

(19)
(12)

(KR)
(A)

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H04L 12/28

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(43)

2002 - 0082465
2002 10 31

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(86)	PCT/CA2000/01441
(86)	2000 12 08

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(87)	2001 06 14

(81)

: ,
- , 가
가
가
가
가
가
가
AP ARIPO : 가
EA :
EP :
OA OAPI :

(30)	60/170,232	1999	12	10	(US)
	60/212,966	2000	06	21	(US)

[illegible]

(72) $\begin{matrix} & , & , & . \\ & , & 0 & 1 & 0, & , & , & 110 \end{matrix}$

(74)

$$\vdots$$

(54)

가 2

2a

, IP , , , .

(routers)

IP (" IP") IP 4(IPv4) IP 6(IPv6) IP IPv4
 IP , 2 IP , IP 32 IP
 IP 가

32 IPv4 40 IPv6 40 50,
 000 ,

, IP 3가 IP , A ,B ,C IP
 . A 16 126
 . B 64,000 16382 , C
 256 2 , IP 256
 가 IP . C B 가 ,
 가 . B IP 가 16 (MSB) 64,000
 , , 27.32.xx.xx.

IP (CIDR)

가 . 500 가 500
 , 128.32.xx 500 가 . IP
 가 . 128.32.4.xx가 ,
 , 128.xx.xx B IP 16MSB .
 가 2 . 2 32
 32 , 32 32 .
 2 가
 IP " " PCT 1998 5 11
 PCT/SE98/00854 .
 , 가 .
 2 3 . 2 3 3 1 IP
 1
 1a 2 1 64K(65536) . 64K (30)
 (44) 1 , (16) 2 (44) (1
 6) . 64K $2^{12} = 4096$ 가 . 1 가 1a .
 (44) 가 (44) 가 (30) " 1"
 . 가 (44) , (30) " 0" .
 1b (36),
 (34) (40) . , 32 IP (38)가 1b .
 (46) (30) (36) (1a) . (4
 6) 6 (46a) 10 (46b) (42) (46) 4
 (46) (34) .
 (36), (34) (40) ()
 (36) (46) (34) (42)
 (42) IP (38) 12 (50)
 (33) (38) 10 (48) .
 (46) 10 (46b) (32) (32)
 4 . 10 (46b) (32) , IP (52) (19:16)
 4 (54) .
 , 가 :

(1) 16 (46) ; (2) 16 (42) ; (3) (32) 4
 (54) ; (4) , (42),
 (46a) 4 (54) .
 2 가 . , 3 12 가
 .

2037.2004 - 001

. " "

, 1 2 가 1
 , 1 1 2 ,
 2 2 1 2
 , 1 2
 .

, IP
 , IP
 1 1
 2 2 가 1
 1 2 ,
 , 1 2
 ,
 , 가
 ,

1a 2 1 ,
 1b ,
 2a ,
 2b 2a 2 ,
 3 40 ,
 4 2a ,
 5 2b 2(112b) ,

6a 2 ,

6b 6a 5 ,

7 5 ptr ,

8 5 ,

9 ,

10a ,

10b 10a ,

10c ,

10d 10c ,

11a 11b 10a 10c 2b 2 ,

12 10a 10c ,

13 10c ,

14 10a ,

15 1 2 2 ,

16a 16c 5 4 ,

17 8 ,

18 17 ,

19a 19d ,

20 8 ,

21 ,

22 ,

23 가 2

24 ,

25 23

26 25 가

[illegible]

2b , 1(112a) r0 r1 2 (114)(
 116) , s0 s1 2(112b) 2 (130⁴)(130²³) (114)(
 114)(116) (102)가 L1 (106a) , L2 (106b)
 (120)가 (130⁴) , L2 (106b) ()가
 (130²³) (106a) (140⁴) (130⁴)
 (120) (104) (102) .
 (114) . 2
 2 , 가 " 1" .
 가 " 0" (114) (116) , r1 '010' MSB
 가 L1 (160a) (102) (114) s0 (130⁴)
 , s0 '00011' MSB 가 L1 (160a) .
 L1 (160a) 가 , (102)
 1(112a) . 1(112a) 32 2 16 .
 16 64K , 1(112a) 32 2 .
 5 L1 (160a) (102) 1(112a) 5(130¹)
 130³²) (114) 5 (130¹)(130²)(130³) ,
 (102) r0 , r0 L1 (160a) (140¹)(140²)(140³), (00000)(00001)(000
 10) (130⁴) (s0) , s0 L1 (160a) (140⁴)
 (00011) , 5 (130⁵ 130⁸) (102) r0 ,
 , r0 L1 (160a) (140⁵)(140⁶)(140⁷)(140⁸) (00100)(00101)(00110)(00111)
 5 (130⁹ 130¹²) (102) r1 , , r1 L1 (160a)
 (140⁹)(140¹⁰) (01000)(010001) .
 L1 (160a) 5 (300¹ 300³²) (102) (106
 b 106c) , 5 (300¹⁻³²) , 3(10
 6c) 32 2 2 , (138) ho (140) h1 .
 (104) 2a , h0 (102)
 가 L3 (106c) (146⁴) . L1 (106a) , L2 (106b) L3 (106c)
 .
 (106b)(106c) , (102) (102)
 (102)가 (106b 106c) (102) 2(112b)
 1 (A) 3 , (132¹)(132²) (102) r0 , r0
 가 L2 (106b) (132¹)(132²) (142¹) (132²)
 (s0) (142³) 3 (132⁴)(132⁵)(132⁶) (102) r0
 , (132²) s0 , r0 L2 (106b) (142³)
 (132⁷) (132⁶) , (r2) (132⁷) L2
 (106b) (142⁴) (r3)가 3 (132⁷) , ,
 s3 L2 (106b) (142⁵) 가
 , (102) , 2(112b)
 1 (A) 8 3 (132¹⁻⁸) L2 (106b) 5
 . (106b)(106c) 5 .
 3 40 (210) (200) .
 , 40 8 32 IP . 8 32 IP
 가 (VPN) . (200) 4 (106a 106d) .
 (106a) 2a 가 . (106b 106d) 가 . (1

06a) 40 (210) 16MSB L2 (106b) (102)
 , L1 64K , 64K 가 1 (112a)(2b
) L1 (106a) L1 (220a) (208) L
 2 (106b) L1 (220a)가 (210b) 8 (220a) L2
 , (210b) 8 L1 (220a) L2
 (106b)

2 L2 (220b) , (208) L3 (106c)
 3 (210c) 8 L2 (220b) L3 (106c)

L3 L3 (220c) (208) L4 (106d)
 L3 (220c) (210d) 8 L3 (220c) L4 (10
 6d) 4

4 L4 (220d) (210)
 (102) (106a 106d) (220a 220d) (208)
 (102) (106a 106d) , (106b) (106c 106d) (220a
 102)가 (106a 106d) , (106b) (106c 106d) (220a
 220d) , (106c 106d) (208) (108)(2a) ,
 (220a 220d) (102) (108)(2a) ,
 (220a 220d) MSB 가

(106a 106d) (208) , (210) 가
 (200) (208) 40 (210)
 (106a 106d) 40 (210)
 (106a 106d) (220a 220d) 40 (200)
 (106a) (200)
 IP (106a) (200)

4 3 (106a) 2b
 2 (300), (302)
 (304) (300)(302)(304) (306)
 (306) 가 (304) (306) '
 1' (312) (106b 106d) (312) (304)
 (312) 4 '0' , 가
 (300) (302) (314)가
 (314) '1' , (302) , (310) (104)
 (102)(3) (306) (102)(3)
 (220a 220d) (108)(2a)

5 2b 2(112b) (106b) (106b)
 (400), (402) (418) (106a) (21
 0a) (312) (400) .
 (400) (312) (404) (404)
 (406) (408) .

2b (404) 2(112b)
 . 2(112b)가 8 ()
 256 .

5 (404) 256
 (102)(3) (102)(3) (418) . 2
 56 , 가 (406)
 . (406) 256 , 1
 (406) 6a 6b (408) 256 16 1
 6 , 256
 (418) 16 (408)
 (408) 6 (418) .

(406) (412) (408)
 (414) (402) , (402) (210b)
 (8) .

(402) (212b) 8 , (412)
 (414) (416) (418) (416) (106a)
 4 (220b)
 (404)가 (220b)가 (112c)(2b)
 (312) ,

(210b) (414)
 , (412)
 (402) 7 .

6a 2 5 3 (r1)
 (r2)(r3) 2 (s0)(s1) 32 (500¹ 500³²)
 가 . (500¹ 500³²)
 1

[1]

	/
00000	r0
00001	r0
00010	r0
00011	r0
00100	r1
00101	r1
00110	r0
00111	r0
01000	r2
01001	s0
01010	r2
01011	r2
01100	r2
01110	r2
01111	r2
1xxxx	r3

6b 6a 5 (406)

(500) 1 (406) 32 6a (406) (502¹ 502³²) : ,

가 (406) '0' (418)(5)

가 '1' (402)

가 (504¹) (r0)

(502¹) 가 '0' (

504¹) (r0) 3 (500² 500⁴) (502²

502⁴) 502¹ (406) '0' (5

00⁵) 가 .

(504²) (500⁵) (r1) (500⁶) (50

2⁵) '1' , (418)(5) (504²)

(502⁶) '0' , 502² 가 (500⁷)

(504³) , 가 (r0) (418)(5)

(504³) (502⁷) '1' .

(500⁸) (500⁷) , 가 (418)(5)

(500⁸) (502⁸) '0' (500⁸)

가 , (418)(5) 가 (500⁹)

(502⁹) '1' , r2 (504⁸)가 (418)

(5) 가 .

(500¹⁰) (500⁹) 가 , (418)(5)

가 (500¹⁰) (502¹⁰) '1' , s0 (504⁸)가

(418)(5) 가 .

(500¹¹) (500¹⁰) 가 , (418)(5)

가 (500¹¹) (502¹¹) '1' , r2 (504⁸)가

(418)(5) 가 .

(500^{12}) 가 (500^{13}) 가 (500^{11}) 가 (500^{12}) 가 (502^{12}) , $(418)(5)$ (500^{13}) (502^{13})
 (406) '0' .

(500^{14}) 가 (500^{13}) 가 $(418)(5)$ (500^{14}) (502^{14}) '1' , s1
 (504^7) 가 $(418)(5)$ 가 (500^{15}) (500^{14}) 가
 (502^{15}) '1' , r2 (504^8) 가 $(418)(5)$ 가
 (500^{16}) (500^{15}) , $(418)(5)$
 가 .

(500^{17}) 가 (500^{16}) 가 $(418)(5)$ (500^{17}) (502^{17}) '1' , r3
 (504^9) 가 $(418)(5)$ 가 .

(500^{18}) 500^{32} 가 (500^{17}) (502^{18}) 502^{32} '0' , $(418)(5)$, 32 (500^1) 50
 0^{32}) $(304)(4)$ $(302)(4)$ 9
 (504^{1-9}) 가 .

(406) "1" , (500^1) 500^{32})
 (504^1) 504^9 $(418)(5)$, (500^2)
 (504^1) 504^9 , (406) (502^1) 502^{28})
 $8)$ 가 '1' 가 8 , 8
 (504^9) .

가 , $(418)(5)$
 (504^1) 504^9 .

