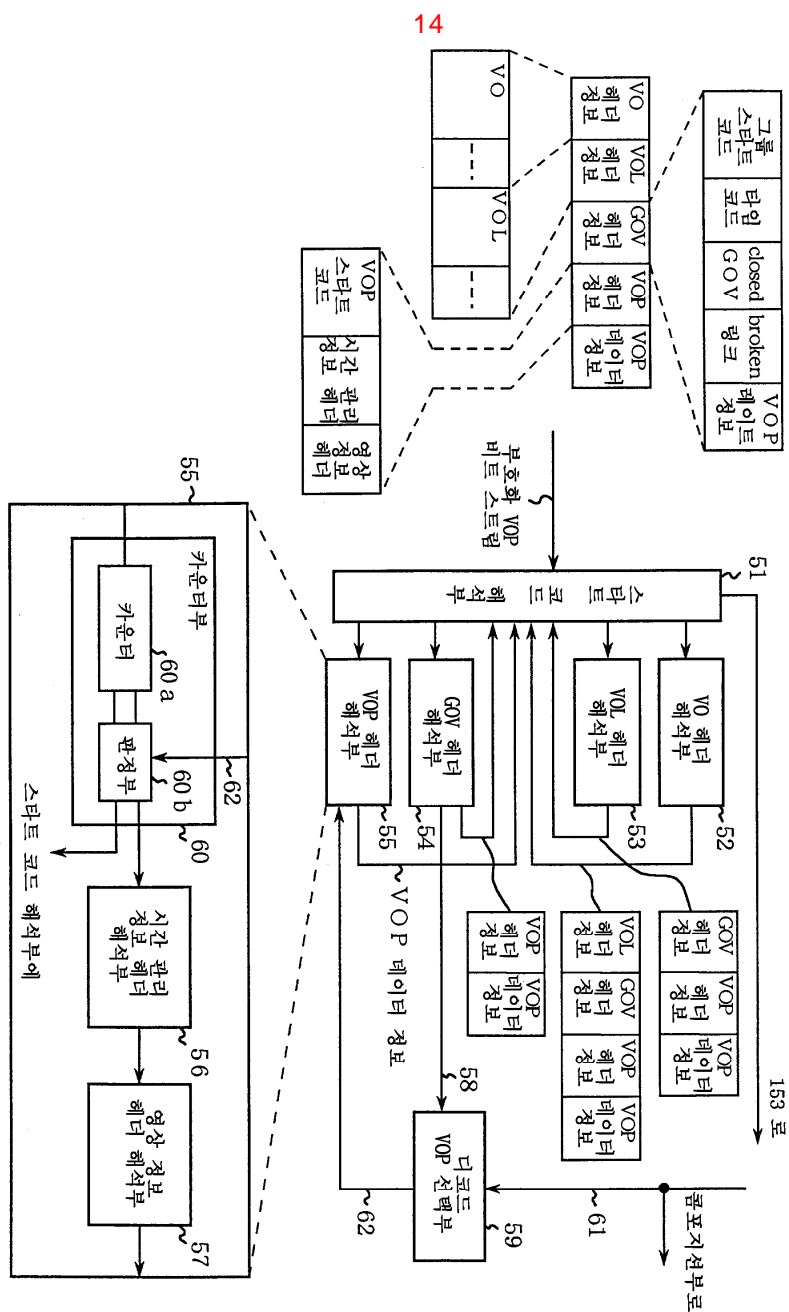


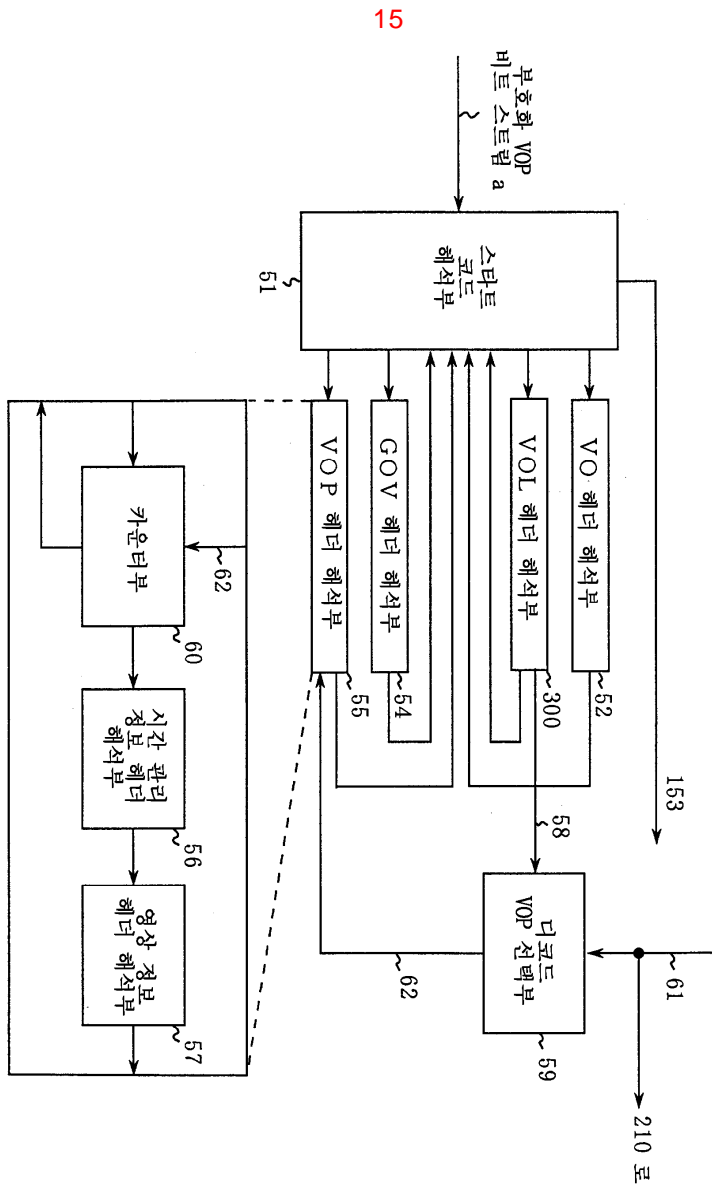




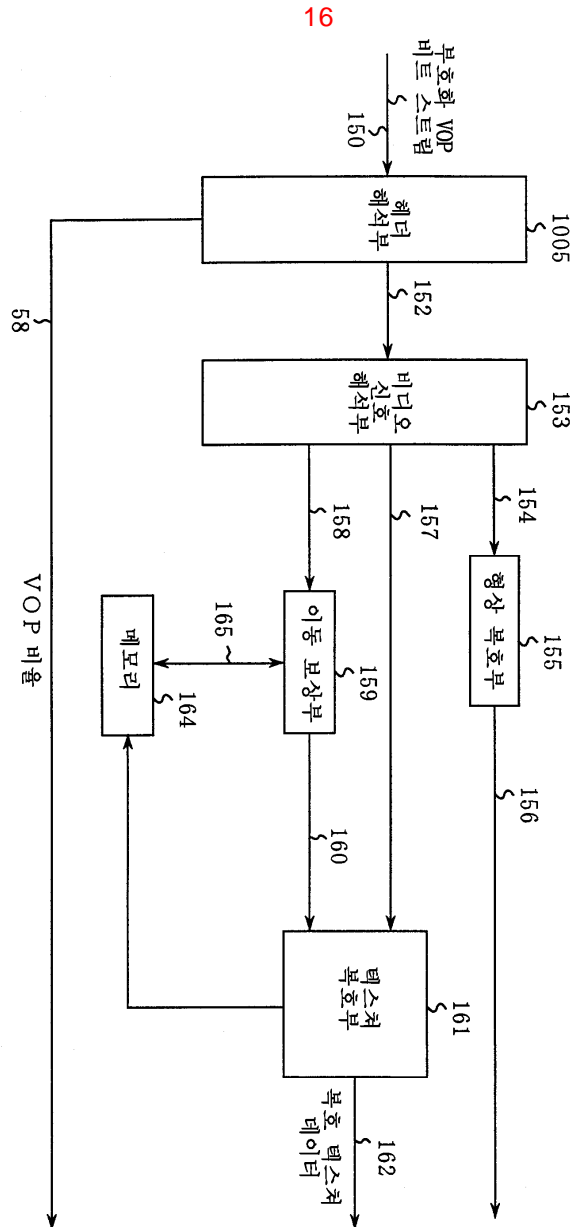


