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(12) (B1)

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(30) 157944/1993 1993 06 03 (JP)

(73) ,
94

(72) 94 ,
94 ,
94 ,

(74)
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(54)

, .
(1) (4) (2A, 2B)
(2A, 2B) (1) ,
(4) (2A) (1) (2
B)
(2A 2B) .

$$[\quad]$$
$$[\quad]$$

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11 D

12 2 가 .

13 2 가 .

14 AMI .

15 2 가 .

16 2 가 .

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21			(A B)	1	.
22			(A B)	2	.
23	21	22	(A)		.
24	21	22	(A)		.
25	21	22	(B)		.
26	21	22	(B)		.
27	21	22			.
28					.
29		가			.

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1 : (PBX) 11 :

13 : 14 :

15 : 16 :

17 : 18 :

19 : 2A :

2B : 3 :

4 : 6 :

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가

$$\begin{bmatrix} & 1 \end{bmatrix}$$

1, PBX(1) (15) (15) (13) (14), 64Kbps
(4)가 (15), (13) (14) (2A, 2B)(3)
(LIN)(11) (5) (COT)(18)가

(16) PBX(1) (17) (15), (11) (18)
(16) (16), (17), (15), (11) (18) (19)

$(2A) \quad (2B) \quad 2 \quad (4) \quad ,$
 $(11) \quad 2 \quad \text{가} \quad . \quad , \quad (2A)$
 $(2B) \quad .$

2 (11) (2A, 2B) , ,
(bearer rate) 512Kpbs , 64Kpbs ()
, B 2 , 16Kpbs D 2B+D
(B1+B2+D) , 144Kpbs , 125μs,
AMI , ,

3 (11) (2A, 2B) ,
4 (2) (501) , B1 (8) (502) , B2 (8) (503) ,
「0」 MF ((504) , D (2) (505) (1) .

5 1 (11) (11)
(207) (207) (210 211) (206) , (206)
(216 217) (205) , (201 202) , (201 202)
(205) (204) (215) , (203) .

(207) PBX(1) (16) (214) ,
(210) (211) (206) (16) D 16Kpbs
(206) 16Kpbs D (16)

(206) 512Kpbs 2 ,
144Kpbs(2B+2D) , PBX(1) (14) (212)
(B1, B2) , (207) (210) (D)
「0」 3 , (216) (217) 「1」 가
(217) , (220) (216)
(213) PBX(1) (13) (B1, B2)
(211) 16Kpbs (207) (D)

(205) (206) (204)
, (218) (219) (204) , AMI
(4) .

, (201 202) (4) ,
(2A, 2B) (203) (- 24V) ,
(215) (4) (204) 가 .

6 (2A, 2B) (2A, 2B) (72
0) (721) , (720) (721)가 (codec) (719) , (719) (717 7
18) (716) (716) (712, 713, 714 715)
(711) (711) (709, 710 733) (708) ,
(708) (706 707) (705) (705)
(738 739) , (711) (732)
(704) (701 702) (704) (701 702)
(703) (C1) (722) DC - DC (723) (724) (729) (7
30) , LED (731) (719), (716), (724), (729), (730) LED
(731) (711) (725 726) (750)

(701, 702) (4) PBX(1) (11) ,

(719) (717) , PCM 64Kpbs 8
 (720) (721) (720) (750) ()
 PCM , PCM 64Kpbs 8 (718)

11) (716) (711) B1 (713) (718) , (7
 (715) (718) (712) (717) 가, (711) B2 (714) (717)
 가 (750) (727)

(750) 가 D (725) ,
 (729), LED (731) (719) (750) (724)
 (716) , (711) B1 (713) , (718)
 (711) B2 (711) B1 (712) (717) 가
 (714) (717) (715) (718) , (711) B2
 (730) 16Kpbs
 2 (726) PBX(1)

(711) 512Kpbs 2 ,
 144Kpbs(2B+D) B2 (726) (713) B1 (715)
 10) , (709, 710) (D 가 「0」) (709) (7
 , 「1」 가 , (709) (710) (705)
 (704) AMI (708) (706, 707) (703) (70
 1,702) (4) (11)

8 (711) (704) (732) (11) AMI
 8 (712) 64Kpbs , B2 D , B1 B2
 (714) 64Kpbs , , D 2
 (725)

(705) (708) (704) (704)
 , (738) (739) AMI
 (4)

, (703),
(4),

(722) DC - DC (723) (4) +5V DC - DC (723)

(704) (708) (711) PBX(1) (11) (705),

(C1) (704) (4)

(11) (2A 2B)

7 (11) (2A 2B) (2A)
(2B), 7

7 (14) (212) (212) B1
(312) B2 가 (207) (D))
(210) (206) B1 , B2 D
3 (308) (4)

01) (2A 2B) (711) (3) (4) (302) , B1
B1 (712) (322) B2
B2 (714) (323) , D (725)
(324)

3 (2A 2B) (711) (713) B1 (325),
(715) B2 (326), (726) D (327)
(310) (4)

(11) (206) (310) (4)
(311) , B1 B2
(213) B1 (316) B2 (317) (13)
, D (211) (318) (207)

(11) (301, 308) (303)
(2A 2B) (302, 309) ,
(305, 310) (322) (306, 311)

(2A 2B) (302, 309) (304)
(305, 310) , FSYNC (11)
(2A 2B)

, (2A) (2B) (4) .

8 (2A) (2B) 8 ,
 (2A 2B) 6 ,
 (2A) 「A」 (2B) 「B」
 . , 8 (2A 2B)

8 , (4) (41) (2A) (701A) (2B)
 (701B)가 (4) (42) (2A)
 (702A) (2B) (702B)가 .

(2A) , (724A) , (750A) 「1」
 , (2A) B1 , (716A) ,
 (711A) B1 (712A) (719) (717A) ,
 (711A) B1 (713A) (719A) (718A)
 . , , (716A) , B2 (715A) (716A) 「1」

, (2B) , (724B) , , (750B) 「
 0」 (2B) B2 , (716B)
 , (711B) B2 (714B) (719B) (717B)
 , (711B) B2 (715B) (719B) (718
 B) . , , (716B) , B1 (713B) 「1」

9 (4) (2A 2B) ,
 PBX (11)가 (2A) D ,
 (2A)가 D , 9 , PBX
 (11) (B01)가 , 가 (4) (B02)
 . , (B01) B1 (2A) D
 , B2 , (2A 2B)
 (B02) , 7 .

, 8 , (2A) (711A) (732A) (B02)
 , B1 B1 (712A) , D
 (750A) (750A) (2A)
 . , B2 (714A) (716A)
 (2B) (711B) (732B) (B02) , B2
 B2 (714B) , D (750B)
 (750B) (2A) . , B1
 (712B) , (716B) .

, B2 (2A) B1 (713A) 「1」
 (715A) 「1」 (B03)
 (4) (2B) , B2 (715B)
 가 「1」 B1 (713B) 「1」 (B04)
 (4) (4) (B03) (B04)가
 (가) (B05)가 , (B05)가 PBX (11)
 (11) 7

(11) (206) (B05) (4) ,
 (B05) , B1 B2 (213) , B1
 (316) B2 (317) (13) D (211)
 (318) (207) 125 μ s (4) (2A 2B)

, D 9 , PBX(1) (11)
 (2A) D , PBX(1) (11)
 (B01, B06, B11, B16) D (2A) 1
 52 1 (), 76 (2A)
 1 9.5mS

, (2A) 1 , PBX(1) D
 (2A) (B18, B23) D PBX(1)
 32 1 (), 16 , P
 BX(1) 1 , 1 2mS

PBX(1) (11) (2A) D
 (11)가 (2A) (B01) 64mS
 , PBX(1) (11) (2B) D

10 PBX(1) (11) (2B) 1
 0 , , PBX(1) (11) (2B) D
 , PBX(1) (11) (B31, B36, B41, B46) D
 (2B) (2A)
 77 , (2B) 1

, (2B) 1 , PBX(1) D
 (2A) (B19, B24) D PBX(1)
 (2A) , 16 , PB
 X(1) 1 , 1 2mS

, PBX(1) (11) (2B) D
 , (11)가 (2B) (B31) 64mS , ,
 PBX(1) (11) (2A) D , 11
 128mS 가 .

(2A)가 (2B)가 가 (4)
 12 13 (2A)가 (2B)가
 가 (4) , 12 (2A)가 D
 , 13 (2B)가 D

12, (a) (2A)가, (1201)
가 B1 (1202) 「1」 B2 (1203), MF (1204)
가 D (1205), (1206) (1207)
AMI (4)

(b) (2B)가 B1 (1212) 가 B2 (1213) MF (1211) 「1」
D (1215) (1216) (1214) 「1」
AMI (4) (1217)

, (4) AMI (1207) AMI (1217)가 가 (

 가), (c) AMI (1227)가 . ,

 (4) (1221) , (2A) 가 B1 (1222)

 (2B) 가 B2 (1223) , MF (1224) (2A)

 가 D (1225) , (1226) , 3

13, (2B)가 12, (2A 2B) D 가 「1」.

$$\begin{aligned} & \text{(2A)} \quad \text{AMI}_{t+2} = \alpha_0 + \alpha_1 \text{AMI}_t + \alpha_2 \text{「1」}_{t+2} + \alpha_3 \text{「0」}_{t+2} \\ & \text{(2B)} \quad \text{가}_{t+2} = \beta_0 + \beta_1 \text{가}_t + \beta_2 \text{「010011001」}_{t+2} + \beta_3 \text{「0」}_{t+2} \end{aligned}$$

15 16 , 15 가
15 , (a) (2A)가 , 가 「000101110111111111001
P」 (「P」) , (b) (a) AMI , (c)
(2B)가 , 가 「0011111111100101100011P」 , (d)
(c) AMI , (b) AMI , (d) AMI
(4) , (e) (1520) , 가

I 가 , (f) PBX(1) AM

16 PBX(1) AMI 16 , (a)
 (2A)가 , 가 「00010111011111111001P」 ,
 (b) (a) AMI . (c) (a) , (b)
 (1607) (1608) , (d) (2B)가
 , 가 「00111111110101100011P」 , (e) (d) A
 MI . (f) (d) , (e) (1617) (1618)

, (2A 2B) (c) (f) , (g)
 가 , (h) PBX(1) AMI

, AMI

17 6 가 (708) (8 (708A, 7
 08B) , 18 (708)

, (708) , (708)
 , 8 , (2A 2B)가 (4) ,
 (2B) (708B) , (2A)
 (724A) B1 , (2B) (724B) B2

, (708)

(711) (709, 710) AMI
 , AMI , (706, 707)
 (704) AMI , AMI , (705)
 (2B) (11) (703) (701, 702)

, 8 , (11)
 (701B, 702B) 가 (703B) (704B) , , (732B)
 (711B) (711B) ,
 (708B) (902) 「0」 D ()
 DFF(805) (822), DFF(806) (823), DFF(808) (825) DFF(809) (826)
 (905, 906, 910 911) 「0」 , 「0」 , 「0」 「1」
 , (11) (2A 2B) 가 , (2A)

(2B)

(801) (803) (732) 2.5V (732) AMI
(804) (732) 2.5V (732) AMI (802)

(732) 가 ((4) 가), , (732)가 (912)
2.5V (801) (820) (903) 「0」 , ,
(802) (821) (904) 「0」 . DFF(805, 806)
(ExOR) (807) (824) (907)
「0」 . DFF(808, 809)

(711B) (709) 1 (924)가 , D
FF(808) (824) 「0」 , DFF(808) (825)
(910) 「0」 , (924)가 NAND (811)
, NAND (811) (828) 「0」 (931) , NAND (814)
, NAND (814) NAND (813) (830)
(909) (710) 「1」 가 「1」 , NAN
D (814) (706) (933) 「1」 , , NAND
(810, 812 813) (827, 829 830) 「1」 , NAND (815) (707)
「0」 (706) 「1」 , (707) 「0」 , (705)
(704) 가 , (4) (937) 가

(2A) (4) (937) (2A 2B)
가 가

(937) (704) (732) (801) (820) (
913) , DFF(805) , DFF(805) (822) (918)
「1」 , (4) 가 DFF(805)
ExOR (807) (824) (919) 「1」 ,
(4) 가

(711B) (710) 2 (927)가 , DFF(809)
, (826) 「1」 , NAND (812) (829) (93
2)가 , NAND (815) (707) (935)가 , (706) 「
0」 , (707) 「1」 , (705) (704) 가
, (4) (938) 가 ,
, (2A) , (938) (2A 2B)가 가 가

, B1 . (2A) B1
 (4) (2A) (939, 940, 941)
 (801 802) (820 821) (914, 916, 915)
 (2A) B1 가 「11010101」 , 3,
 5, 7 가 「0」 .