7 5 (408) . (408) $(418)(5)$ 16
 (504^1) 504^{16}) $(6b)$)
 $(600^1)(600^2)$. 16
 $(418)(5)$. 8 256 $(602^1)(602^2)$
 256 가 . (602) 16 $(600^1)(600^2)$
 $()$ $(602^1)(602^2)$, (
 602) .

16 (504^{1-16}) , 16 ,
 $(418)(5)$ 가 .

8 5 (402) . (402) (7
 00), (702) 가 (704) . (700) (706) 1
 (708) . (710) .

(706) $(210b)$ 8 (412) $(500)(6b)$
 (718) 1 (708) 1 (708) (
 500) (406) 1 . 1 (712)
 (702) (714) 가 (704) .

8 가 256 (406) 256 '1' .

8 2 , 4MSB (712) , 4 (LSB)

(714) .

, 8 (210b)가 '0100 0100' , (68) , (412)

68 27 '1' , 1C Hex(0001 1100), MSB(0001); , (714),

(602¹)(6) LSB(1100) ; , (504¹¹)(6),

(502¹) 12 .

(414) (710) (700) (712)

(716) . 가 (704) (700)

(714) (716) 가 , (416) . (416)

(106b 106d) (504)(6b) .

9 (200) (210)(3)

. .

800 , (210a)(3) (106a) . 802

. .

802 , (210a)(3) 1 (504)(

6b) (220a)(3) .

, 804 , 1 (504)(

6b) (302)(4) , 808

. .

804 , (106b 106d)가 . (210b 210d)

(312) . (504)(6b) (304)(4)

806 , (504)(6b)

. . , 804

. , 808 .

808 , (106a 106d) (504)(6b) (102)(3)

(200) (102)(3) .

. .

3 (200) (102) (418(5))

(504(6B)) . , (418(5))가 128K

2 (418(5))가 , 256K (102(3)) (

200) . 128K (418(5)) 17 - . 512K

(418(5)) 32 - IPv4 가 4 (200) 2 512K

(418(5)) (102(3))

. .

가 (102(3)) (504(6B)) (200) (50
4(6B)) (210) (200) (418(5))

10A . 2 가 , (200a)
(200b) , 2 , (200b)가 가

(200a - b) (210) (210) (102(
3)) (200a - b) (418(5)) , (200a, 200b)
(106a) (900) (200a, 200b)

10B 10A (200a) (200a - b) (106a - d)
(208) , 3 (902) (200)
(200a) (106a - d)
(220a - d) (208) (2
08) (904) (902) (200a - b) (106a)
(504(6B)) (304(4)) , (302(4)) (2
00a) (106a) - (300(4)) (302) (200b)
(106a) (504(6B)) (106a) 3
,
(200b) 64K (106a)
가 (102(3)) (106a) (302(4)) ,
(200a) (106a)

10A (200a) (200b) (900)
(900) (200a, 200b) (102(3)) (200a,
200b) (900) (200a, 200b)
a, 200b) (900)

가 (900) (200a, 200b) (210)
가 , (200a, 200b) (906) . 3 -
8

(902) (904)가 (102(3))
(200a) (902) () (900)
. 2 (200a, 200b)가 ,
가 (200a, 200b) ()
bus conflicts)

10C (210) 가 가
(200d) 10C , 2 (200c - d) , (200c)
(200d) 가 가 2 ,
(200d) 가 가 [39:0](210) (200c -

d) (200c - d) .

10D 10C (200d) 3 (200)
 (106a - d) (200c - d) (106a)
 (304(4)) (200c - d) (106a) (504(6B))
 (304(4)) (312) (106b - d) ,
 (102(3)) (200c) (106a) (200d)
 (106a) , (200b, 200d)

(200d) (904) (1004)
 (1004) (1002a) (200c) (1000a) (904)
 (102(3))가 (904) ,
 (1002a) (102(3))가 (1000a) , (1000a)
 (1002a) (102(3))가 (1000a) (904)
 , (904) (1002a)

10C , (200c) (200d) (1000a)
 (102(3)) (1002a) (200d)
 (200d)가 , (102(3))
 10A (900)
 , (1000a)

11A - B (200a - b(10A) 200c - d(10C)) 2B

11A (200a(10A) 200c(10C)) 2B
 B (200a) (106a) 130¹ - 130²²
 3 (200a) (200a) ,
 B가 X (200a)
 130²³ (504(6B)) (312(4)) B
 - (300(4)) (200a) 130²³ (504
 (6B)) , 130²³ 가 (200b)
 (418(5)) .

11B (200b(10A) 200d(10C)) (418(5)) (5
 04(6B)) (200b)
 A가 2B , 130¹ - 130³ 130⁵ - 130³²
 2B (200b) 130⁴ (504(
 6B)) (312(4)) A (200b)
 130⁴ - (300(4)) , 130⁴ 가
 A (138
 (11A)) (200a) , B (1
 40) (200b) (200b, 200d)
 ; , (200b, 200d) 1 (106a)

11A 11B , (210a) 1 _1(1104a) _1(
 1102(3)a) 130⁹ - 130¹² (200a, 200c) (106a)
 (504(6B)) (302(4)) r1(116) , (200b, 200d)
 (106a) (504(6B)) - (300(4))가 (200a, 200c)
 (302(4)) (1000a) (200b, 200d) , (1002a)
 (200b, 200d)

(210a) 1 130⁴ (200a) (106a) (50
 4(6B)) (304(4)) A (312(4))
 가 (312) (200a) (106b) , (20
 0a) (302(4))

(210a) 1 130²³ (200a) (106a)
 (504(6B)) - (300(4)) (200b) (106a) (50
 4(6B)) (304(4))가 , (302(4))
 (200b) (106b) (210b)

12 10A (200a - b) (504(6B)) (302(
 4)) 10C (200c - d)
 (302(4)) (200a - b) ()

(302(4))가 , (200a - b(10A))
 (302(4)) _1(1104a(11B)) (302(4))
 (200a) (106a) _1(1104a(11B)) (304(4)) (200
 a - 200b) (106a)

1200 , (200a - 200b(10A)) (106a) (304(4))
 (302(4)) (200a - b(10A)) (302(
 4)) (302(4)) (504(
 6B)) 가 1202

1202 , (504(6B)) (200a - b(10A))
 (302(4)) , (200a - b(10A))
 1204

1204 , (302(4)) (200a - b) (418(5))
 (504(6B)) 1206

1206 , (200a - b(10A)) (418(5)) (504(6B))
가 가 (200a - b(10A)) 가 n 1/n , 1
208 . , (200a - b) 1/n 1
208 .

1208 , (200a - b)가 1/n , - (300(4))
(200a - b) 가
. 1210 .

1210 , 가 , , 1212
.

1212 , (200a - b(10A))가 . 1204 .
IP , (200a - b(10A))
. (200a - b(10A))
(200a - b(10A)) .

13 10C (200c - d)
.

1300 , (200c - d(10C)) (210) . (200c - d) (106a)
(210a) 1 . 1302 .

1302 , (106a) (504(6B)) . (200c)
(504(6B)) - (300(4)), (302(4))
(304(4)) (200d) (504(6b)) - (300(4))
(304(4)) (200) 가 ()
302(4)) , (200c - d)
, 1310 , 1304 .

1304 , 가 (304(4)) , (200c - d) 가
1306 . , - ,
가 , 1310 .

1306 , (106b - d(3))
(312(4)) (210b - d) .
1308 .

1308 , (106b - d)
. (504(6B))가 (304(4)) ,
(106b - d) 1306 (504(6B))가
(304(4)) , 가 1310
.

1310 , (1000a) ,
가 (200d) , (200c) (1000a)
(200d) , (200d) 1312 .

1312 , (1000a) (200d) 가 , 1314
. (1000a) (200d) 가 ,
(200c - d) (504(6B)) . (210)
, 1316 .

1314 , (1000a) (1000a)
(302(4)) . (100a) - (300(4))
(304(4)) , (304(4)), (302(4))
- (300(4)) 4 . (1000a)가 , 1
318 . 1320 .

1318 , (1000a) (200d)
(1000a) (1002a) (200d)
(1000a) , (1000a) (200d)가
(3)) . (102

1316 , (200c - d)
. 가 .

1320 , (200d) (1000a)
, (200d) (1000a) .

14 10A (200a - b)

1340 , (200a - b) 1 (106a) (210a) 1
. 1342 .

1342 , 1 (210a) 1 (106a) ,
1352 , 1344 .

1344 , (210a) 1 1 (106a)
(304(4)) , 1346 . ,

1346 , (304(4))
ree select) (210b - c) . (subt
1348 .

1348 , (302), - (300(4)) (304(4))
가 (304(4)) 가 1346
. 가 (304(4)) , 1350

1350 가 (102(3)) , 1352 .

1352 ,
(102(3)) .

(Sparse Mode)

5 가 , (404) 256 , 256 가
(418(5)) (418(5)) (504(6B)) (416) 504¹ - 504ⁿ (406)
(404) (408)
6A - 6B
256 (502(6B)) , 가
256 , , 가 .

15 1 (112a) (304(4)) 2 (112b)
A B (106a) s1 (312) (106a) s0 (312)
04(4)) A (404) (304(4)) B (404) (312)

B 11 가 ; , r6 - r16 6 ; , s2 - s7 .
(304(4)) (302(4)) (504(6B))
(416) 6B

A 2 ; , r1 r2 .
(404) (504(6B)) 3 (416)
; , r0, r1, r2 .

(200)
(404) 가 .

16 (504(6B)) 가 , (404)
(406) 6A - 6B
15 (504(6B)) 가 ; (404)
(400) , ,
(200) .

16A - C 4 (304(4)) 5 (404)
(408) (406) , (404)

16A 가 , (404) (406) 6B $1400^1 - 1400^n$
 1400^n $1400^1 - 1400^n$ $1402^1 - 1402^n$
 $1402^1 - 1402^n$ 9 - $1402^1 - 1402^n$

16B 가 , (1404)
 (404) (408) 가 , (408) (404) 32
 (416) 16 (416) (600¹) (1404) (600
 2) (600¹) (1404) (1404)
 (404) ($1400^1 - 1400^n$) ($1402^1 - 1402^n$) 2
 ($1400^1 - 1400^n$) (404)

[2]

	/			/			/		
0	1	1	9	16	16	16	112	32	32
1	2	2	18	10	20	20	76	30	30
2	3	3	27	8	24	24	40	32	32
3	4	4	36	6	24	24	40	30	30
4	7	5	63	4	28	20	4	32	24
5	15	8	135	2	30	16	- 14	32	18

2 , , (404) (408) (1404)
 '4' , (404) (1400) 5 7
 ($1402^1 - 1402^n$) ($1402^1 - 1402^n$) 9
 (1400) ($1400^1 - 1400^n$) ($1402^1 - 1402^n$)
 9 4 (1400) , 7
 (1402) (1400) 63 (7 * 9 = 63)

(404) (1400) (406)
 ($1400^1 - 1400^n$) 4 , (406)
 256 , 63 , ($1400^1 - 1400^n$)
 $4(\text{int}(256/63)=4)$

(404) ($1402^1 - 1402^n$) (40
 4) ($1400^1 - 1400^n$) 7 ($1402^1 - 1402^n$)
 가 (7*4=28), 4 (404) (1402) 28 ,
 ($1400^1 - 1400^n$) 5 (1402)가 (5*4=20), 20