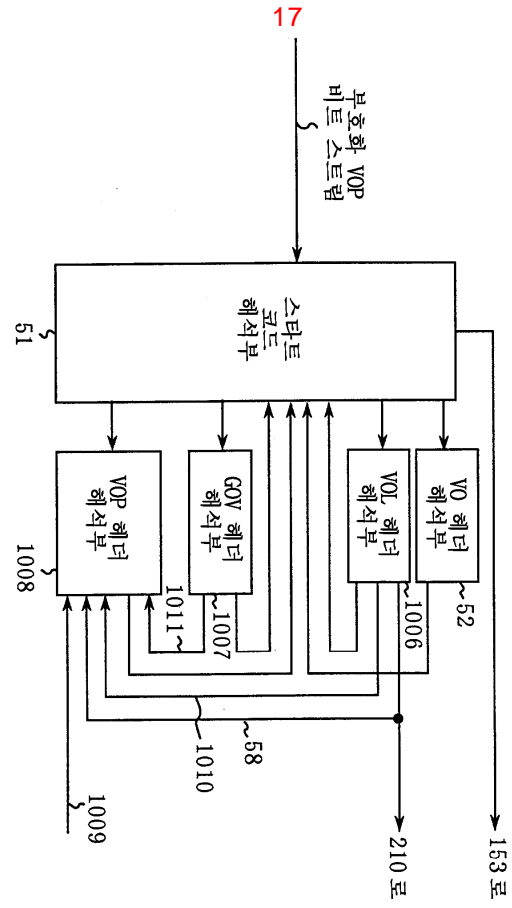


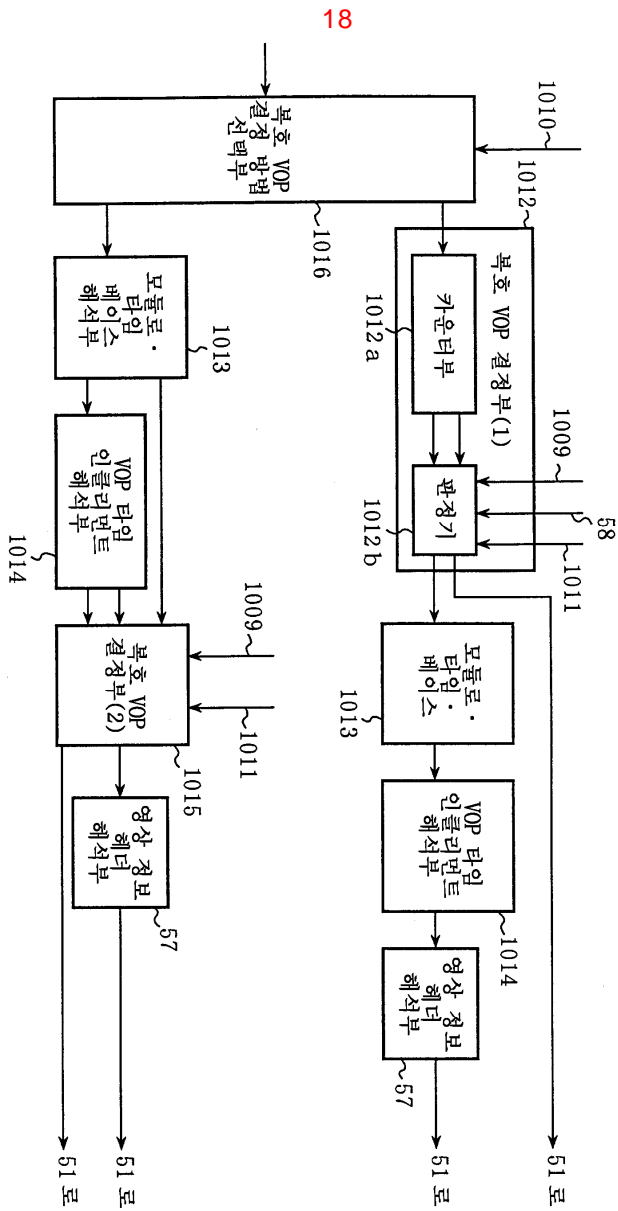


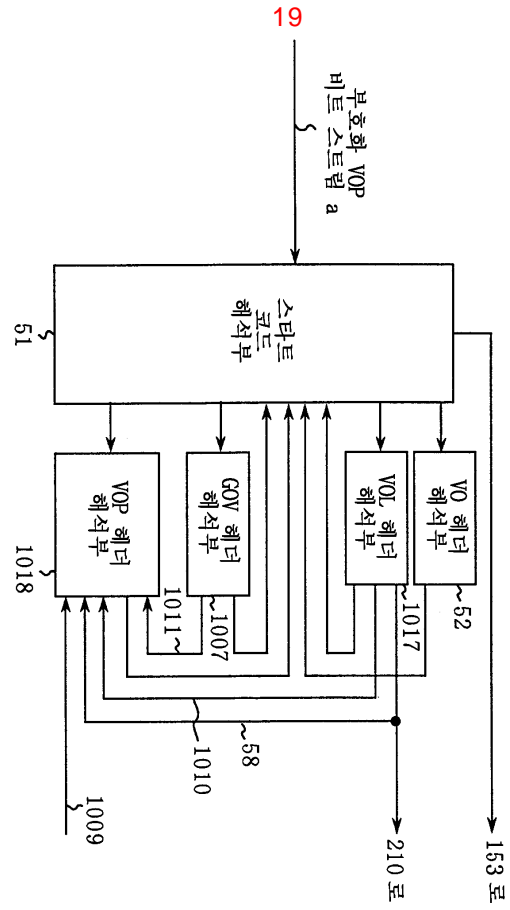