ExOR (807) (824) (939, 940, 941) (920) 「1」 ,
 (921) 「0」 , (922) 「1」 ,
 (824) (4) DFF(805, 806)
 (922) 「1」 , DFF(805, 806) (4)

, (2B) B2 (4)
 (2B)가 B2 가 「11011010」 ,
 B2 3, 6, 8 가 「0」 , 가 3, 8 (709)
 (925, 926) , 6 (710) (928)
 (927) (710) , (925) (709)

, ExOR (807) (824) (922) 「1」
 (709) (925) , DFF(808) , DFF(808) (825) (
 929) 「1」 , 가 , NAND
 (810, 811, 812, 813, 814, 815) , NAND (815) (707) (936) .
 (706) 「0」 , (707) 「1」 , (705)
 (704) 가 (4) (942) 가

, (4) (942) (802) (821) (917) , ExOR (4)
 807) (824) (923) 「0」 , (824)
 (923) 「0」 ExOR (807) (824)
 , DFF(809) (826) (930) (928) , DFF(809)
 (710) (928) NAND (814) (934) , (706)
 「1」 , (707) 「0」 , (705) (704)
 가 , (4) (943) 가

, (2A 2B)가 (4) (2A 2B)
 (708) DFF(805, 806) , DFF(808, 8
 09), ExOR (807) NAND (810, 811, 812, 813, 814, 815)
 (2A 2B) 가 , B1

가 , B2 D , MF AMI AMI
(4) AMI (4)

(2A 2B) (4) , PBX1
(11) (11) (2A) B1 (11)
(2B) B2

, PBX(1) (11) (2A 2B) (4) 7
PBX(1) (2A 2B) (301) (2A
2B) PBX(1) (306)가

, 8 (4) (2A 2B) , ,
(2B) (711B)가 (2A)가 (306)가 , PBX(1)
(301) (301) (2B)가
가 가 (2B) (2A)가
(306) D 가

, (2A 2B) (750A 750B) , D 가 ,
(711A, 711B) , D

, 1 8

19 PBX(1)가 D (2A 2B) 19
, (1900) (1901) (2A 2B) 가
(1902) (1903) (1904) ,
, (1905) , LED , LED (1906) ,
LCD (1907) , 가 (1908) , BCC B
CC (1909) , (1900) 152 (= 8byte x 19)

20 (2A 2B)가 D PBX(1) 20
, (2000) (2004) (2001) ,
(2002) BCC BCC (2003) , (2000)
32 (= 8 byte x 4)

21 27 PBX(1) (11) (2A 2B) ,
(11) (2A 2B)

, (11) (S01), (2A 2B)가 (4) ,
(2A 2B) (S02, S03). , (2A) 8 ,
(724A) , B1 (716A)
(S04). , (2B) (724B) , B2
(716B)

, (11) (2A) (1900) (4) (S06),
(16) (S13).

, (2A) (1900) (S07), (1900) (1902)
(2A) (2A) (11) (2000) (S11), (11) (11)
(2000) (11) (190
0) (2B)) (S15), (1900) .

, (2B) (11)가 (2A) (1900)
(S08), (1900) (1902) (2A) (2A) (S
S10), (1900) (S12). , (2B) (S
18).

(11) (2A) (2000) (S14), (2000)
(S16), , (2B) (16) , (16)
(S23). (1900) (4) (S19), (16)

(2B) (1900) (S20), (1900) (1902)
(2B) (11) (2000) (S22), (S21). , (2B)
(2000) (11) (11) (1
900) (2A)) (S25), (1900)
(S29).

, (2A) S15 가 (11)가 S19 (20
00) . , (2A) S15 , 100mS ,
(S27), (S28).

, (11) (2B) (2000) (S24), (2000)
(S26), , (2A) (16) , (16)
6) (S34). (1900) (4) (S30), (1

(2A) (1900) (S31), (1900) (1902)
(2A) (11) (2000) (S33), (S32). , (2A)
(2000) (S36), (1900)
(S38).

, (2B) S25 가 , (11)가 S30
(2000) . , (2B) S30 , 100mS ,
(S39), (S40).

, (11) (2A) (2000) (S35), (2000)
(16) (16)
(S37), (2B) (1900) (4) (S41), ,

23 22 23 (A) (S06, S30) . 23
, , (S50), 가 (1900)
(2A) (S51). , 가 (S52),
(2A) . , (2A)
(729A) (721A) .

24 22 23 (A) (S14, S35) . 24
, , 가 가 (S60), , (S61).

25 22 23 (B) (S19, S41) . 25
, , B (S70), 가 , (1900)
(2B) (S71). , 가 , B (S72),
(2B) . , (2B)
(729B) (721B) .

26 22 23 (B) (S24) . 26
, 가 가 (S80), (B) (S81).

27 22 23 (S07, S08, S20, S31, S20)
. 27 , (11) , BCC (S90),
가 , (711A), (711B) , (S92).

PBX(1) (11) (2A 2B) .

, . 28 . PBX(1)
(2A 2B)가 . , PBX(1) (6) 1 ,
(6) (2A) m , (6) (2B)
n .

, (2A)가 (2B)가
, m n (m+n) 50m 가
. (708)가 ,
(2A) (2B) 가 ,
512Kbps 가 .

29 28
 29 , PBX(1) (6) (1) 가 20 (0.5Ø
 , 110m) (6) (2A) m (6)
 (2B) n 10m .
 가 , PBX 가 .

2 2
 2B+D , B1+B2+B3+D (3B
 +D), B1+B2+D1+D2 (2B+2D) 2B+2D , D
 가 , 가 .

가 , , , ,
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 가 .
 가 , 가 ,
 , 가 .

(57)

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5 , 1 , 1 , 1 가 , 1 .

7.

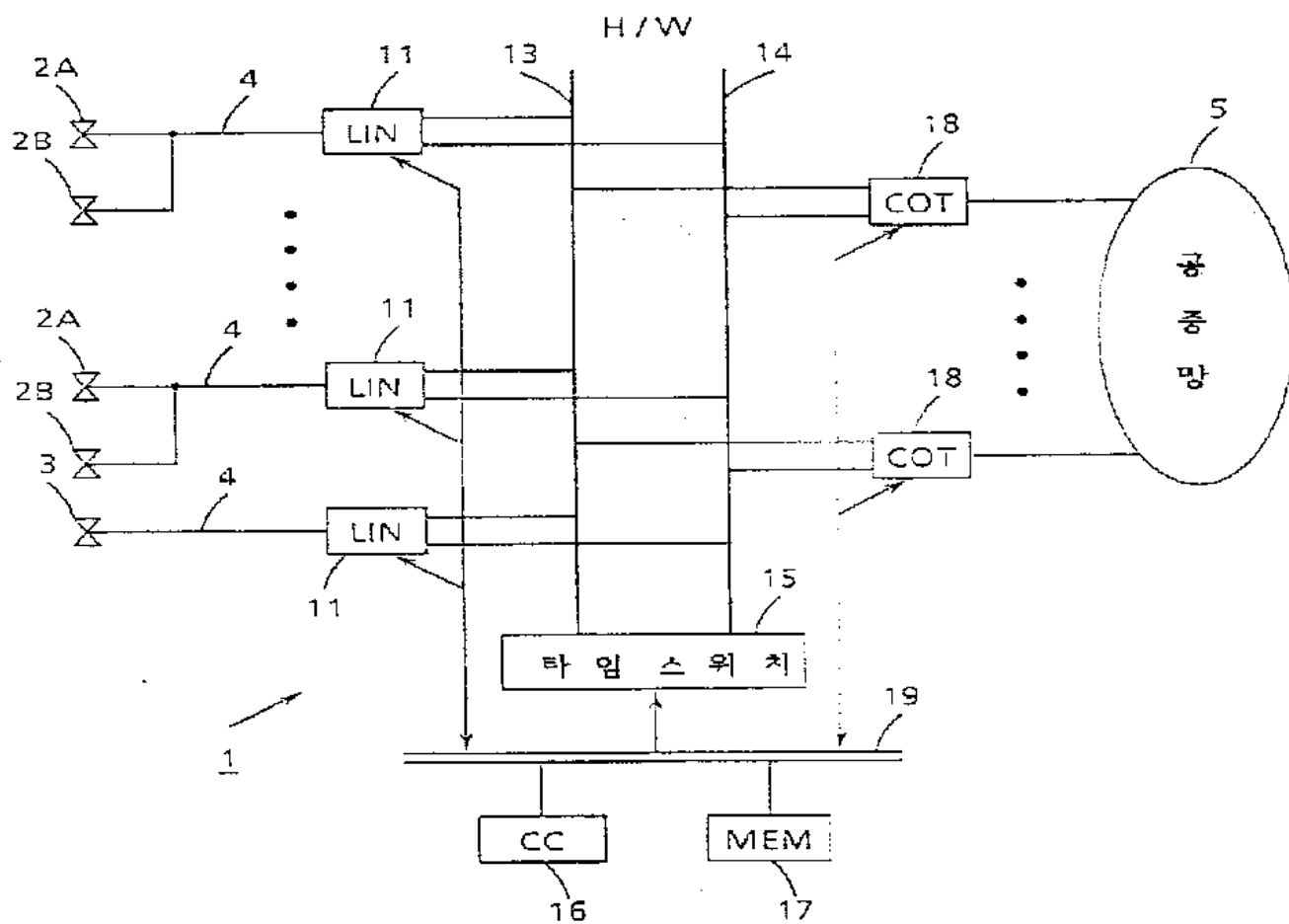
6 , 2 AMI , .

8.

6 , 1 가 , .

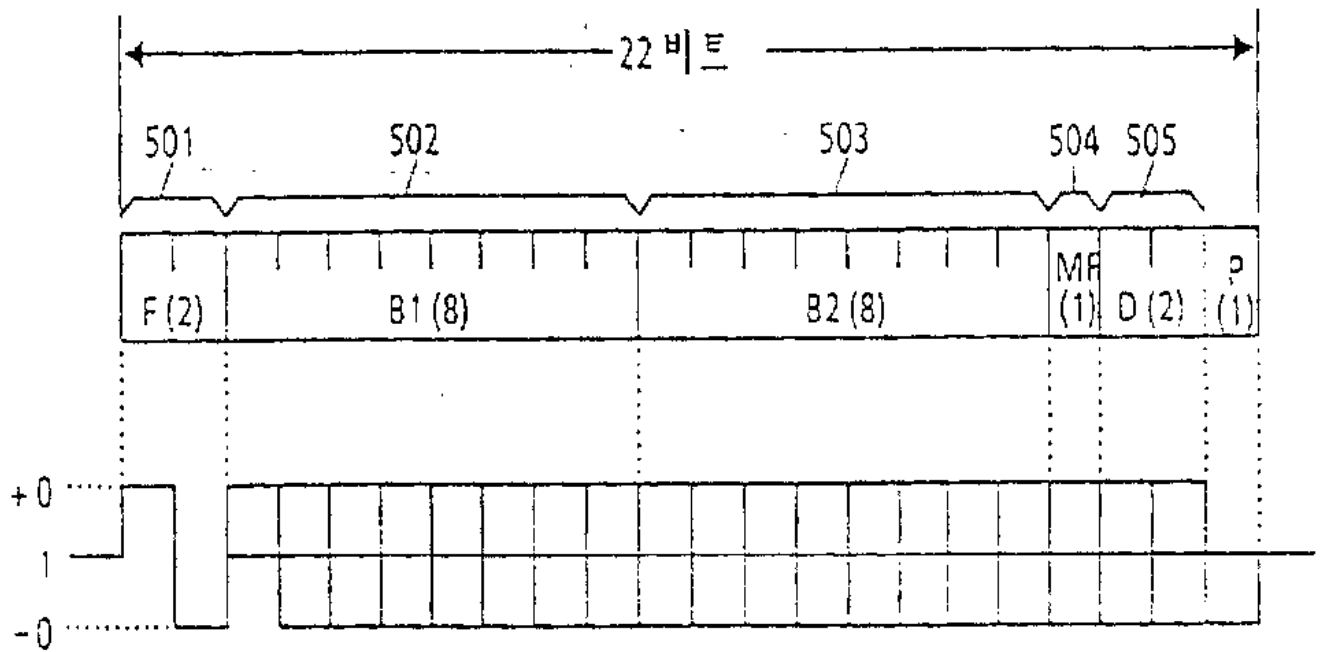
PBX

1



항 목	내 용	
전송 배어터속도	512 Kbps	
전 송 용 량	음성데이터채널	64Kbps x 2채널
	제어정보	16Kbps
버스트동기	125	
전송부호	AMI부호	
동기방식	스타트비트에 의한 조보동기	