2 (418(5)) (504(6B))가
 (404) 가

가 가

2 4 , (1400) 7 (1402)가 ,
 $32((7+1)*4=32)$ (404) , (1400) 5
 (1402)가 , $24((5+1)*4=24)$ (1402)가
 (1400) (404) (404)
 가 30 , (418(5)) (416)가
 16 가 32 (416) (408) 2
 (600¹, 600²)
 16C , (400) (404) 6B
 4 (418(5))
 (304(4)) (404)가
 (1406)
 (1406) (404)가 (1408)
 (312) (1400)
 (1408) 16
 17 (714) 8 (700) (1502)
 (1502) (404) (504(6B))
 (714) (1400) (1402)
 (1500) (700) (1500)
 08) (706) (1500) 8 (714) (7
 (1406) 가 (404)가 , (40
 4) (412) (1502) (1502)
 18
 18 17 (700) (1502) (1502)
 (1600), (1602), (" CAM")
 (404) (406) (1604)
 (412) (700) (700) (1400¹ - 1400ⁿ)
 00¹ - 1400ⁿ) (1502) (1602) (14
 (1400¹) (1600) (1614)

(1600) (1408)
 (1400¹) (1614) ,
 (404) (408) (1404)
 . 3 4 (404) (1602) (16
 10) (412) (1400¹) . 2
 4 , 4 4 (404) . 4
 (1400) 63 7 5 (1402) . , 4
 (1400) 63 . 1 (1
 400¹) (406) 62:0 . 2 (1400²) (
 406) 125:63 . 3 (1400³) (406) 188
 :126 , 4 (1400⁴) 251:189 .
 (406) (1408) (1408) , 3 ,
 (1408)가 '0001' , 2 (1400²)가 , 256
 (412) 125:63 (1610) (1602)
 (1604) .

[3]

0000	62:0	1
0001	125:63	2
0010	188:126	3
0011	251:189	4

(400) (404)
 (1402) (404) (1404) (1400)
 (1400) (1400) (1402)
 (1402) (1402)
 8 8 (1402) 8
 , 9 (1402) (1402) 8
 8 (run bit length encoding)
 9 8 가
 (1604) (1400) 9 (1402¹ - 1
 402ⁿ) 'X' (don't care) 9 CAM , 8 CAM CAM(1606)
 (1604) 8 - CAM 9 - (1402)
 4 .

[4]

8 -	9 -
101100XX	101100100
100XXXXXX	100100000
001111XX	001111100
0011XXXX	001110000

9 (1402) 4 1 (140
 2) 9 '101100100' , 8 '101100XX' CAM 1606
 (conversion logic)(1604) 9 가 1
 1 (1604) 1 '0' '100' ('XX')
 1 , 8

4 2 (1402) 9 100100000 (1604) 9
 , 가 1 1 9
 LSBs (Least Significant Bits)가 'X' 8
 9 (1402) (1402)
 , (200) (1402) 가

9 (1402) 8 (1604) 8 CAM(1606)
 8 (1402)가 (1400) CAM
 , (match) . CAM(1606) (1400)
 (1402) , (1606)
 (5) (1400) (1402) 15
 8 16 . CAM(1606) 3 (multi - m
 atch resolver) CAM (1606) (true contents addressable memor
 y) . CAM(1606) CAM

(1400) (1402) (1400)가
 (404) . (1400)
 (1402) (404)
 8 CAM 1

(1400) 8 CAM(1606) , CAM(1606) (210b)
 . (210b) 가 CAM(1606) 가 . CAM
 (714) (714) (418)
 (416)

19 a - d (sparse populated subtree) (1700) (714)

17a . r0,r1 r2,r1 (17

00) (1700) (1400)

(1402¹, 1402²) . r0 CAM(1606) 1 (1702)

2 , (1402) (1400) '1'

(1404) (404) .

(1700) , r2 10XXXXXX , r1 01XXXXXX

(1400) (1402¹,1402²)

, (1402¹,1402²)

. '1'

X , X 0 . , 10XXXXXX 1010000

, 101XXXXX 010100000 .

19b (1400) (1402¹,1402²)

(1400) (1402¹, 1402²)가 , (1402

¹,1402²) 1 (1404) (404) . 가 (

, r1 3 1 , r2 2 1 , r1 .

1402¹,1402²) , r2 (14021) r1

(14022) , (1400) (match order)

19c (1402²)가 8

(1708¹ - 1708⁹) , '1' (17086) . 8

(1402²) 8 ,

(1708¹) '0' 'X' , 8

(1710¹) . (1708²) '0' 'X' , 8 (1

710²) . (1708³) '0' 'X' , 8 (171

0³) . (1708⁴) '0' 'X' , 8 (1710⁴)

(1708⁵) '0' 'X' , 8 (1710⁵)

(1708⁶) '1' . (1708⁷) '0'

8 (1710⁶) . (1708⁸) '1' 8

(1710⁷) . (1708⁹) '0' 8 (1710⁸)

19d CAM(1606) (1402¹,1402²) (1400)

(418)(5) (504¹ - 504³) .

(1400) 9 (1402¹,1402²) (1604)(18) , CA

M(1606) . CAM(1606) (1702) 19a (1700) r0

(1704) (1400)

(1402²) (1704) r2 .

(1400) (1402²) 010100000 010XXXXX CAM(1606)

(1706) .

CAM(1606) (714)(18) (714) (418)(5)

(504¹ - 504³) (416) . CAM(1606) 가

(1702,1704,1706) (210b) . CAM(1606)

(714) (404) (600¹,600

1)

$20 \quad 8 \quad (702) \quad (1800)$
 $(702) \quad (418)(5) \quad (504)(6B) \quad (416)$
 $(716) \quad (702) \quad (710)$
 $(1800) \quad (304)$
 $(4) \quad (1406) \quad (1406) \quad (404)가$

$(404)가 \quad (1400)$
 $(1800) \quad (1400) \quad (716)$
 $(1800) \quad (1404) \quad (1608) \quad (716) \quad (404)$
 $(600^1, 600^2) \quad (414),$
 $(304)(4) \quad (1408)$
 (716)

1

()

$= \quad +$
 $= ((1+ /)^*$

$(4) \quad (404)^2 \quad (716)$
 $(1408) \quad '1'$
 $(600$
 $^1, 600^2) / \quad 7 \quad (2) \quad 8 \quad ((1+7)*1).$
 $(404) \quad 16$
 $2 \quad 16 \quad 8 \quad 2 \quad (600^1)$
 $(600^1) \quad (716) \quad (600^1)$
 $+ 8 \quad 5 \quad (4) \quad (404) \quad 4$

[5]

1+0	1
2+8	2
2+0	3
2+8	4

$21 \quad (400)$
 $21 \quad 15 \quad B(21) \quad (404^1) \quad (406^1) \quad A(21) \quad (404^1) \quad (1400^1)$
 $(404^2) \quad (406^2) \quad 6b \quad (1400^1)$
 $19b \quad B \quad r4 \quad r5 \quad (1402^1, 1402^2)$
 $(312) \quad (404^1, 404^2)$

s0 (106a) (504)(6b) (304)(4) (312)
 (404¹) . s1 (106) (504)(6b) (30
 4)(4) (312) (404²) . (400)
 (404¹, 404²) .

22 (418)(5)
 (504)(6b) (416)(5) (4
 04) .

가
 (400) (404) 가
 (400) 가 .

(1900) , (404)
 (304)(4) (1406)(16c) (404)
 (1902) . (1914) .

(1902) , (404) (404)
 (1400) (1404) . (700) (1502) 14
 (1404) (304)(4)
 (1408) (404) (14
 00) . (1904) .

(1904) , (1400) (1402) 9 8
 , CAM(1606) .

(1906) , CAM(1606) CAM (210b) .
 (1908)

(1908) , (210b) CAM (1606)
 (714) . (714) (418)(5) (504)
 (416)(5) . (1910) .

(1910) , (1400) (716)
 (304)(4) (1408)
 (404) (1404) . (1912)

(1912) , (416) (714) (704)(8) (71
 6) . (504)(6b) (418)(5) (302)
 (304) (418)(5) (416)
 (504)(6b)가 (302) . (504)(6b)가
 (304)(4) , (210)

(1914) , (404) , (406)
 (714) 6b , (404)
 (406) ' 1 ' (1916)

(1916) , (404) (408) 16 (600)
 (600) 8 (702)
 (710) (1912)

23 (200) 가 1(2000)
 2(2002) 3(2004) (200) 2(2002)
 A B 3(2004) A_1, A_2, B_1 B_2 . s5
 (418)(5) (304)(4) . s5
 (304)(4) (210) 3(2004)
 B_2 B_2 (2006) r6 h1 가
 14a , r6 h1 (1402)(2)
 (1400) (1400) (1402)가
 , B_2 (2006) (1400) (400) ' 1 ' h
 (1404) (404) B_2 (2006) 가 B_2 (2008)
 2 (200) 가 B_2 (2006) 가 2 3
 (1402) 가 h1 B_2 (2006)
 가 (1400) (1402) 가 ' 2 ' ,
 (1404) (404) (1400)
 h1 가 B_2 (2006) B_2 (2008)

24 (2400) (200)
 (200) (2400) B_2 h2 B_2 (2006)
 (2400) B_2 (2008) 가
 (route update routine)(2402) (200) B_2 (2008) 가
 (2404) , (2406) (2404)
 (2406) (2402) (2410) (2404) (200)
 (2412)
 (2412) (400)(5) (418)(5)

23 , (2412) (504)(6b) B_2 (2008)
 (418)(5) B_2 (2008)
 (504)(6b) h1, h6 h2 B_2 (2008)
 08) 가 (418)(5) (504)(6B) ,
 (1402)가 (1400) (1400)
 (404) (404) (1404) (1400)
 (1402)

B_2 (2008) (404) , s5 (1400)가 (200) (304)(4) (400) B_2 (2006)
 B_2 (2008) B_2 (2008)가 가 , B_2 (2006)
 r6 h1 s5 B_2 (2008)가 , s5가 B_2 (2008)가
 (2008) r6 h1 h2
 (200) 가 B_2 (2006) r6 h1 h2가
 가 .
 25 (200) (418b) (504c⁴) , 23 h
 2 . 25 24 .
 2(2002) B r3, s4 s5 가 . B 16
 B r3, s4 s5 (1402a¹ - 1402a³)
 (400a) (404a) (1400a¹) . (50
 4a²) - (504a⁴) B 418a (504a² - 504a⁴)
 4) 302(4) (304)(4) .
 (304)(4) (504a³, 504a⁴) s4, s5 . s5 504a⁴
 (304)(4) , 3(2004)
 (400b) (312b) .
 B_2 h1 r6 B_2 (1402
 b¹ - 1402b²) (400b) (404b) (1400b
 1) B_2 (504b² - 504b³) , B_2
 (504b₁) .
 B_2 (2006) h1 , s5 (1402)
 (1400a) (404a) (400a)
 (312a) (404a) (406) (408)
 (402a) (412a) (414a) (402a) s5
 (504a⁴) (416a) (416
 a) (412a), (414a) (210b) . s5
 (400b) (312b) .
 (400b) B_2 (2006) (1402b¹, 1402b²) . B_2
 (1400b¹) 404b) (404b)
 (406) (408) (402b) (412b) (414
 b) (402b) h1 (504b³)
 (416b) (416b) (412b) (414b) (2
 10c) .
 B_2 (2006) h2 , (418b) (602c)
 B_2 (2008) r6, h1 h2 (504c² - 504c⁴)
 (504c¹) B_2 (2008) (504b¹)
 (504c²) r6 .
 (504b²) (504c³) h1 (5
 04b³) (504c⁴) h2 (50
 4c¹⁻⁴) , (504b¹ - 504b³) (418a)
 (504a⁴ s5 .