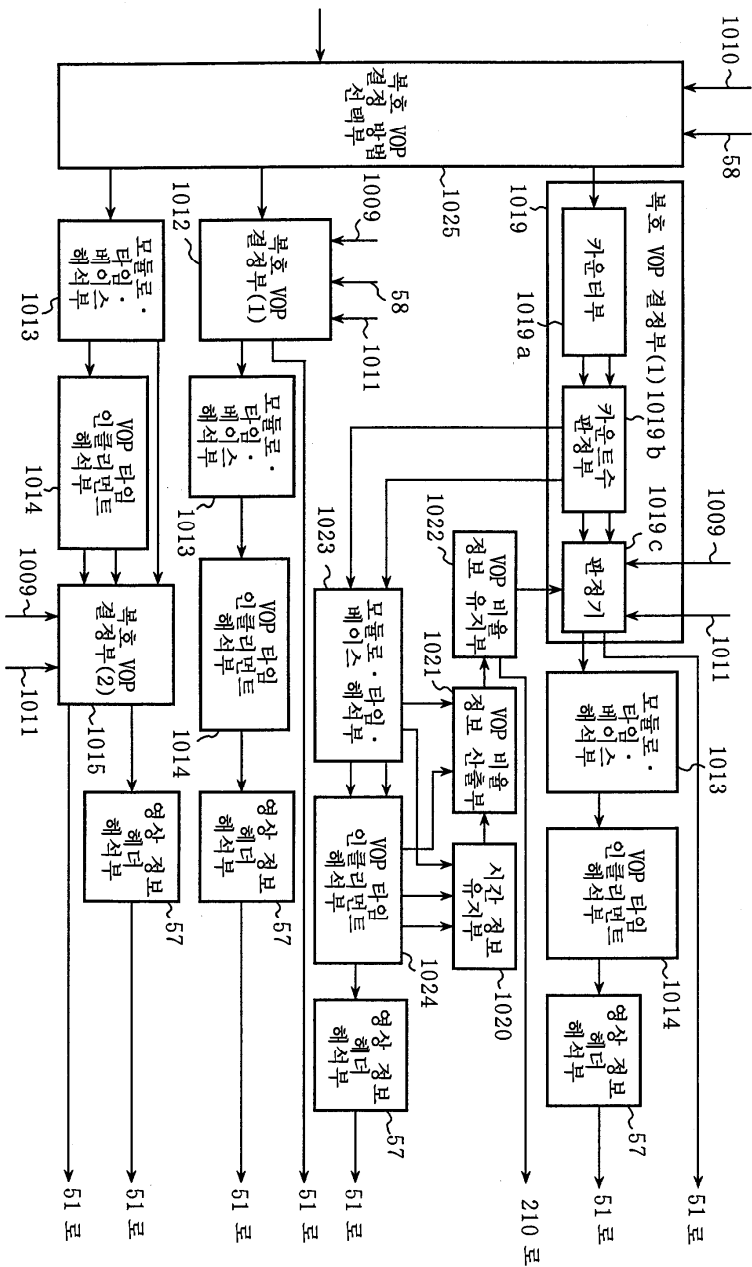




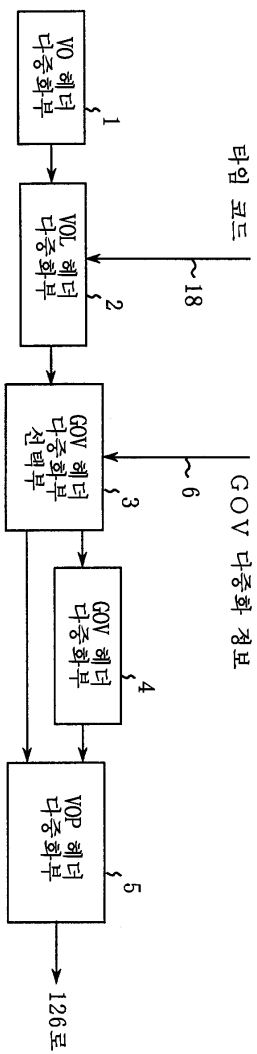




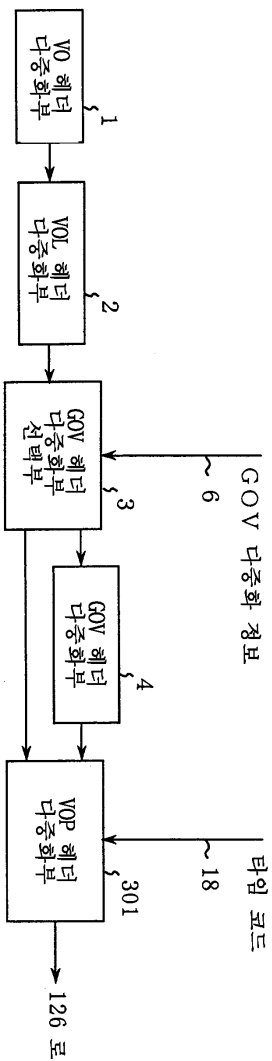