3

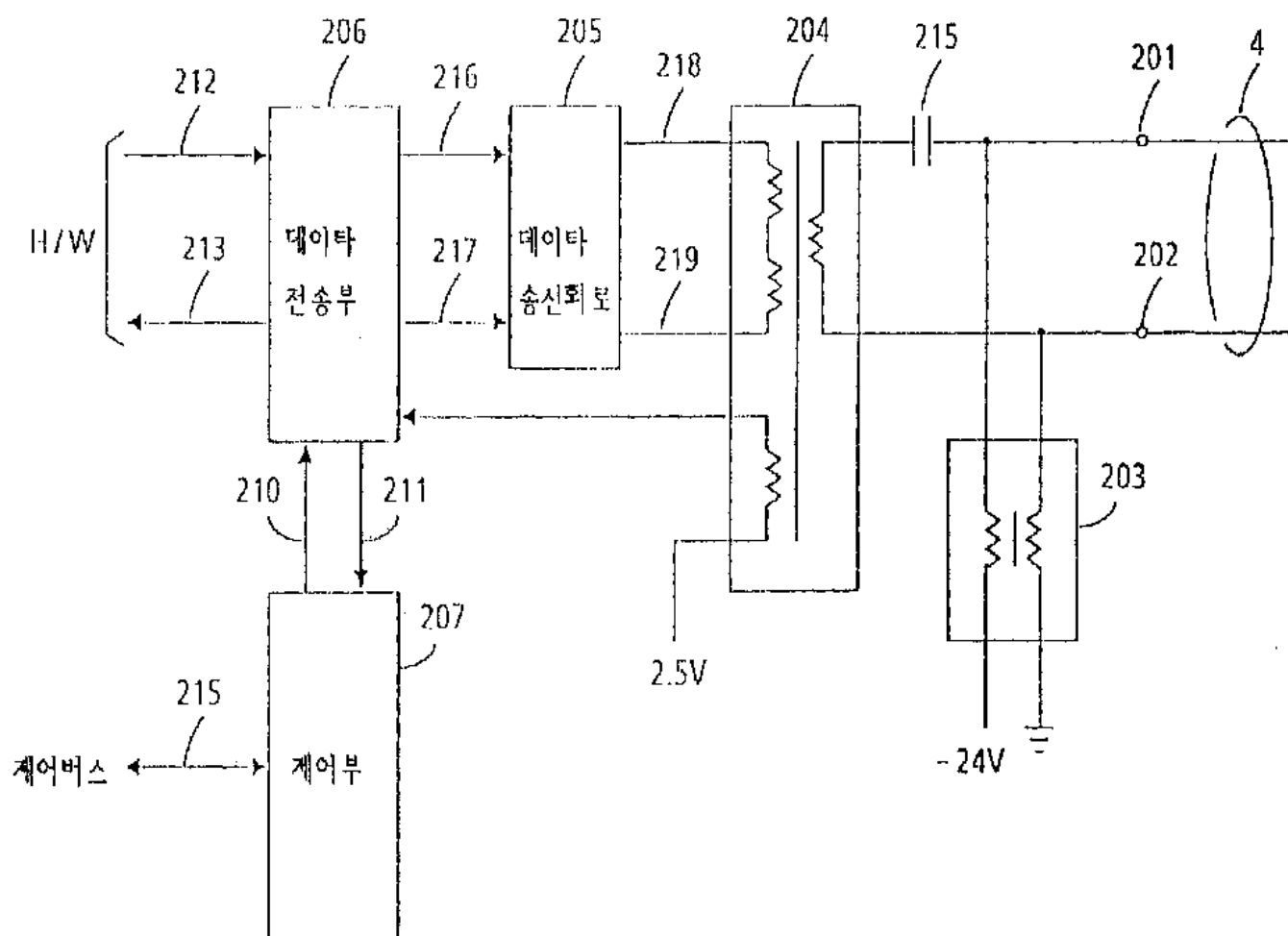


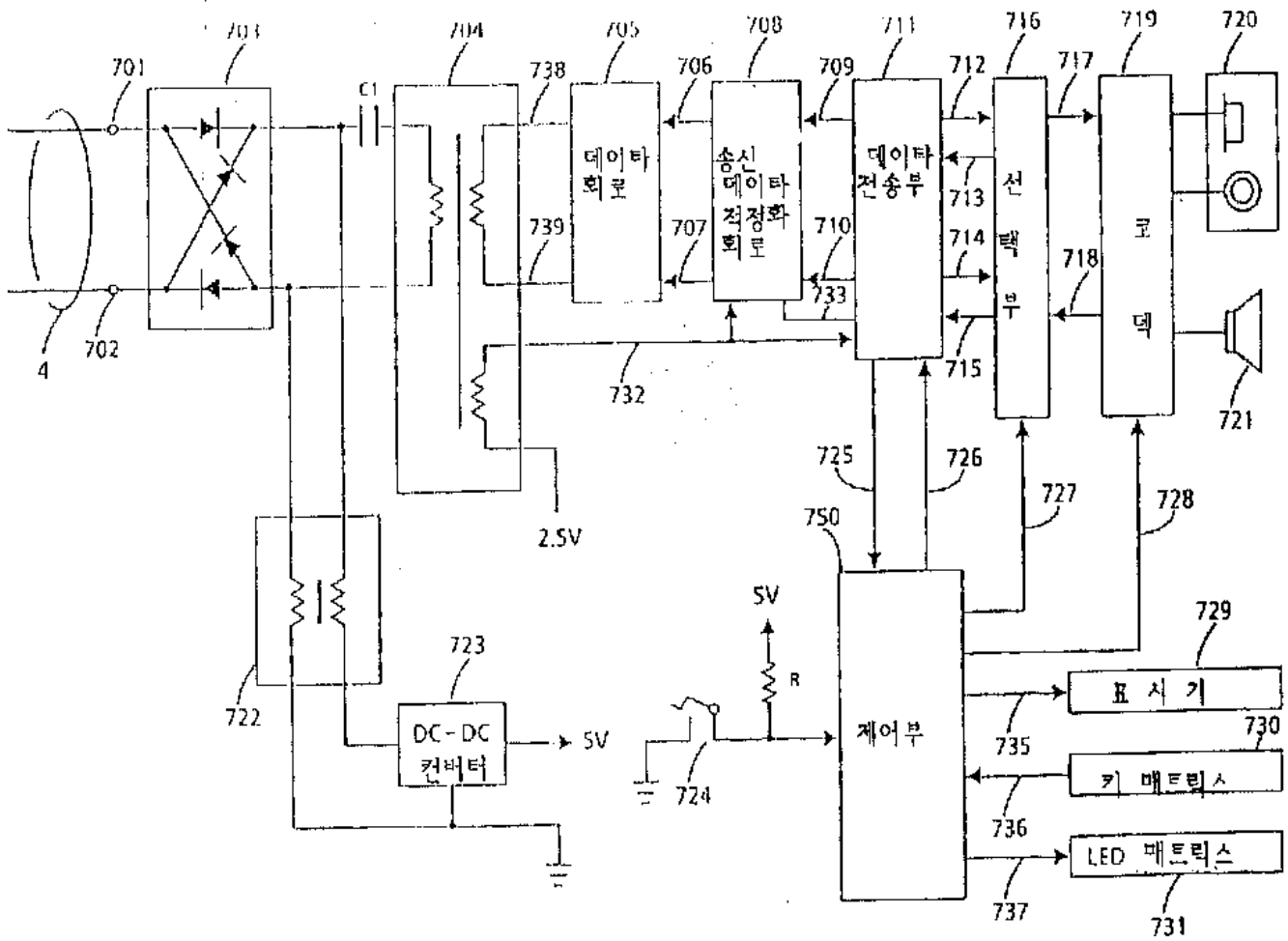
AMI 부호화

예(수신파형)

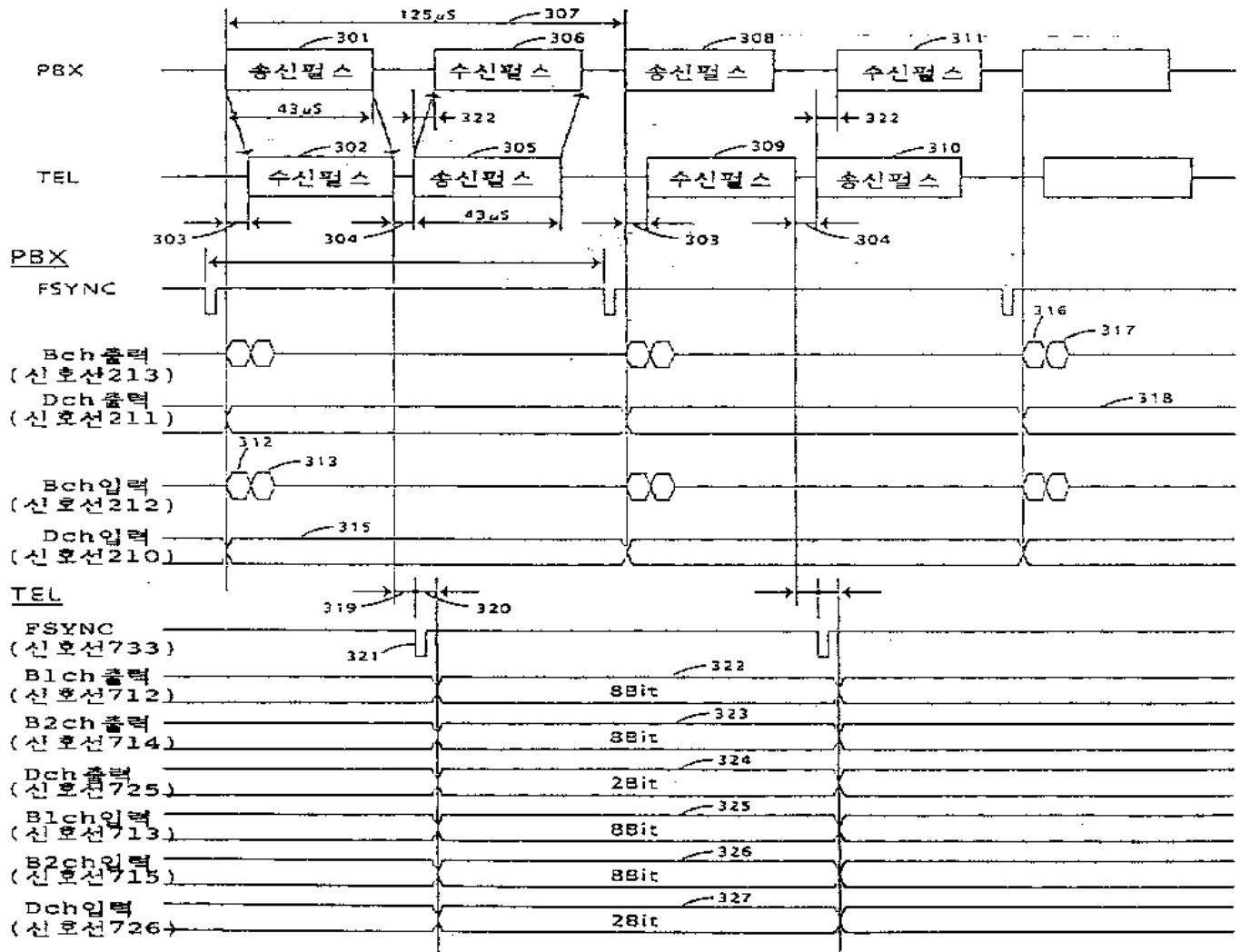
부 호	내 용	비 고
F	스타트비트(프레임도이)	상시 '00'
B1	B1 채널 (64Kbps)	{ 무통화시 all '1'
B2	B2 채널 (64Kbps)	
MF	MF비트	상시 '0'
D	D 채널데이터 (16Kbps)	
P	패리티 (우수)	직류성분제거