(1400c¹) (418b) B₂ (504c¹⁻⁴) ,
 (1402c¹⁻³) (400b) (1402c¹⁻³) 16 ,
 (1400¹) (1400c¹) (400b) (1402c¹⁻³)
 B₂ (2006) (1400c¹)
 (1402c¹ - 1402c³) 2 3 가 (1400c¹)
 3 2 (1404) (404c)
 (1400c¹) (3) 가 (404c)
 404c) (3) B₂ (2008) (3) (404c)
 (1400c¹) (1402c¹⁻³)
 B² (2008) 가 (1400c¹) (1402c¹⁻³) 가 (400b)
 (404b) B² (2008) (504a⁴)
 (1400c¹) (1400b¹) (404c)
 c³) h1 (504c⁴) h2 r5 (504c², 504
 (504b¹ - 504b³) (1400b¹)
 (1400b¹) ()
 가 (404)
 가 (418) (504a⁴) (404)
 가 가
 26 25 (200) 가 가
 (2200) 가 가 가
 가 (2218) 가
 (2202)
 (2202) (2204)
 (2204) (418)(5) (404)
 (1400c¹)가 (404)
 , 4 (1400c¹ - 1400c⁴) (4) (404)
 3 가 (404)
 (404) (404)가
 (2208) (2206)
 (2206) (404c) (1400c¹)
 (504c¹ - 504c⁴) (404c) (1400c¹)
 (1402c¹ - 1402c³) (504)(6b)
 (2208)
 (2208) (1400c¹) (504c¹)
 (404c) (408) (404c)
 1404) (2210)

(2210) (418b) (540c¹ - 504c⁴)
 (2212) .
 (2212) (1402c¹ - 1402c²) (1400c¹)
 (404C) (2214) .
 (2214) (504a⁴) (304)(4) (404
 c) (1400c¹) (504c⁴)
 h2 (2216) .
 (2216) (504b¹ - 504b³) (1400b)
 (504b¹ - 504b³) (418b) (504)(6B) ,
 (404b) 가 가
 .
 (2218) (404) (2400)(24) (40
 4) (404)
 (418b) (504) (50
 4)(6b) (404)(5) (408) (222
 0)
 .
 (2220) (404) 6a 6b
 (404) (406) (2222) .
 (2222) (404) (408)
 (418)(5) (504)(6) (2224)
 .
 (2224) (504a⁴) (304)(4) (504c⁴) h
 (404c) (2226) .
 2
 (2226) (404) (408)
 (504)(6b) (2400)(24) .
 (404b) (2400)(24) 가 .
 가
 , (504c⁴) h2 B₂ , r6 h1 2
 , (2)
 ,
 (404) (504a⁴)
 (304)(4) .

1.

1 1 1 ;
2 2 2 , 1
2 , 1 2
.

2.

1 ,
.

3.

1 , IP , .

4.

1 , 1 1 ,
2 2 가 1
.

5.

1 , 1 2 ,
.

6.

4 , 1
2 2 .

7.

1 , 가
.

8.

1 2 ;

1 1 ;

2 2 ;

1 2 ;

9.

8 , .

10.

8 , IP , .

11.

7 , 1 1 ,
2 2 가 1 .

12.

8 , 1 2 , .

13.

12 , 1
2 2 .

14.

8 , 가 .

15.

1 1 1 ;
2 2 2 ;
1 2 1 2 ; .

16.

15 , .

17.

15 , IP , .

18.

15 , 2 1 1 가 1 ,

19.

15 , 1 2 ,

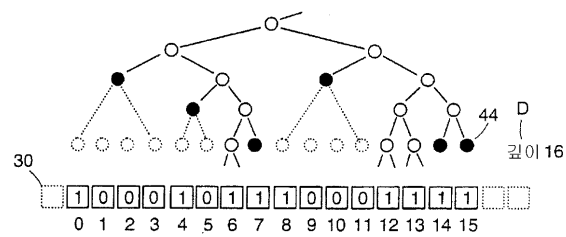
20.

19 , 1 2 2 .

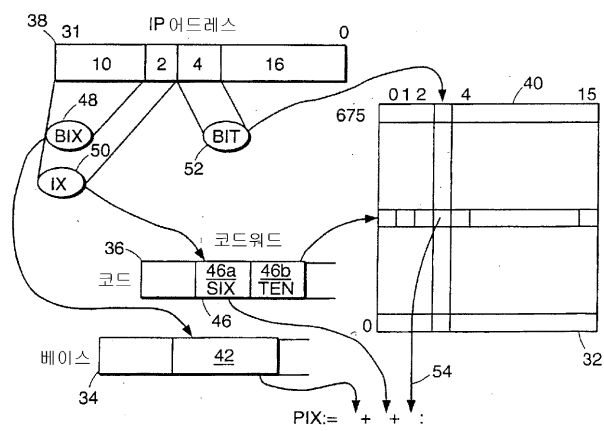
21.