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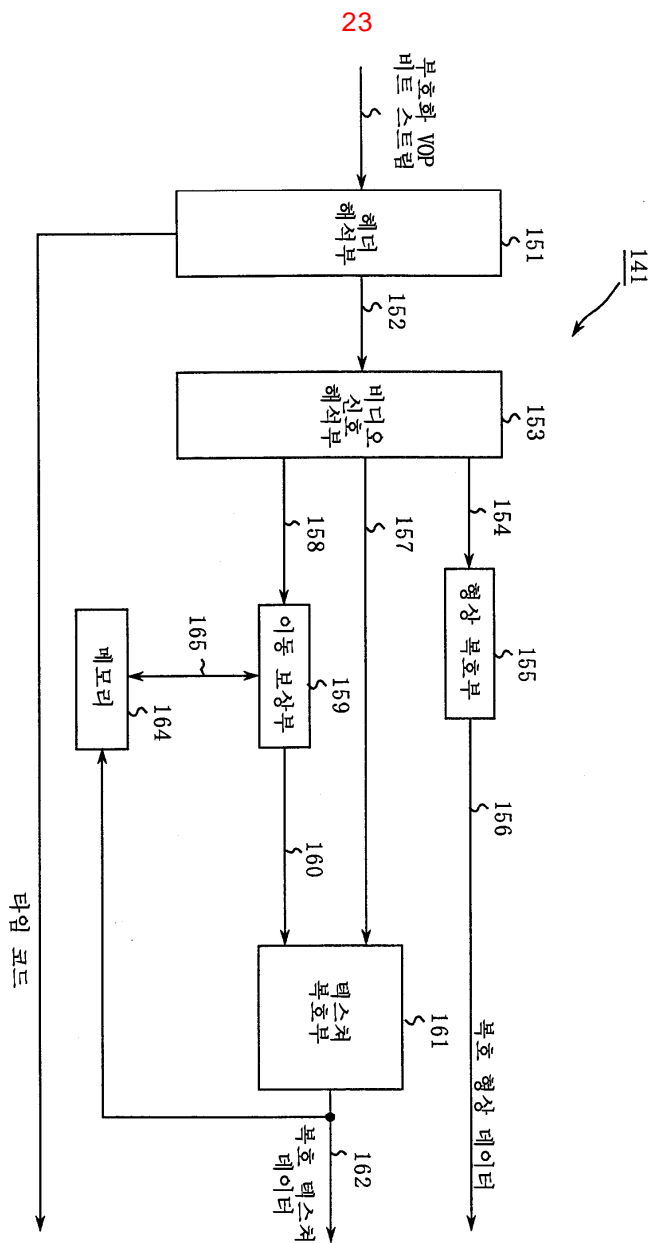