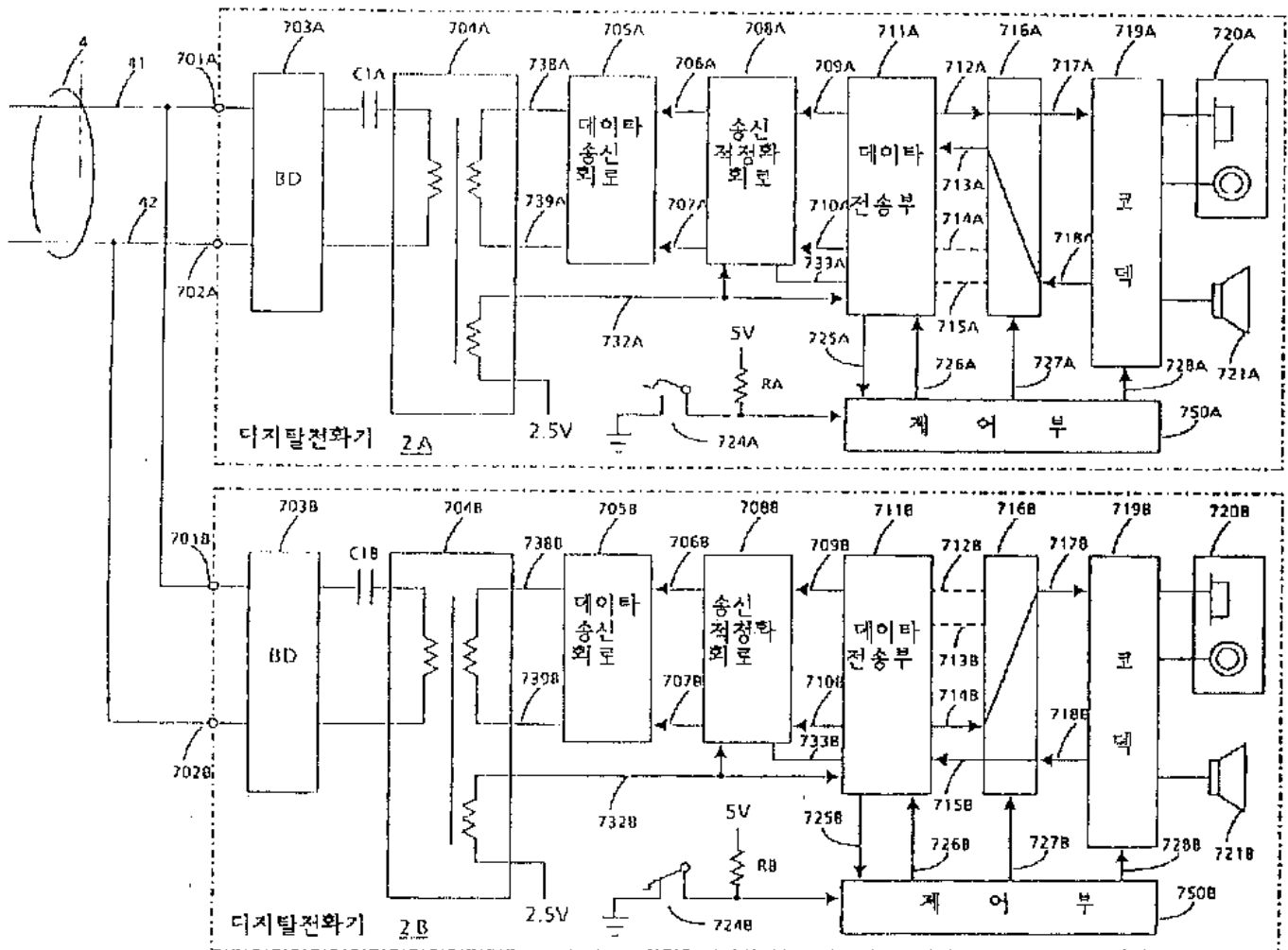
5

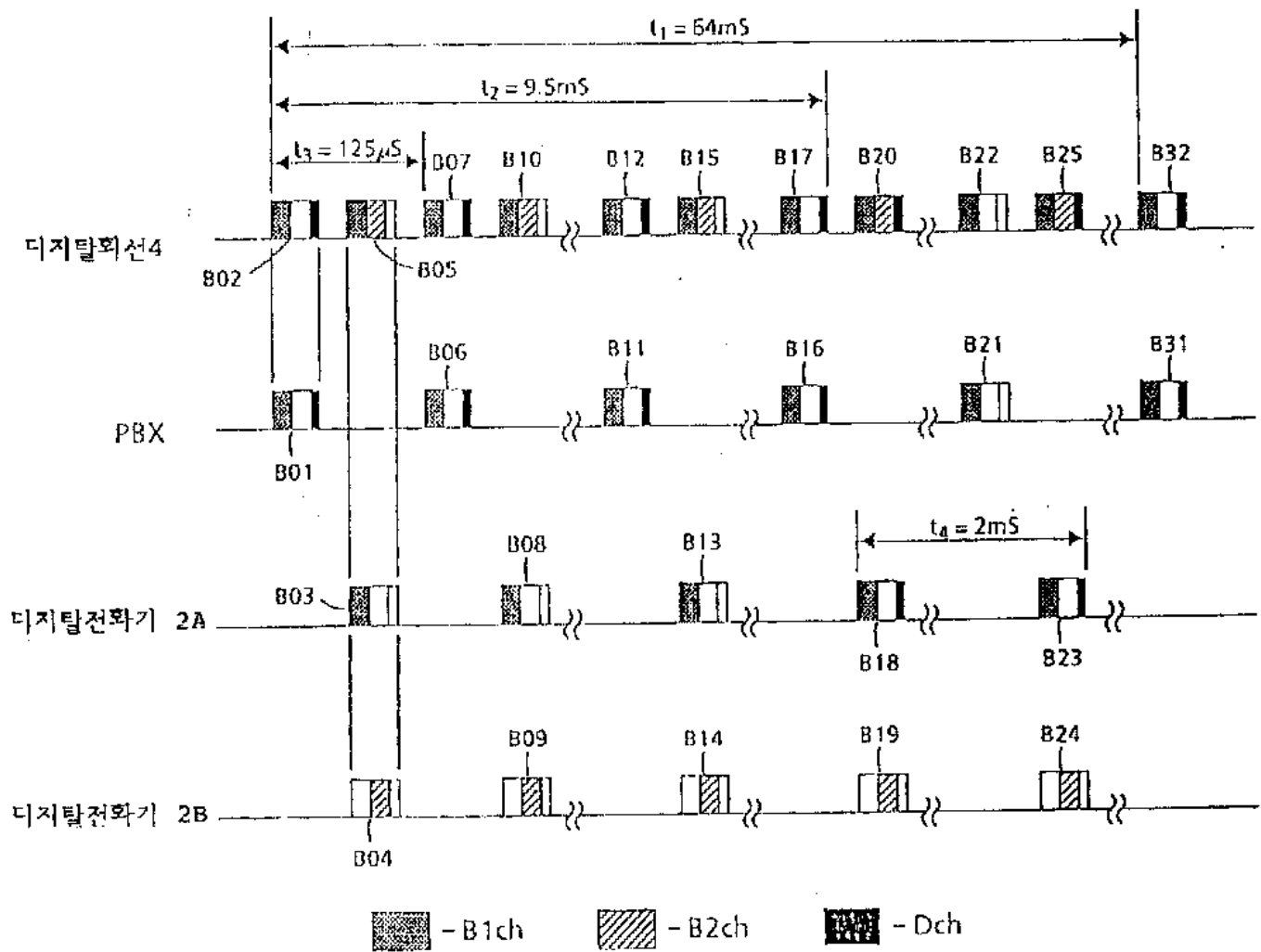




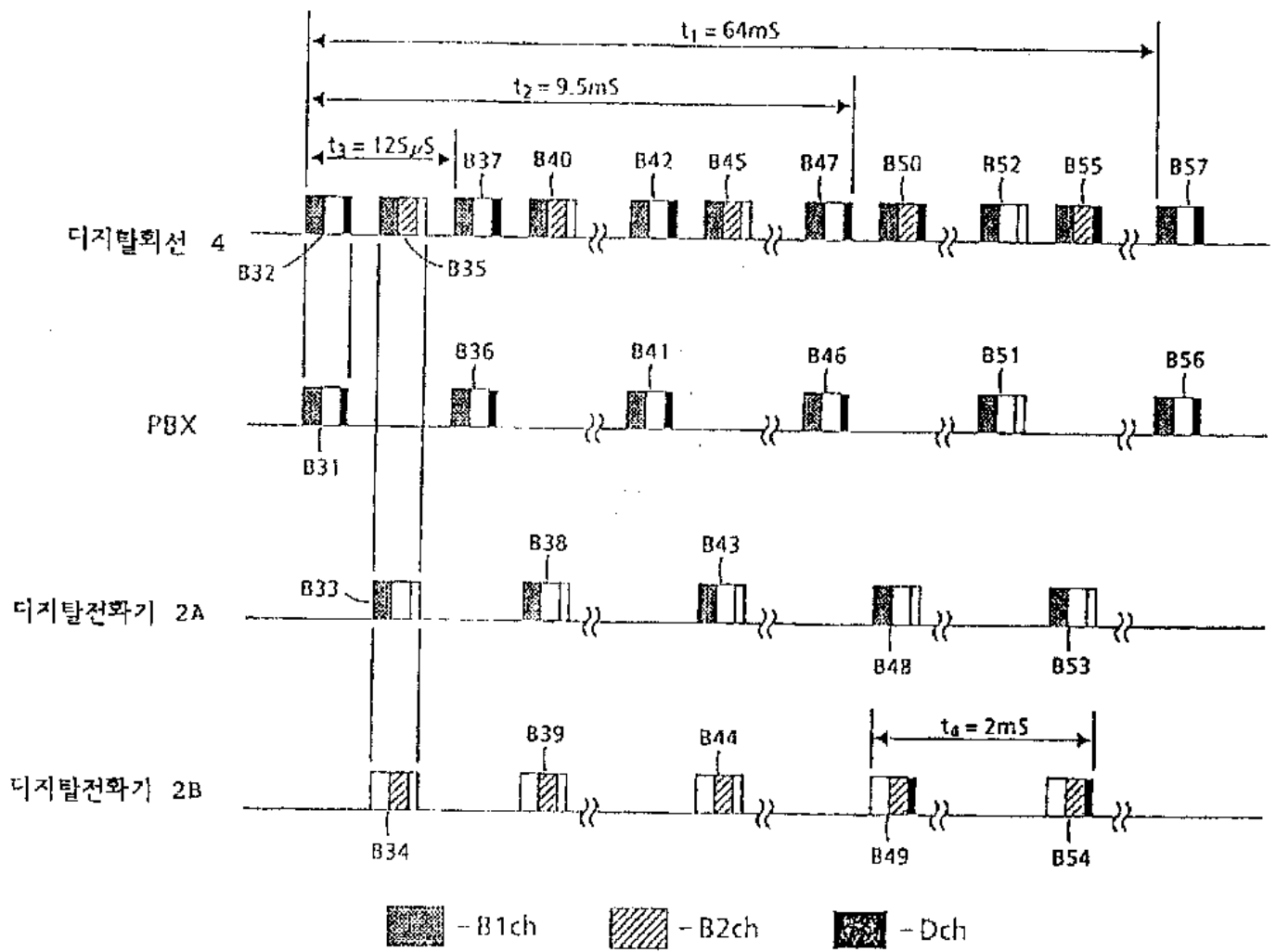
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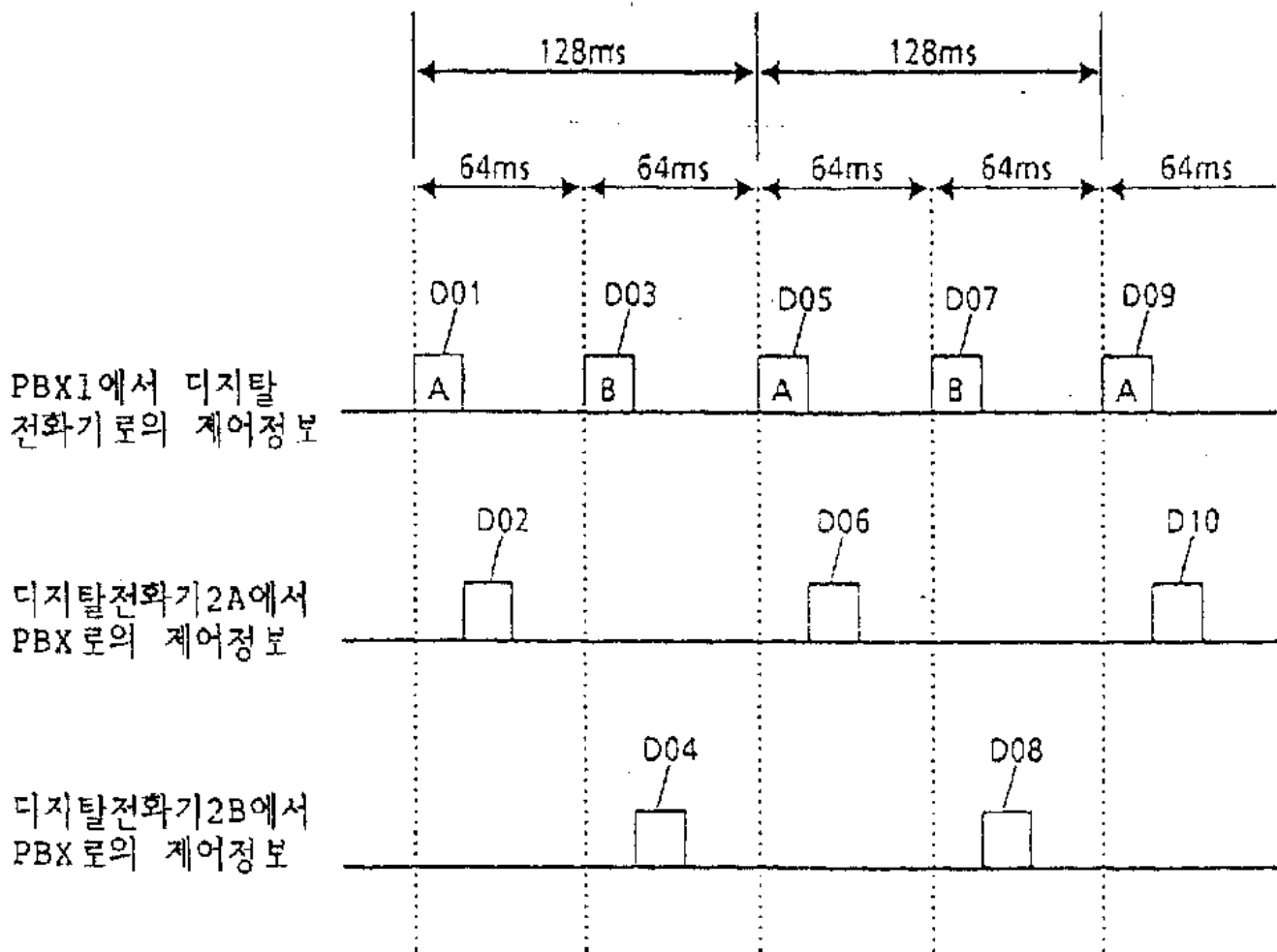