15 , 가

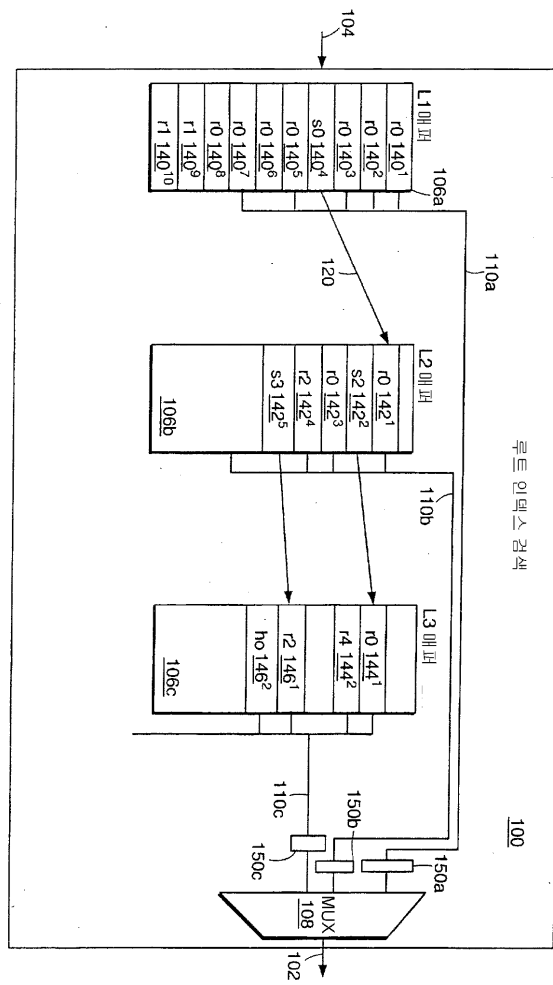
1a



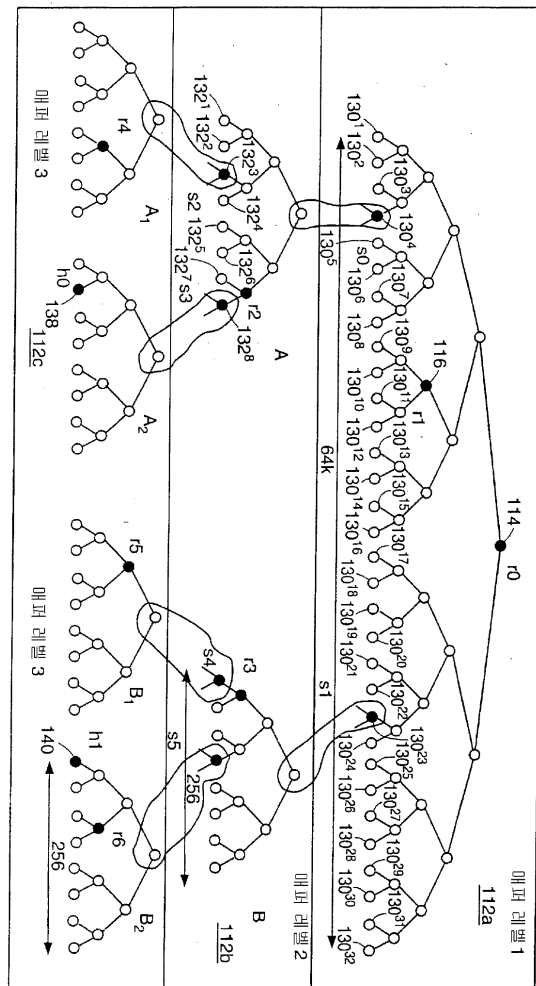
1b



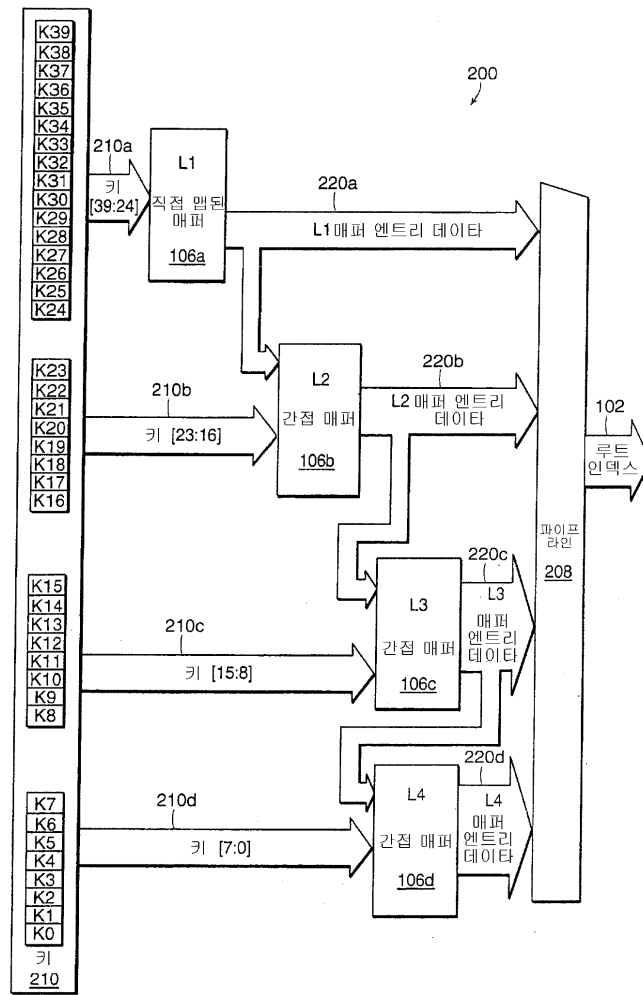
2a



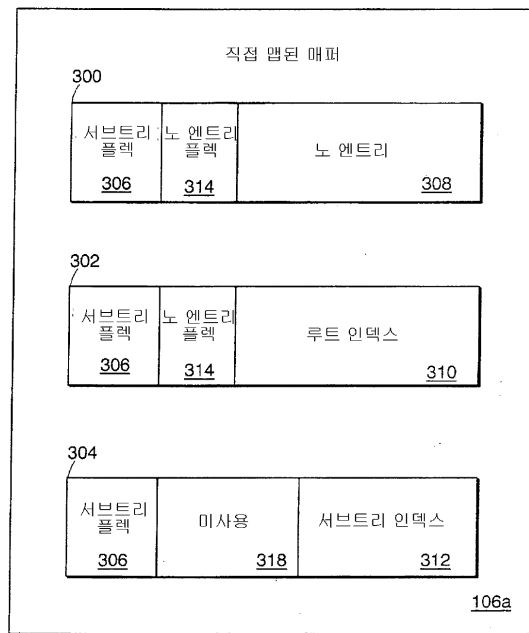
2b



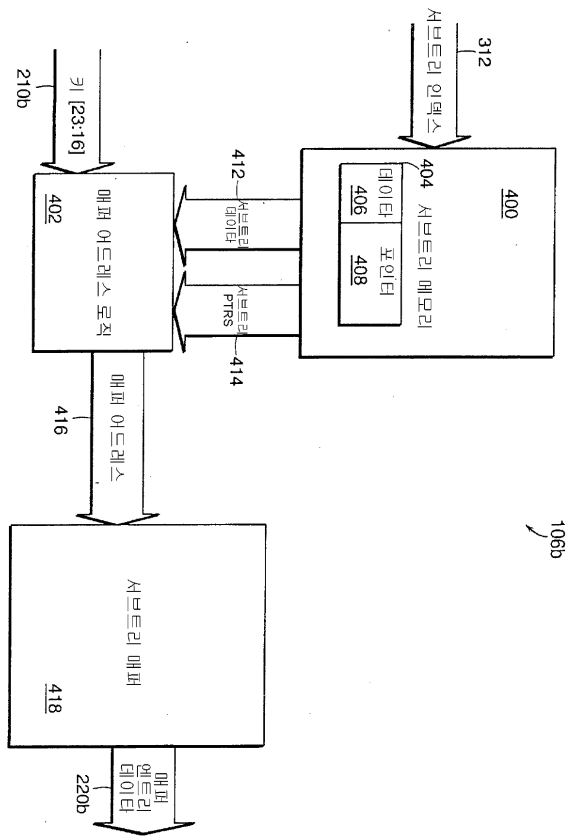
3



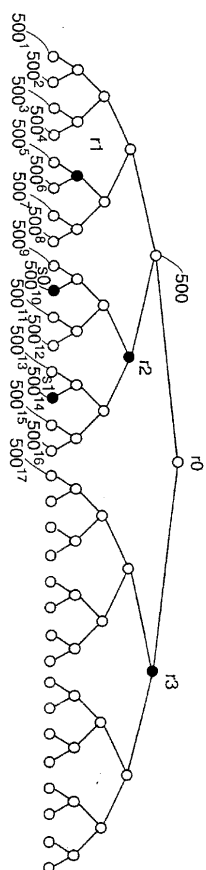
4



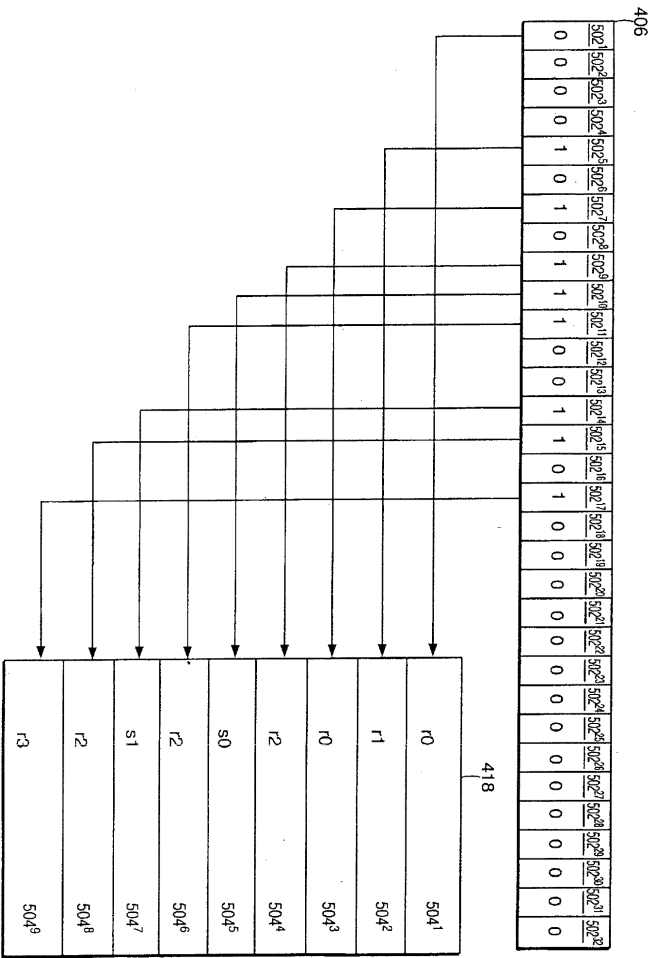
5



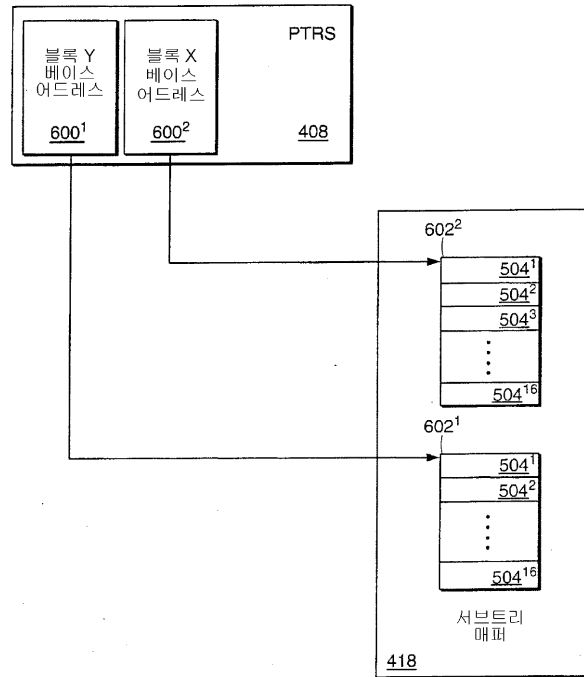
6a

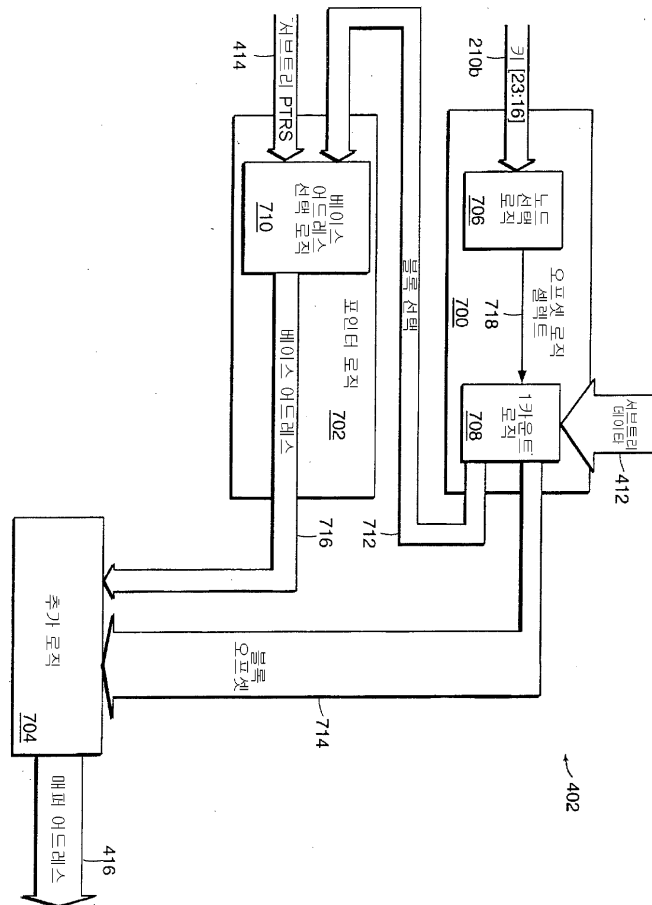


6b

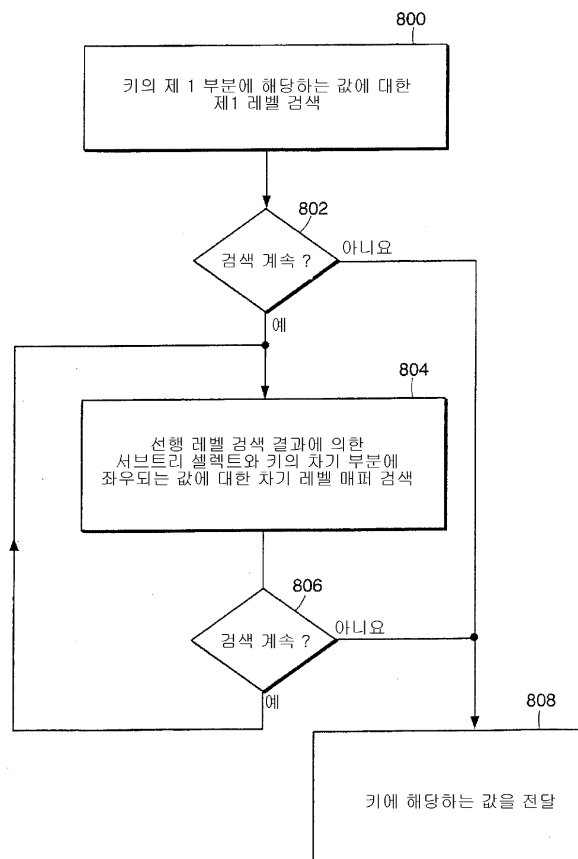