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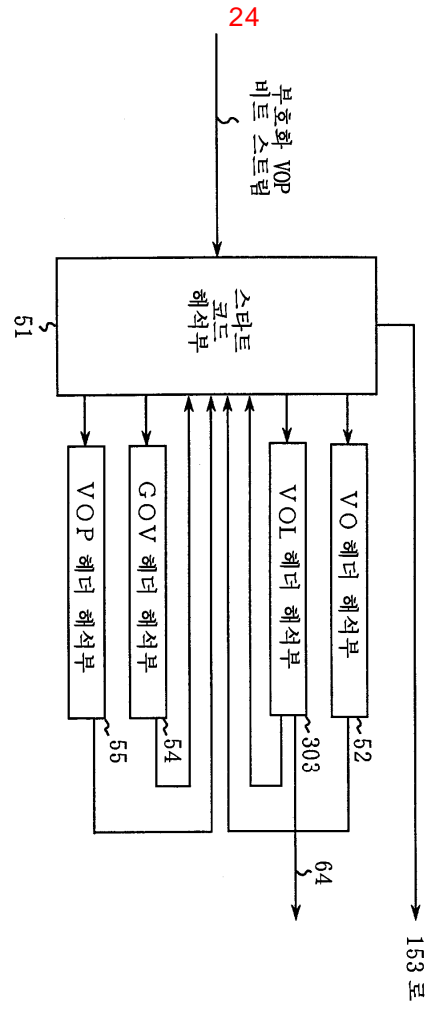


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