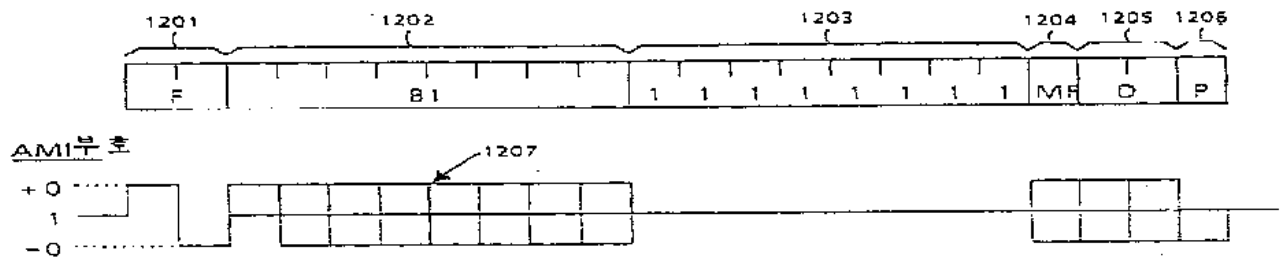
10



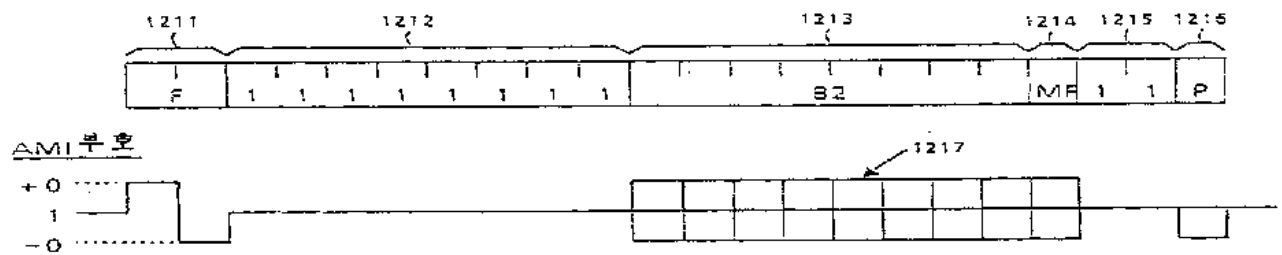


12

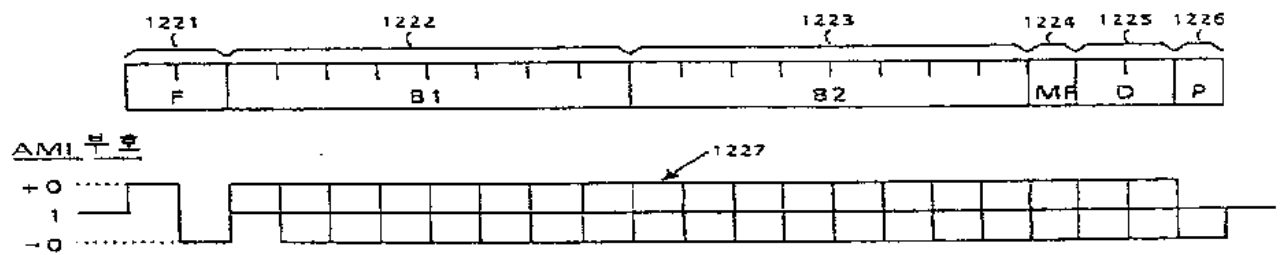
(a) 디지털전화기 2A의 송신 버스트신호



(b) 디지털전화기 2B의 송신 버스트신호

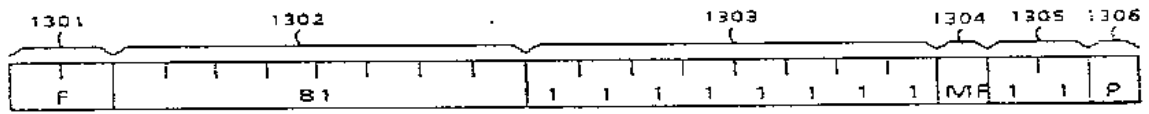


(c) 디지털회선4상의 버스트신호

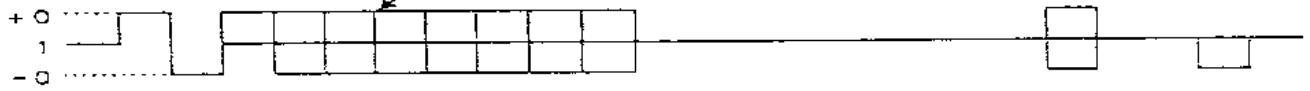


13

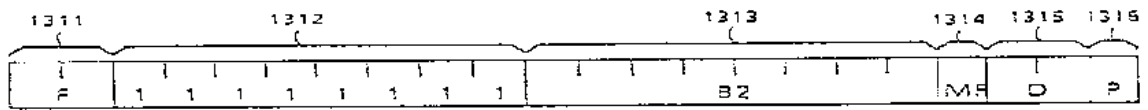
(a) 디지털전화기 2A의 송신 버스트 신호



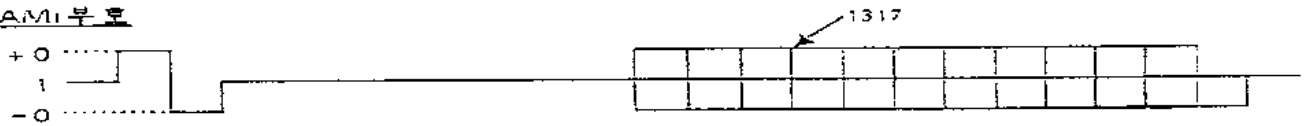
AMI 부호



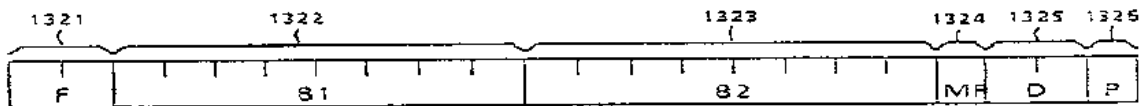
(b) 디지털전화기 2B의 송신 버스트 신호



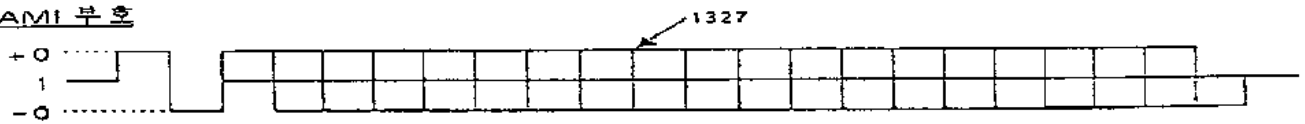
AMI 부호



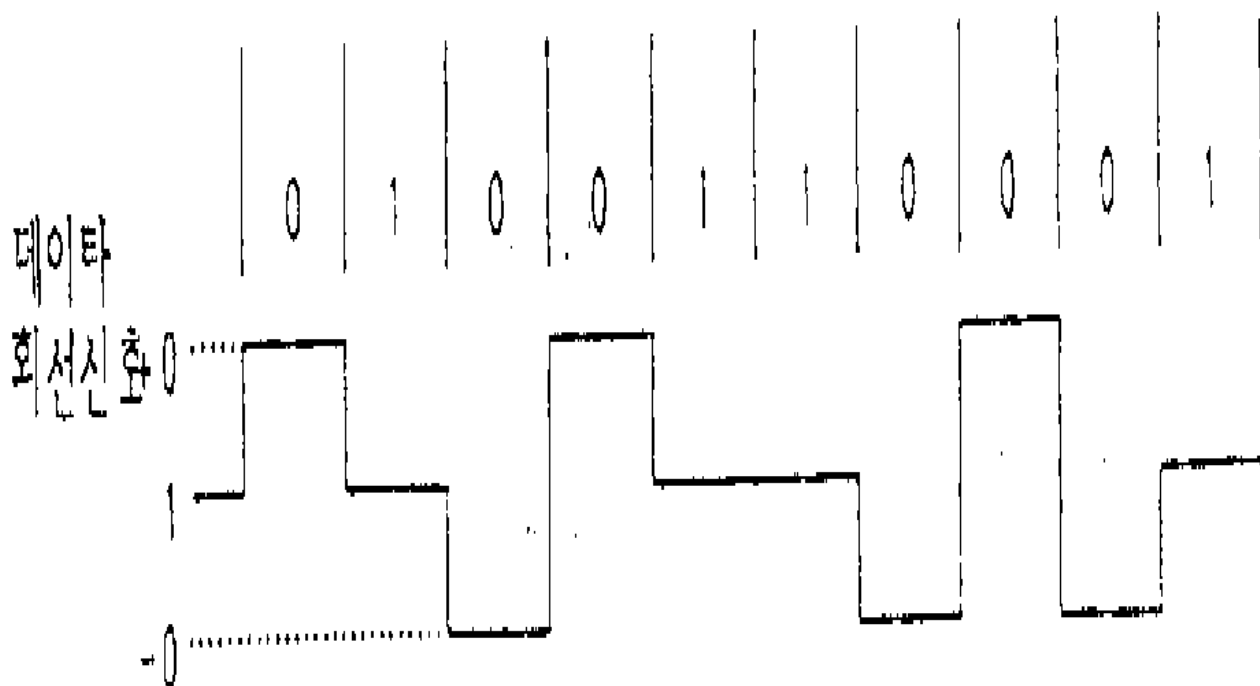
(c) 디지털회선4상의 버스트 신호



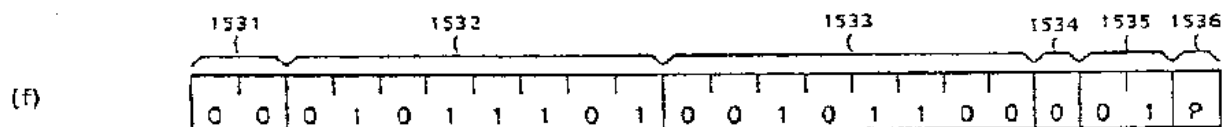
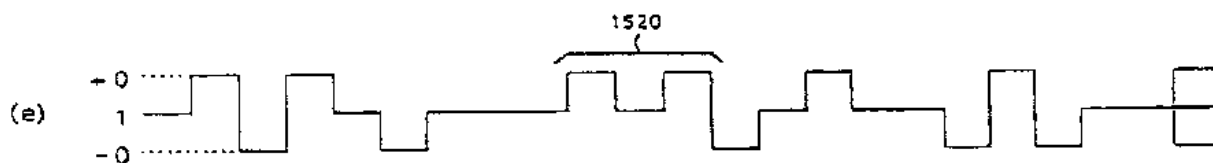
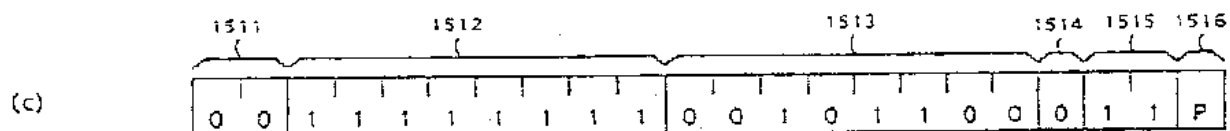
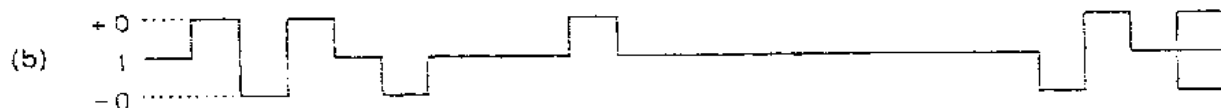
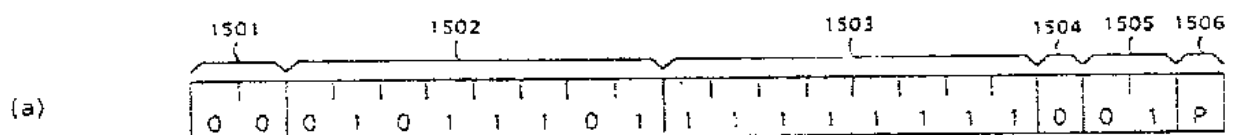
AMI 부호