7

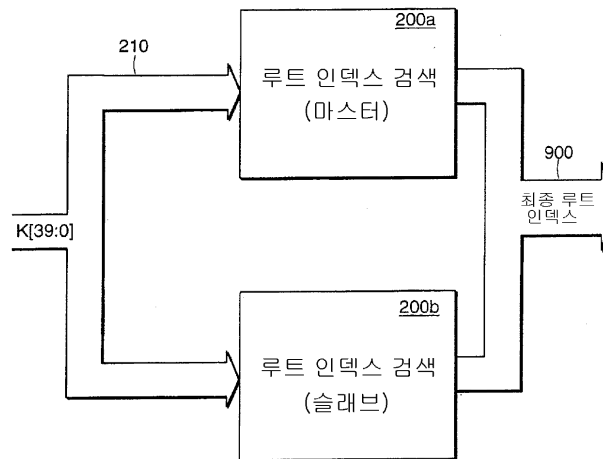


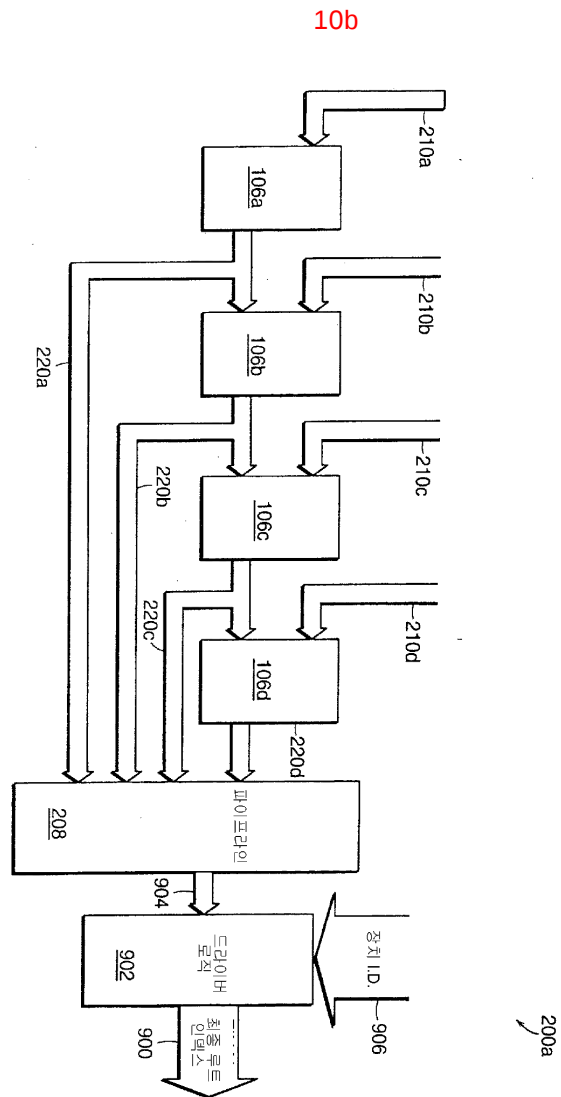


9

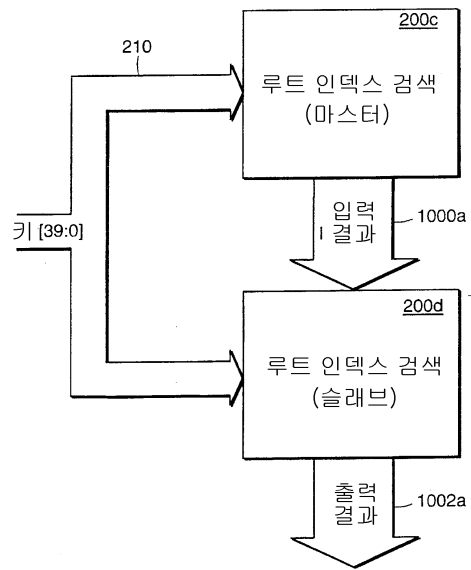


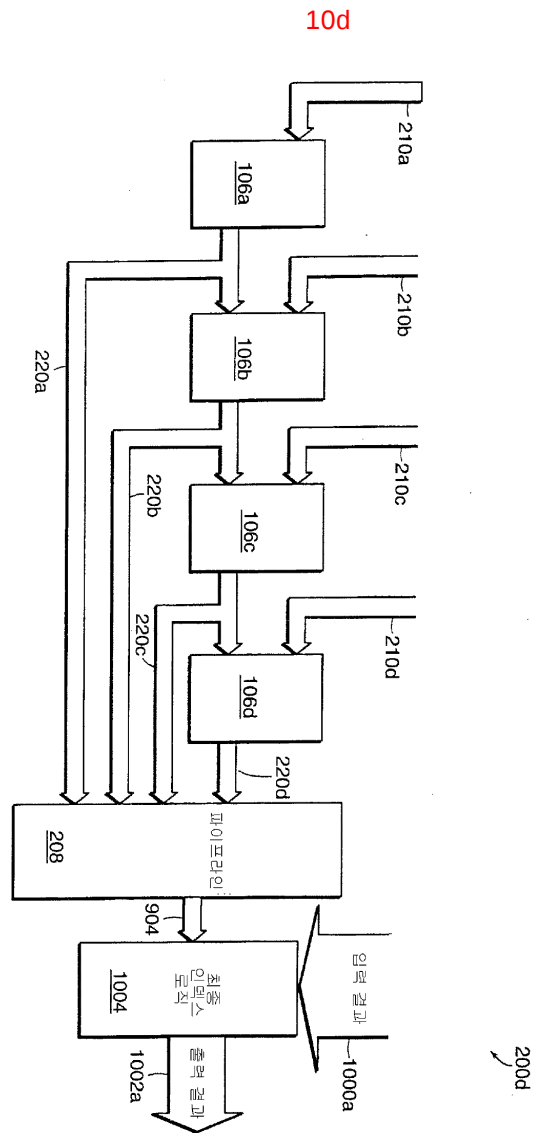
10a



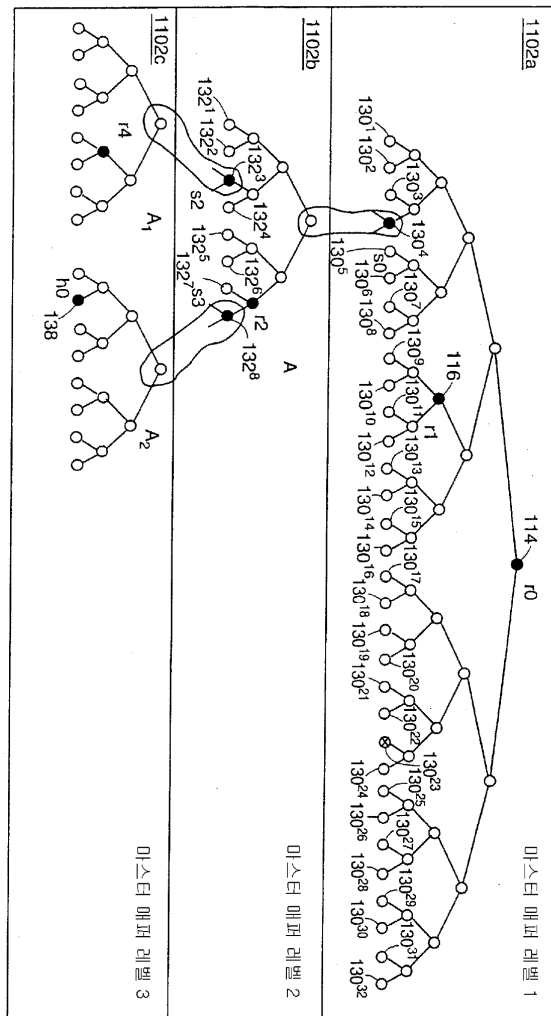


10c

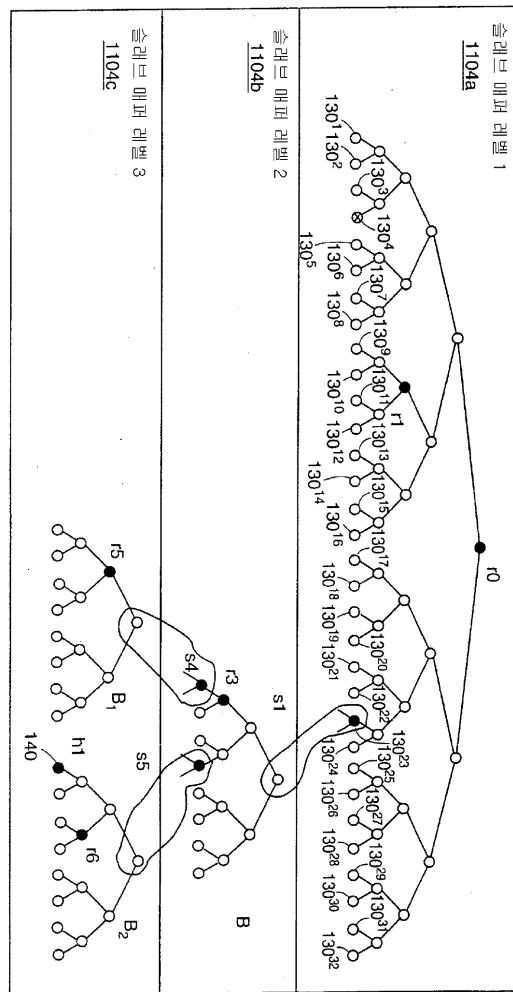




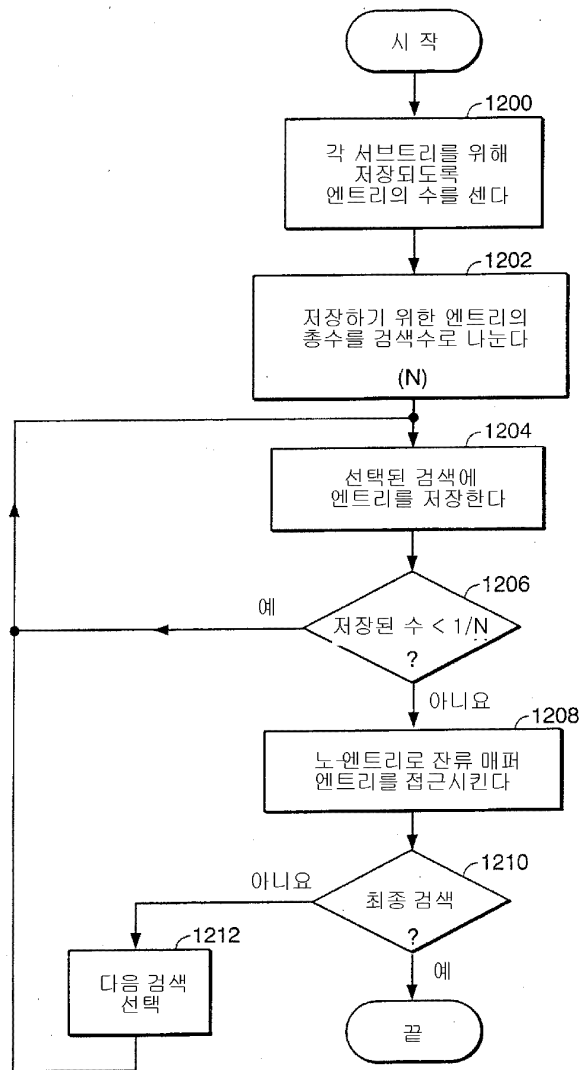
11a



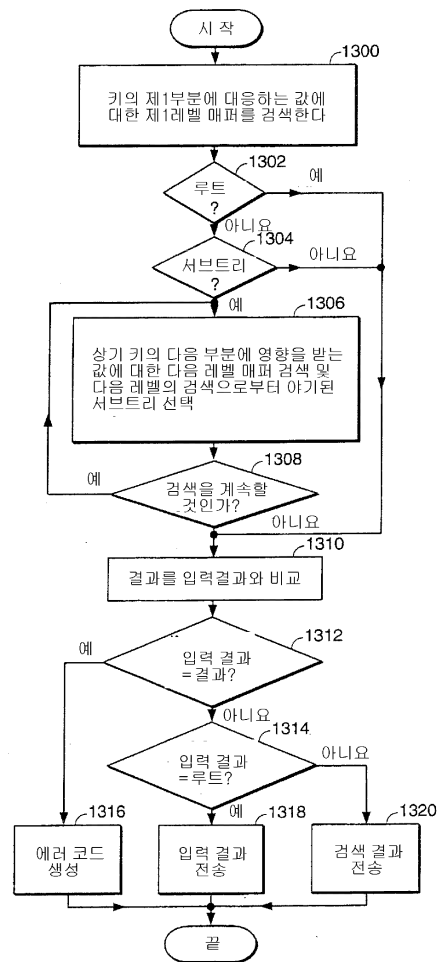
11b



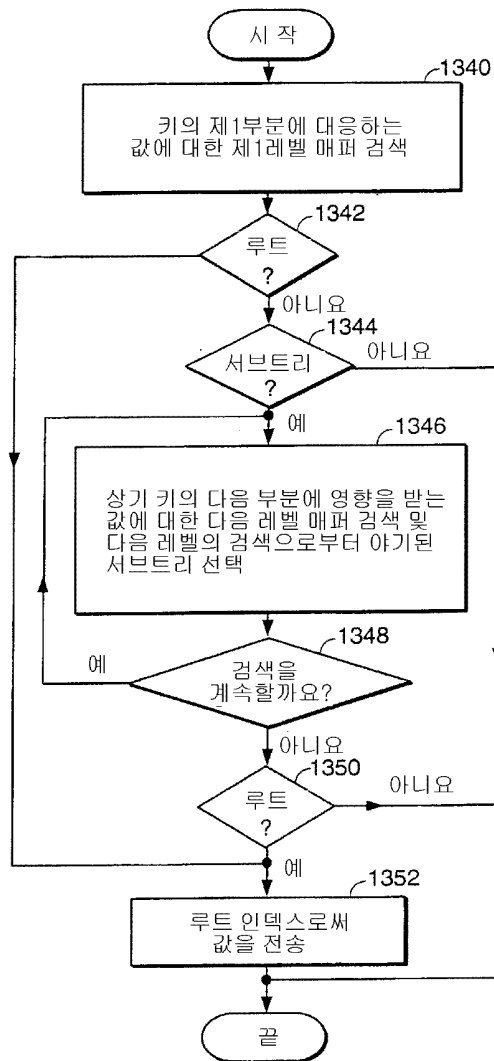
12



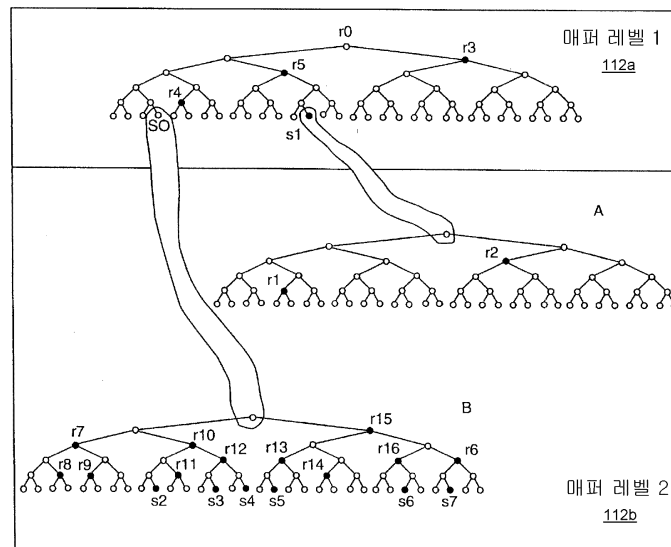