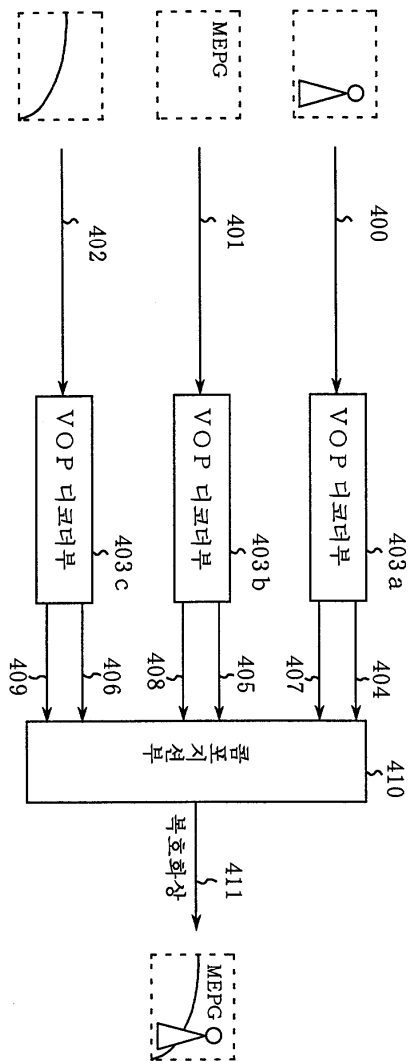


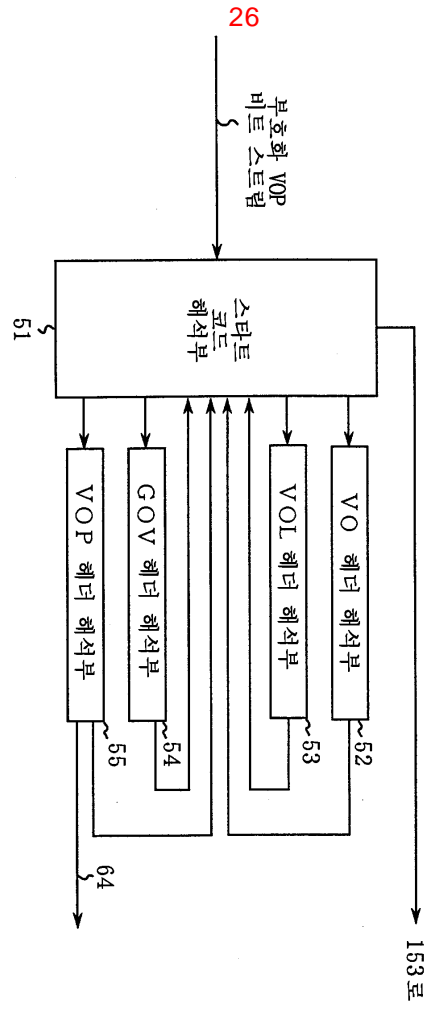


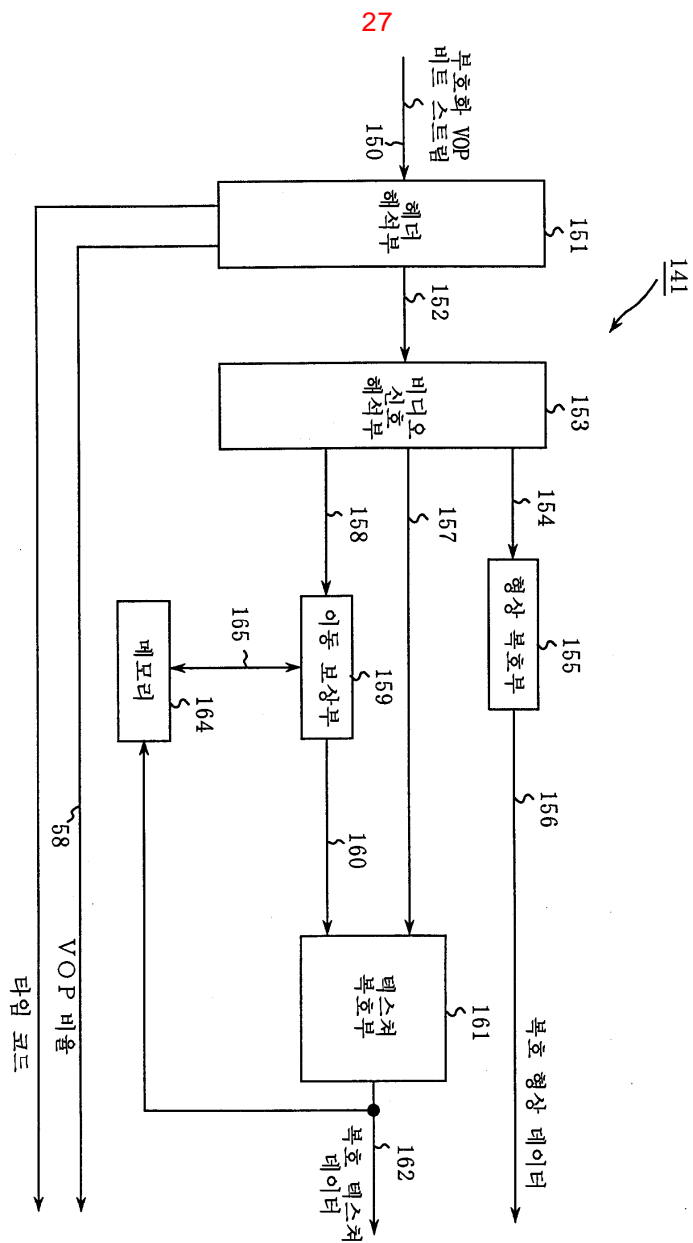