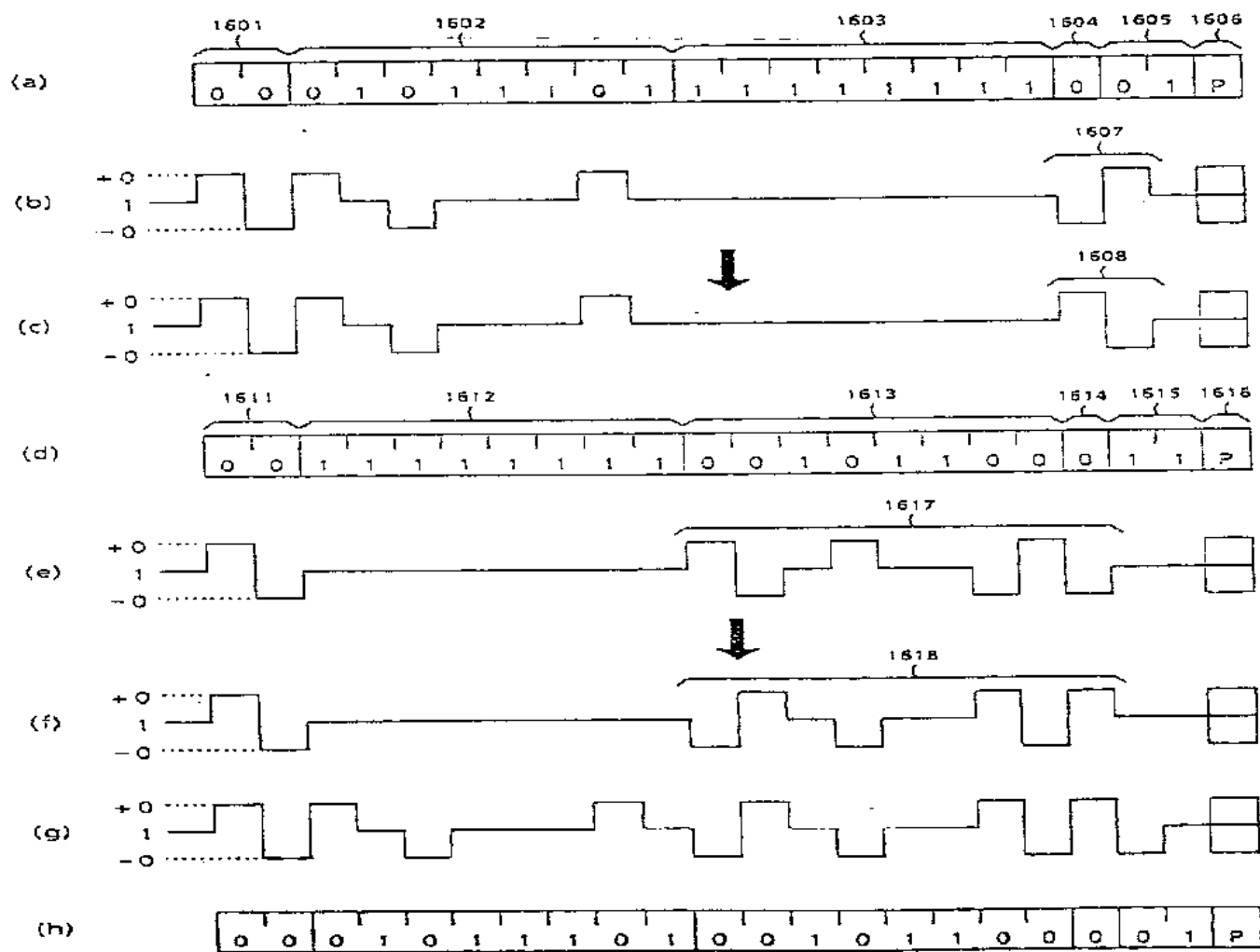
AM 부호



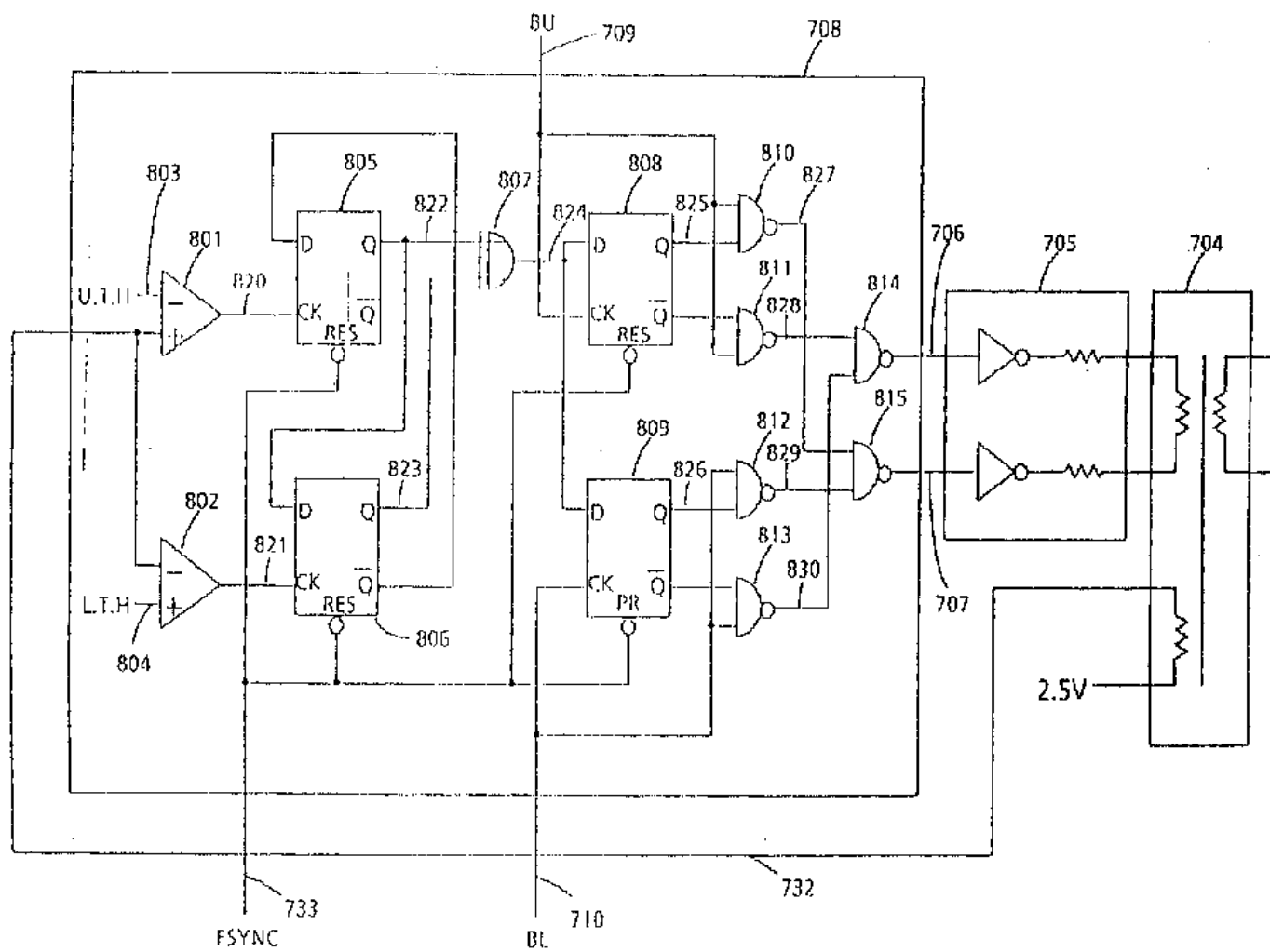
15

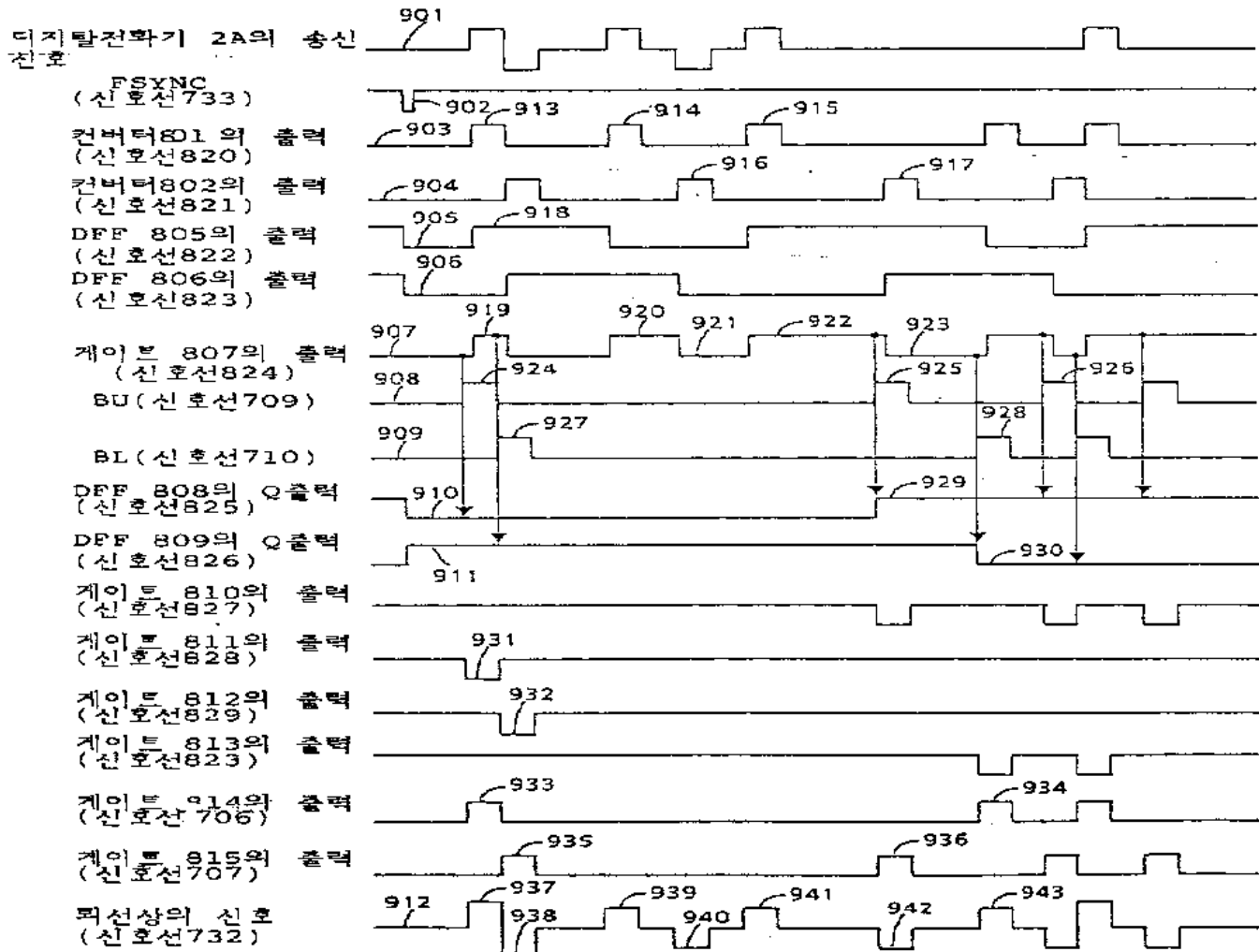


16



17



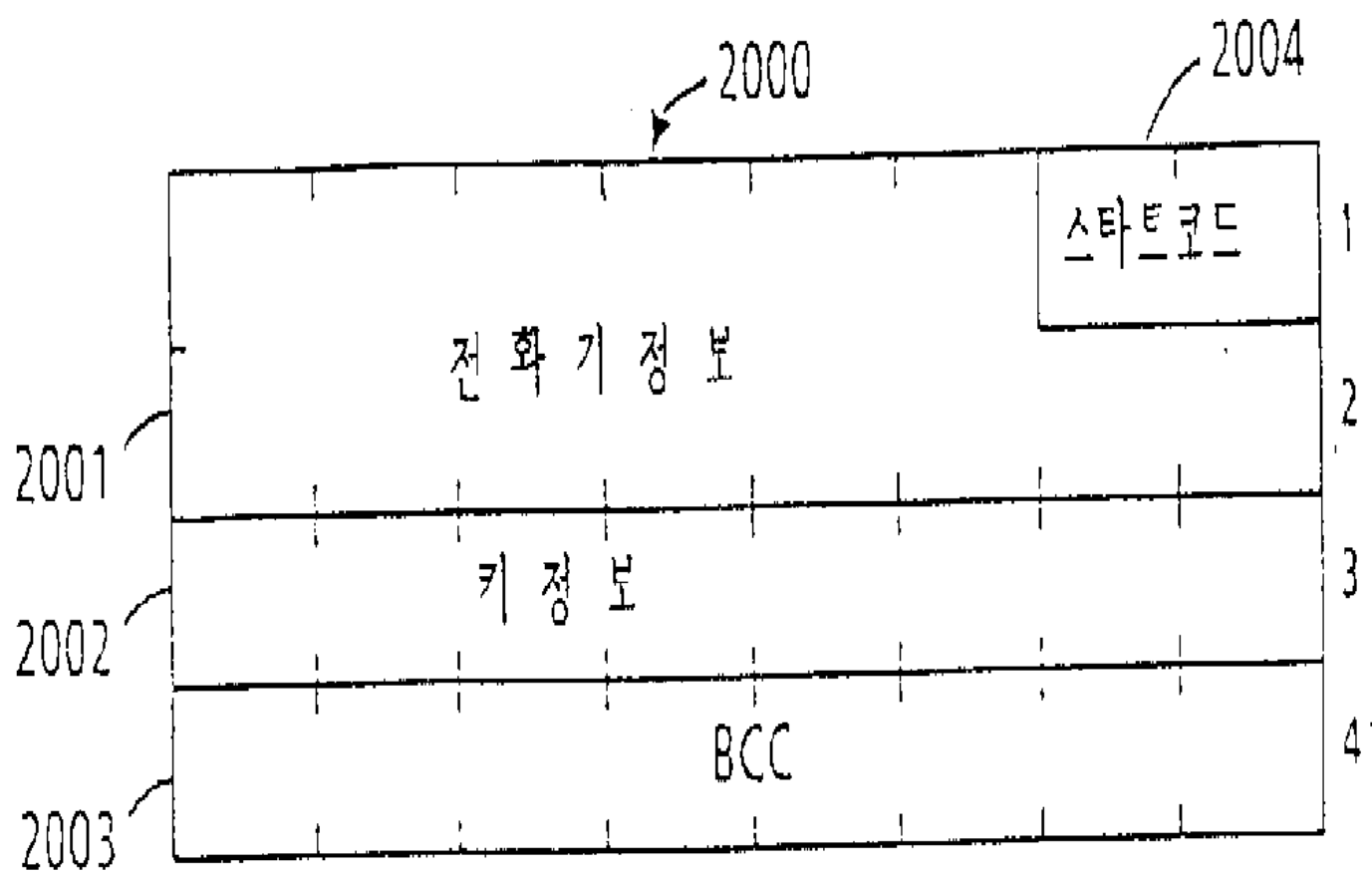


19

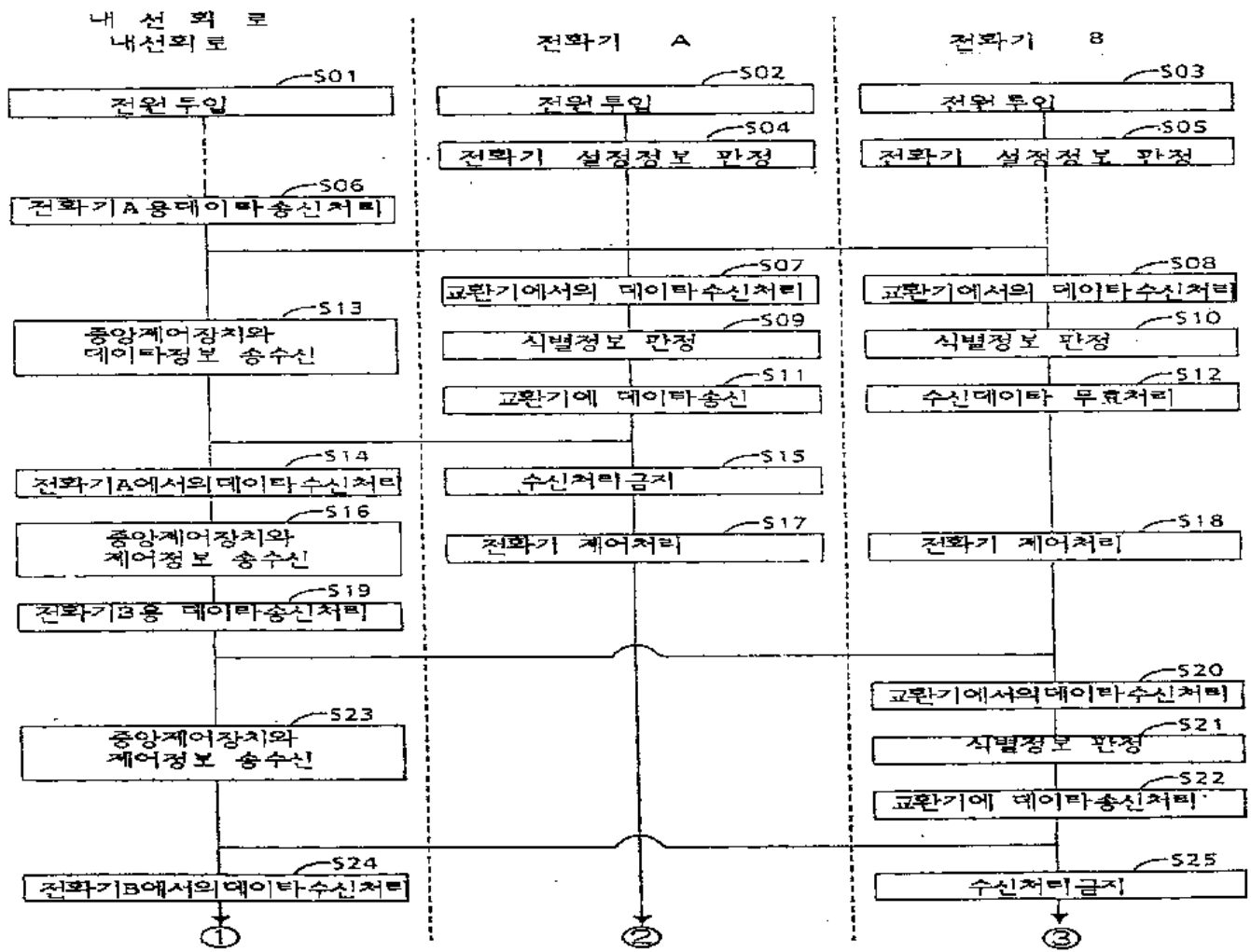
		1902	식별정보	1901	스타트코드	1
1903			통화정보			2
						3
1904			시계정보			4
						5
1905			신호기 정보			6
						7
1906			LED 정보			8
						9
						10
1907			LCD 정보			11
						12
						13
						14
						15
1908			부가정보			16
						17
1909			BCC			18
						19