13



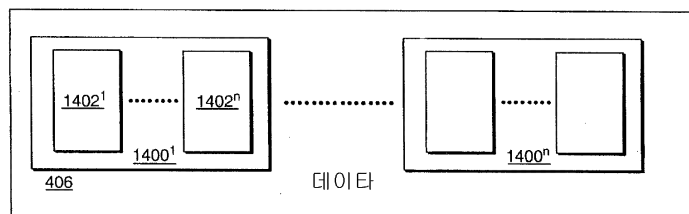
14



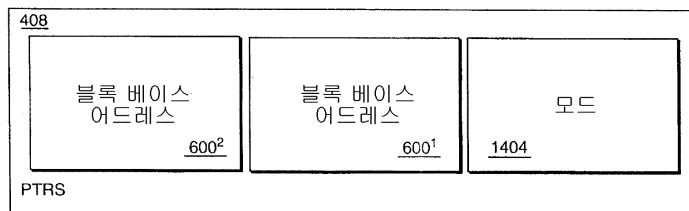
15



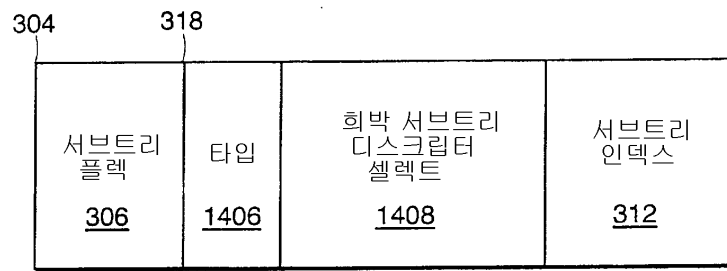
16a



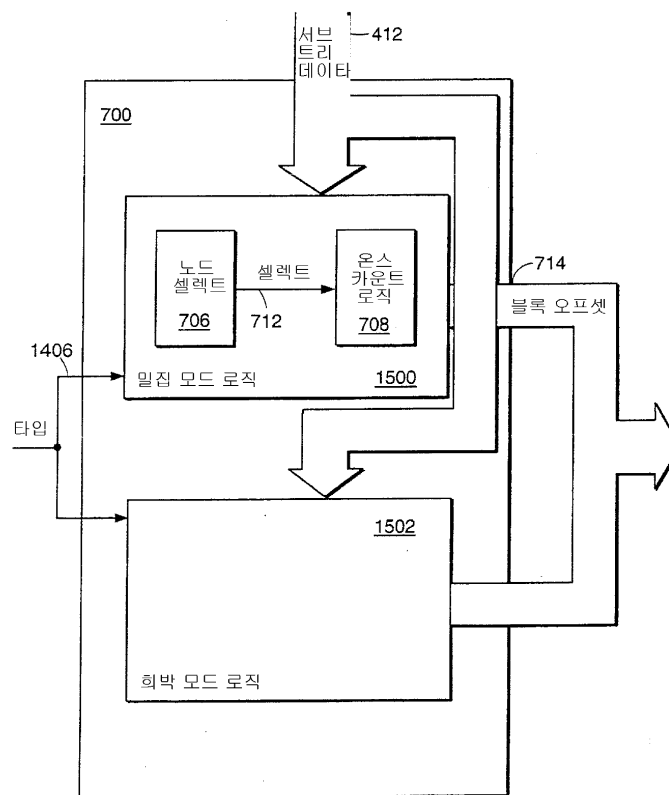
16b



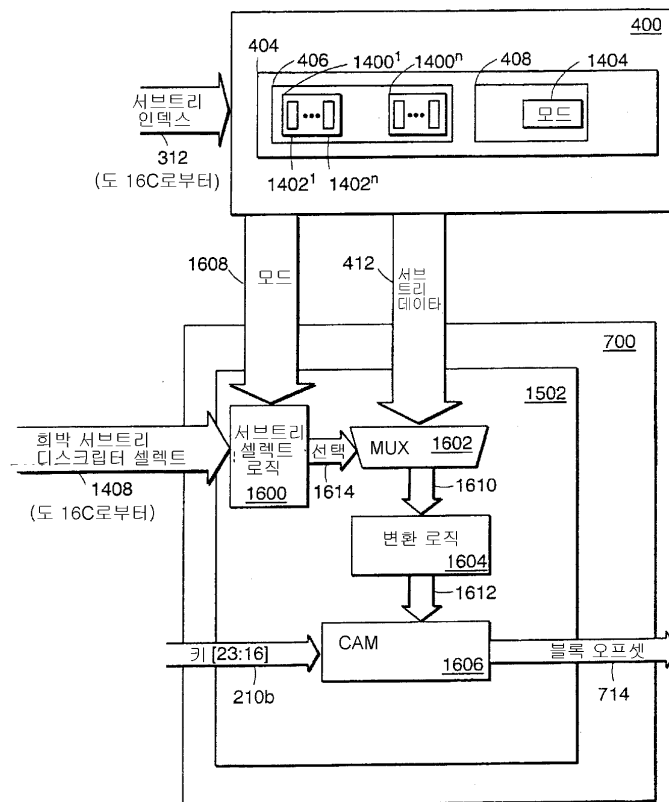
16c



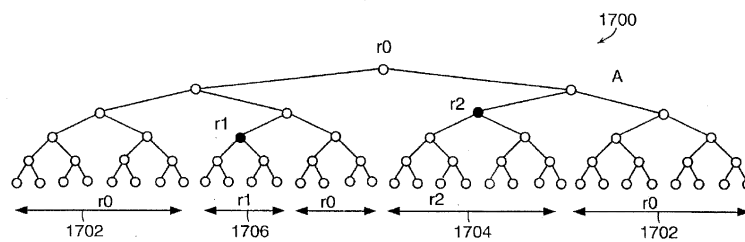
17



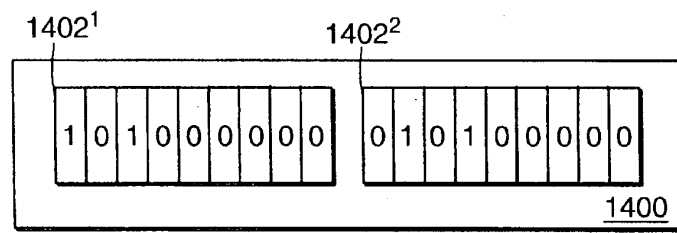
18



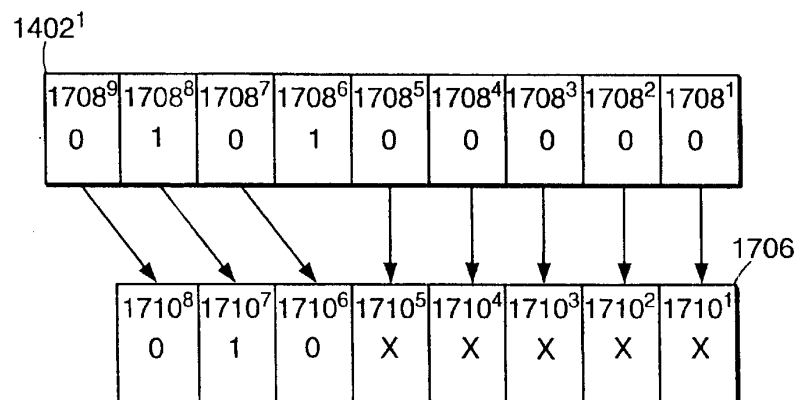
19a



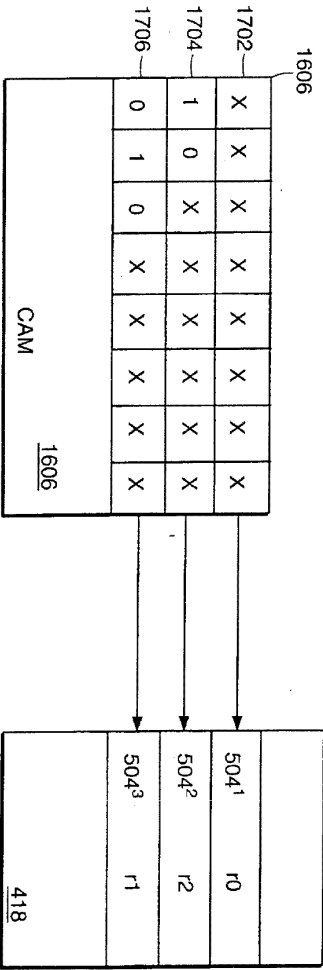
19b