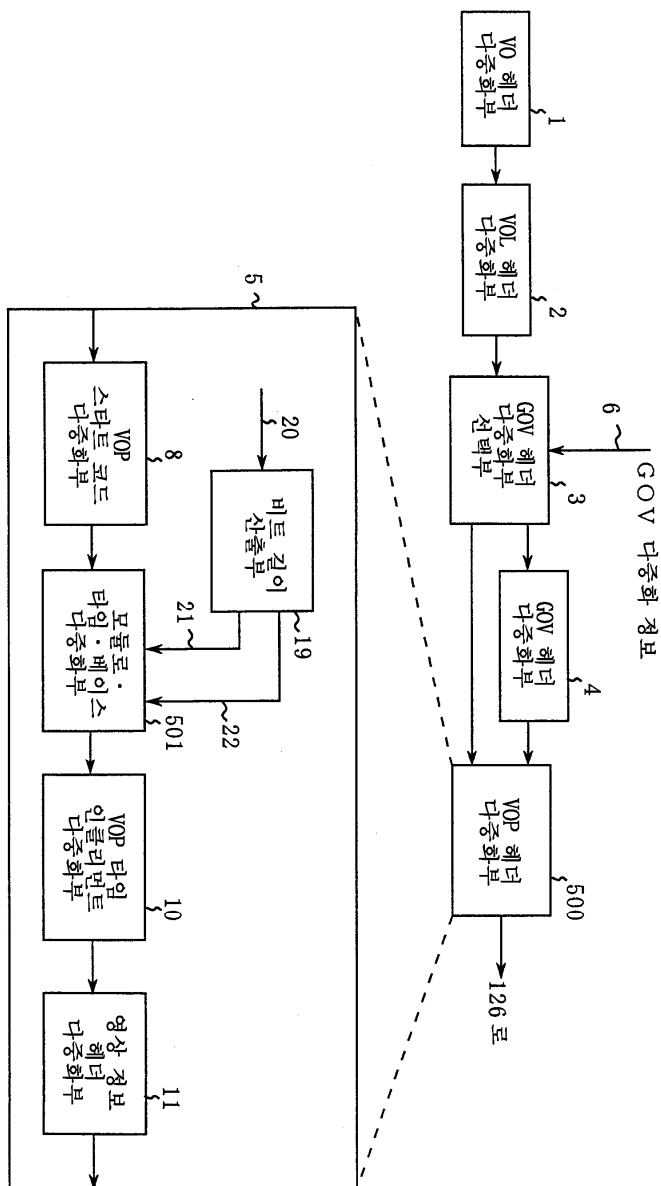
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