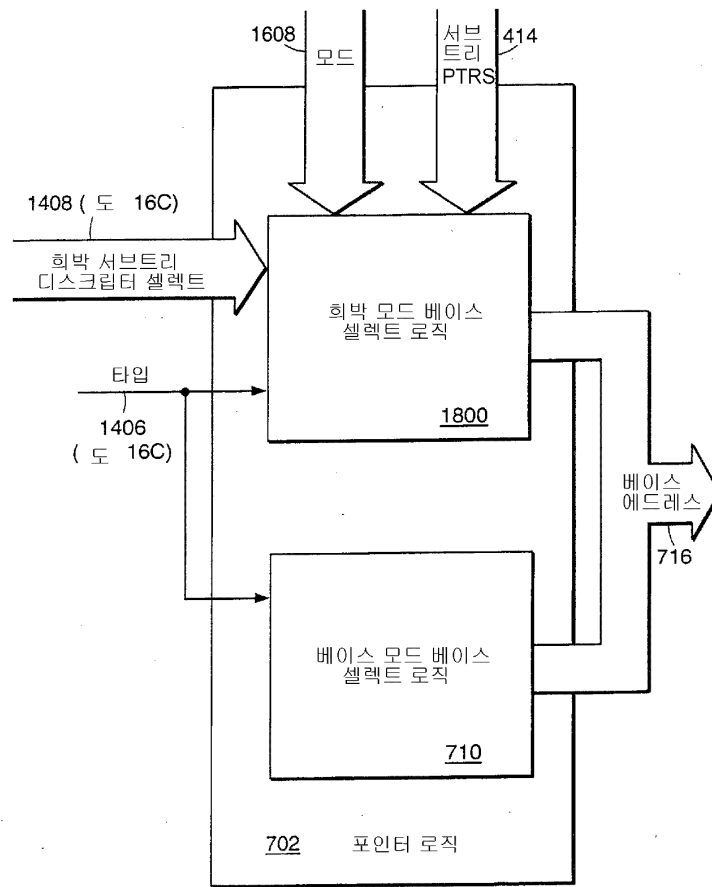
19c



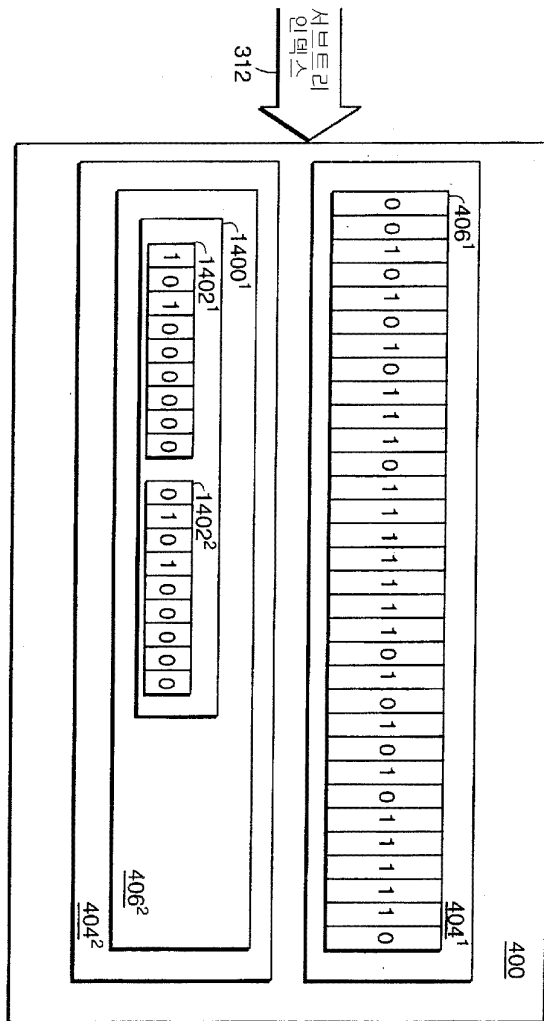
19d



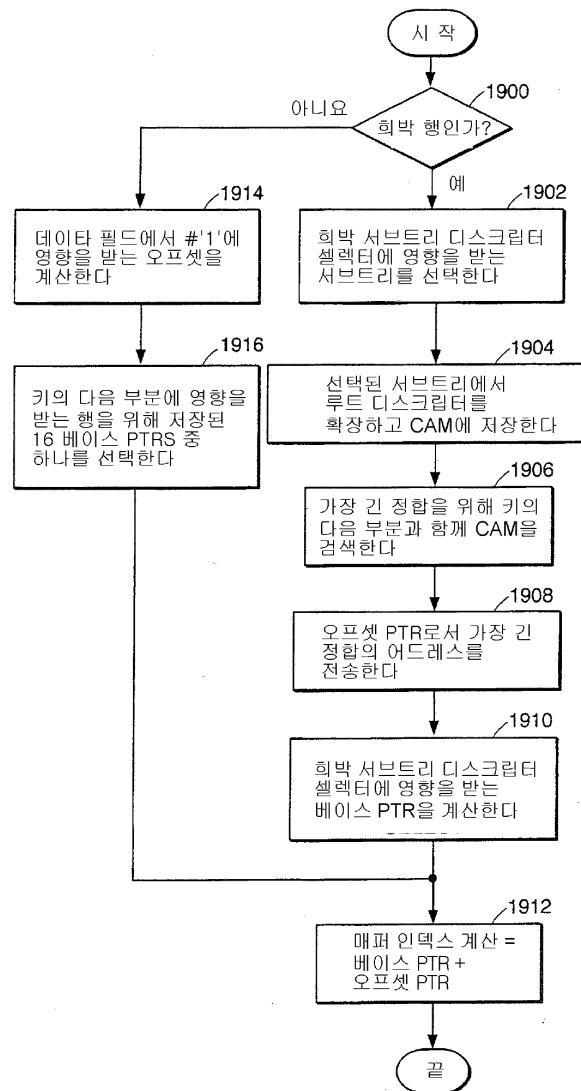
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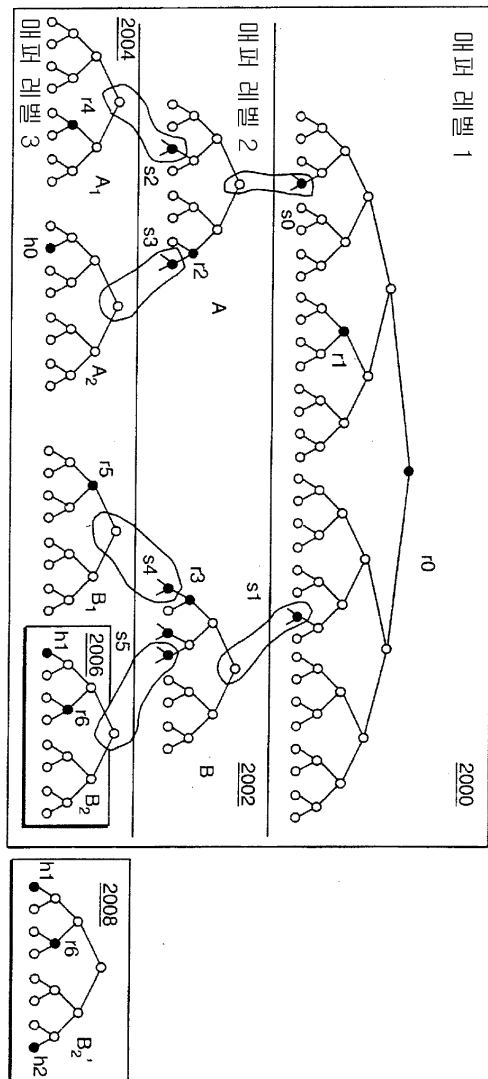
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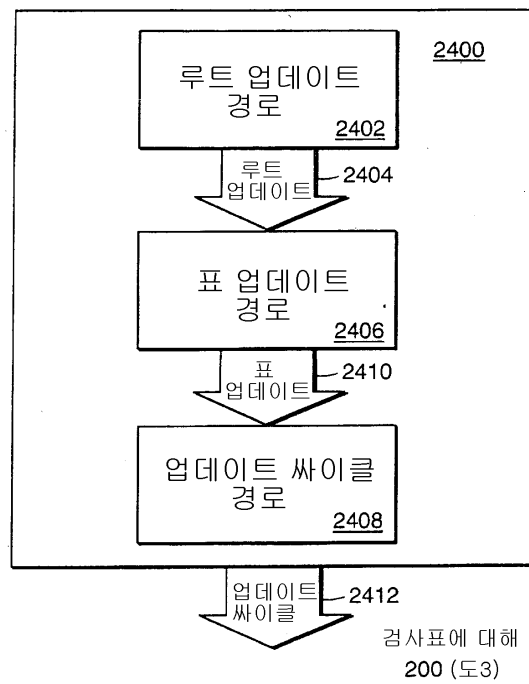
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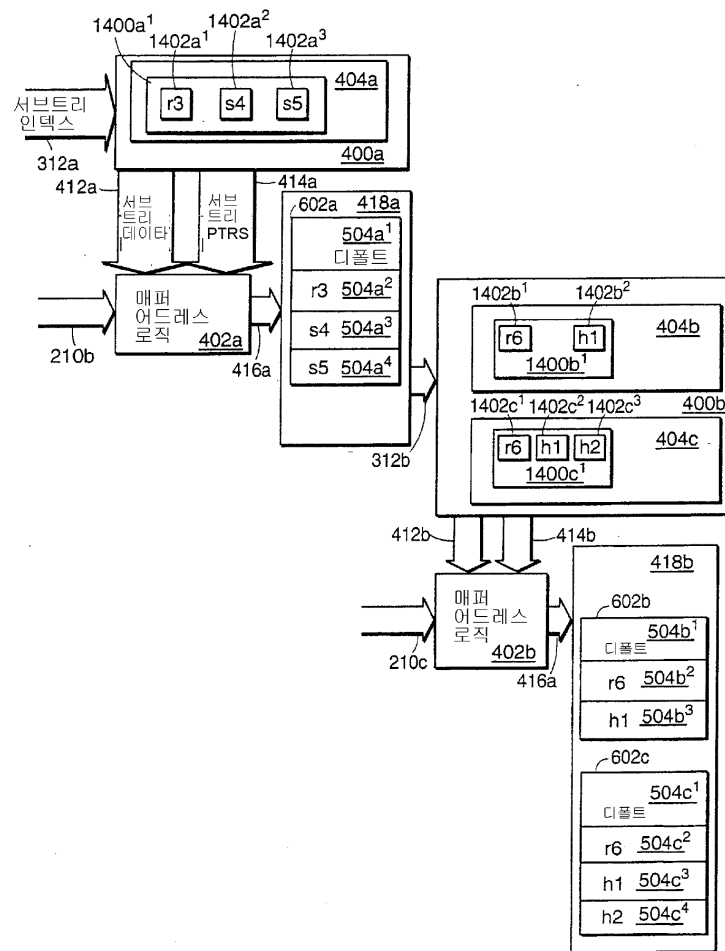
23



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