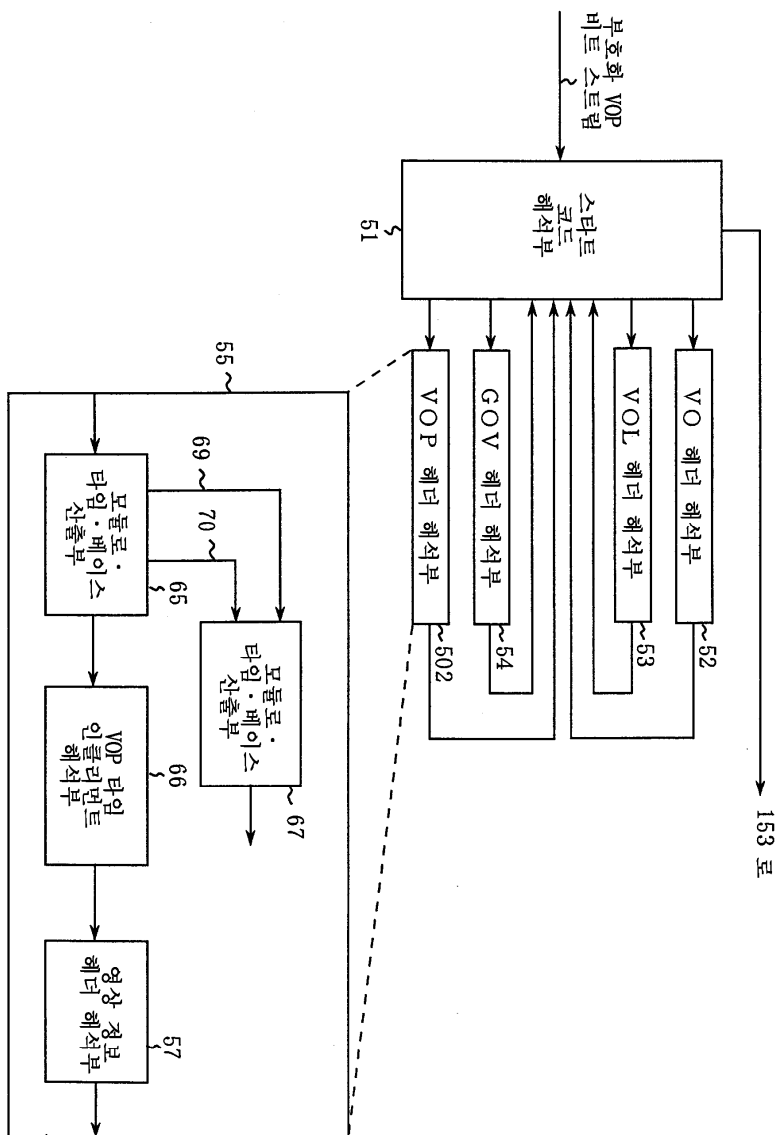




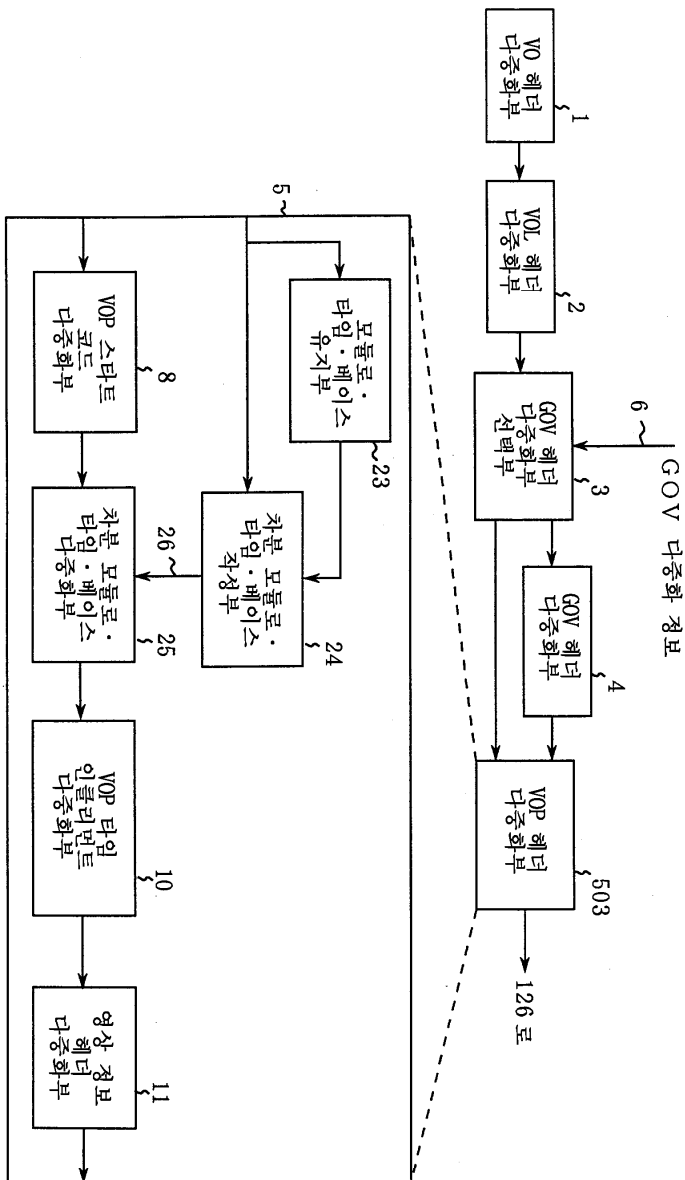
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