1900

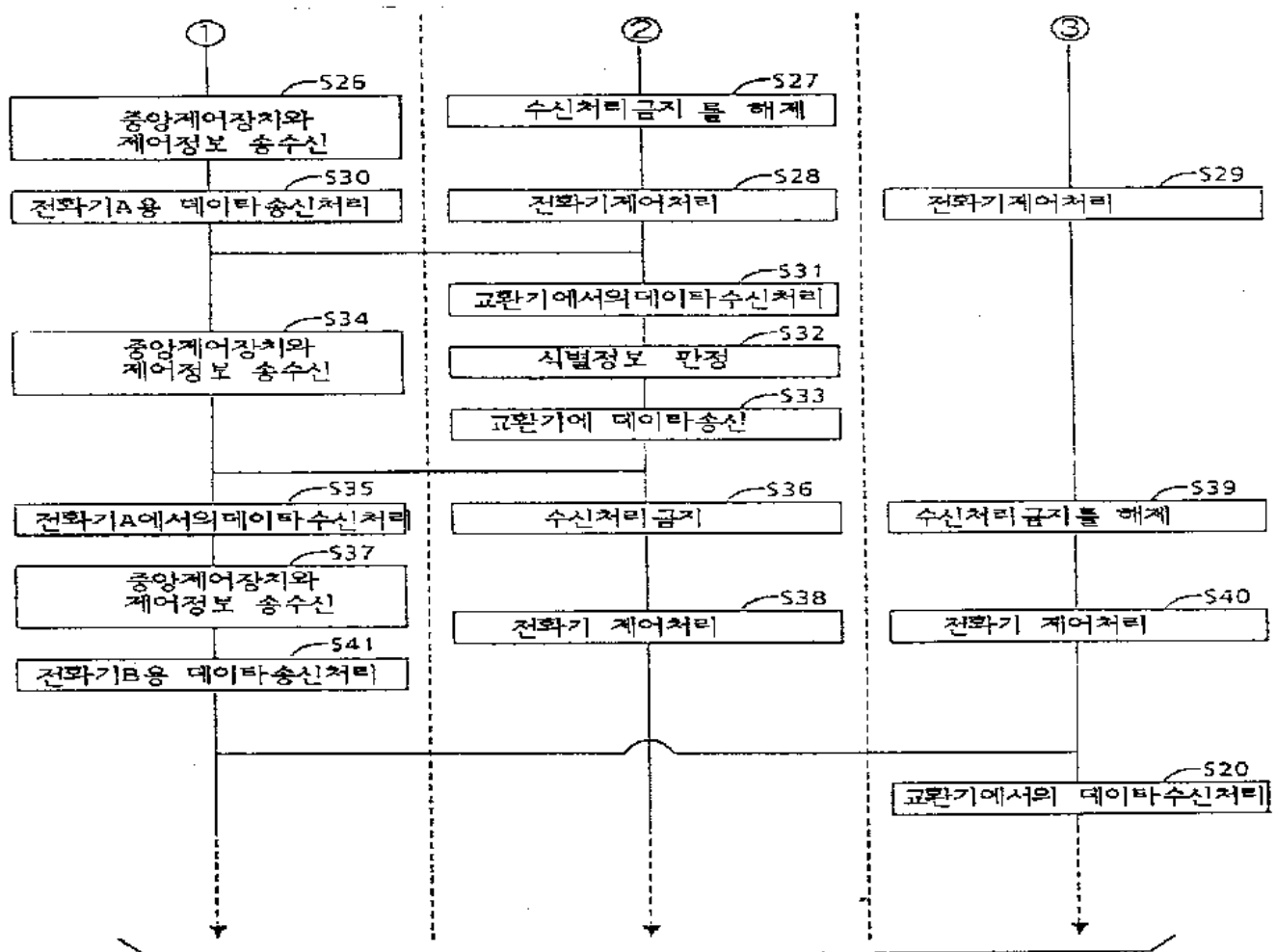
20



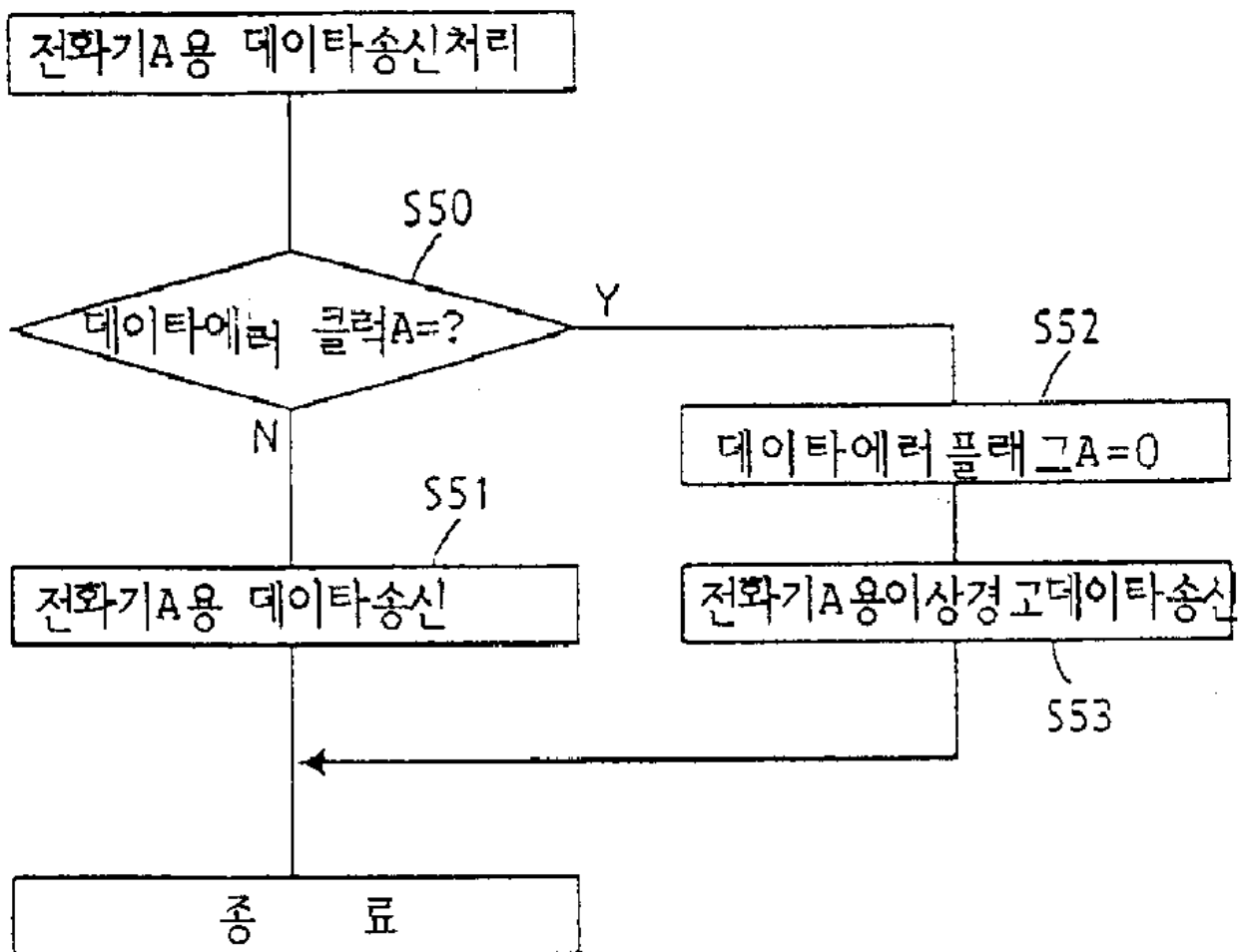
21

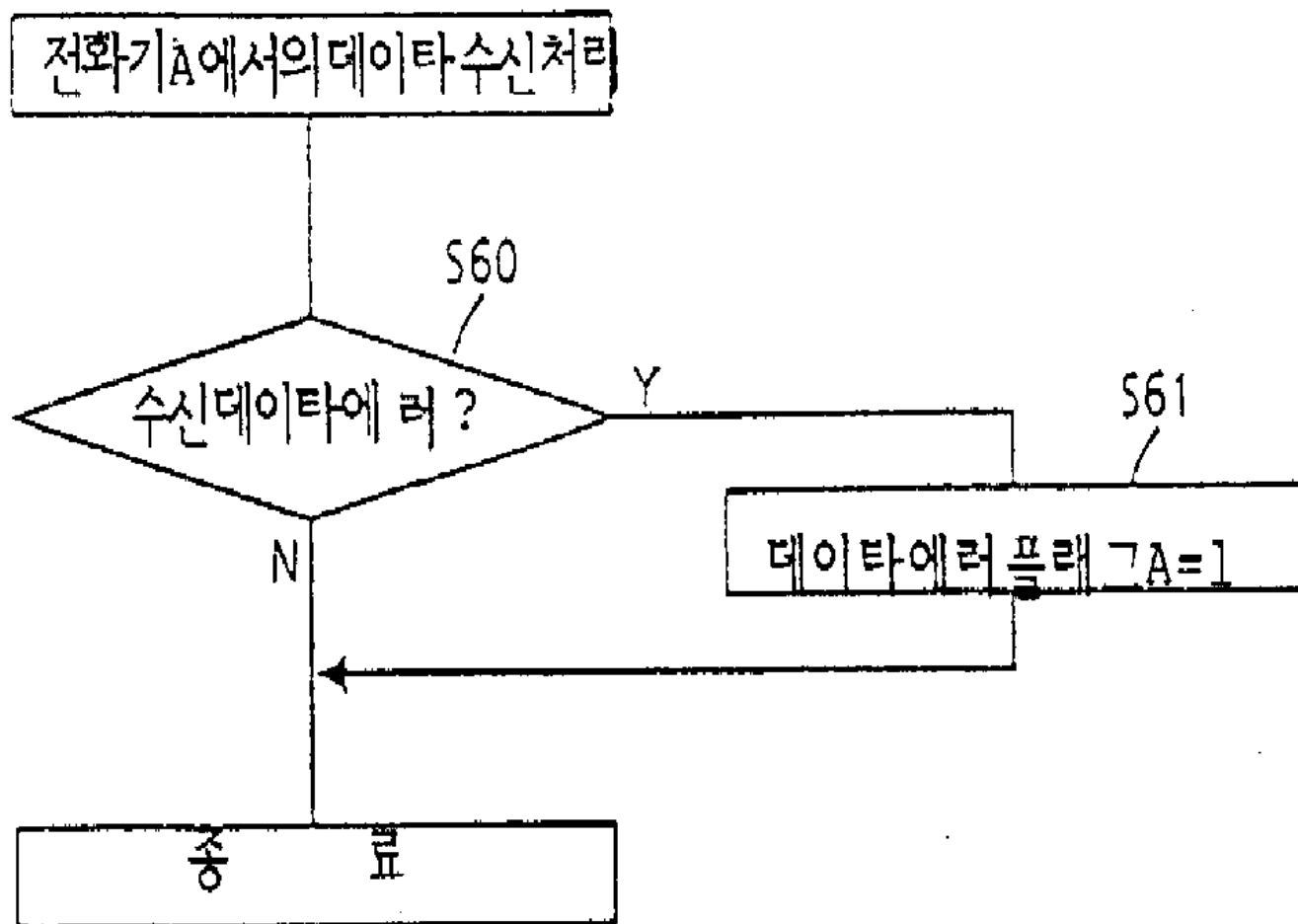


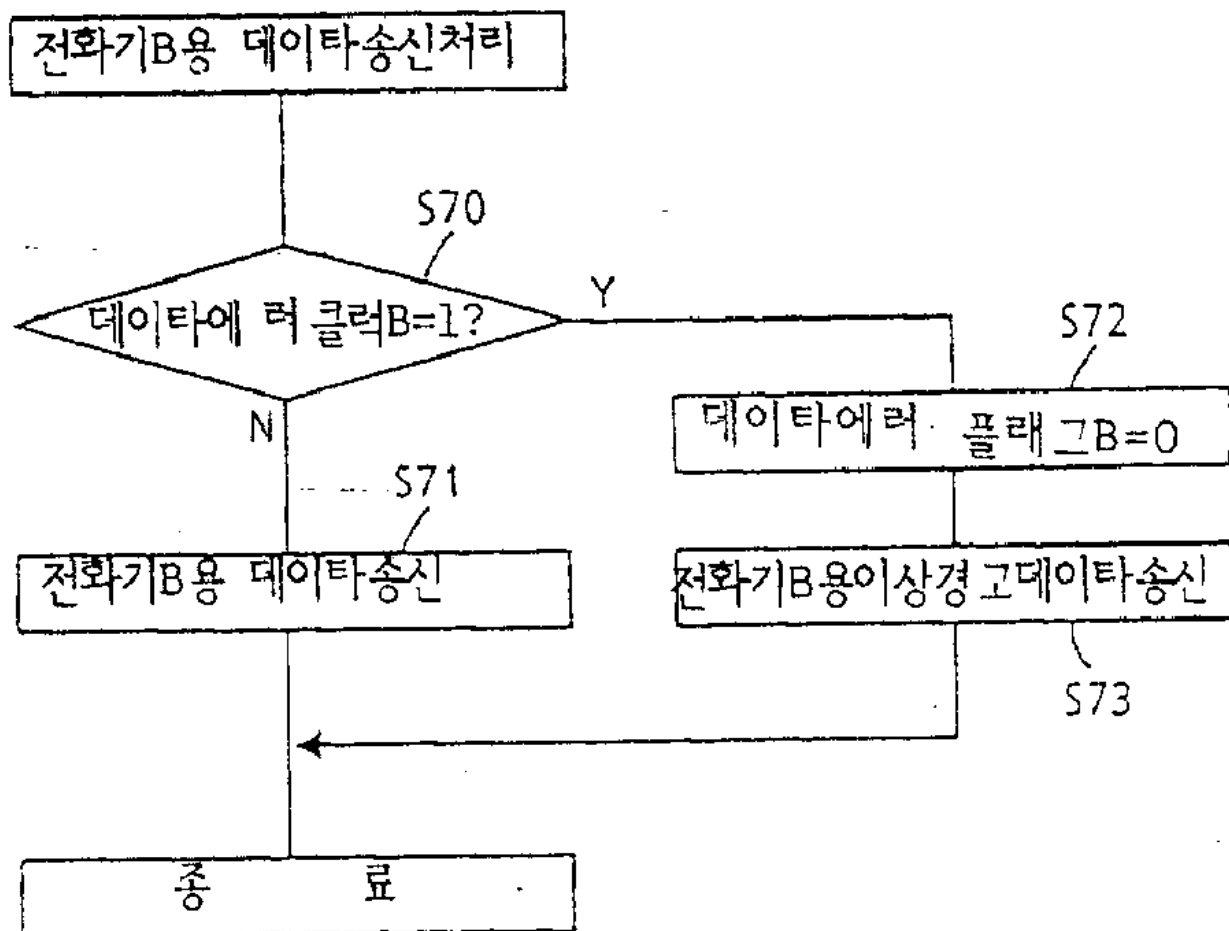
22

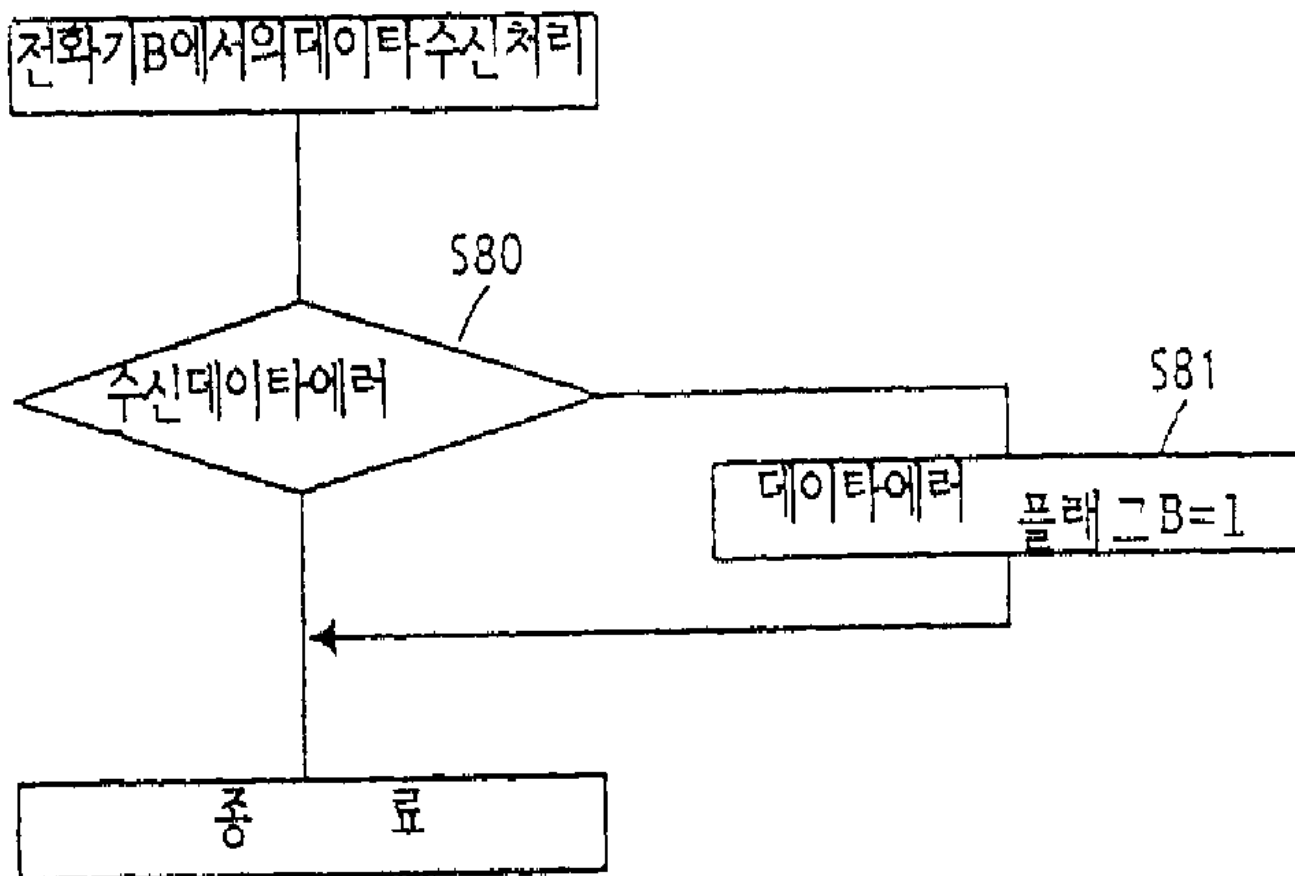


이하, 동일한 처리를 반복한다.

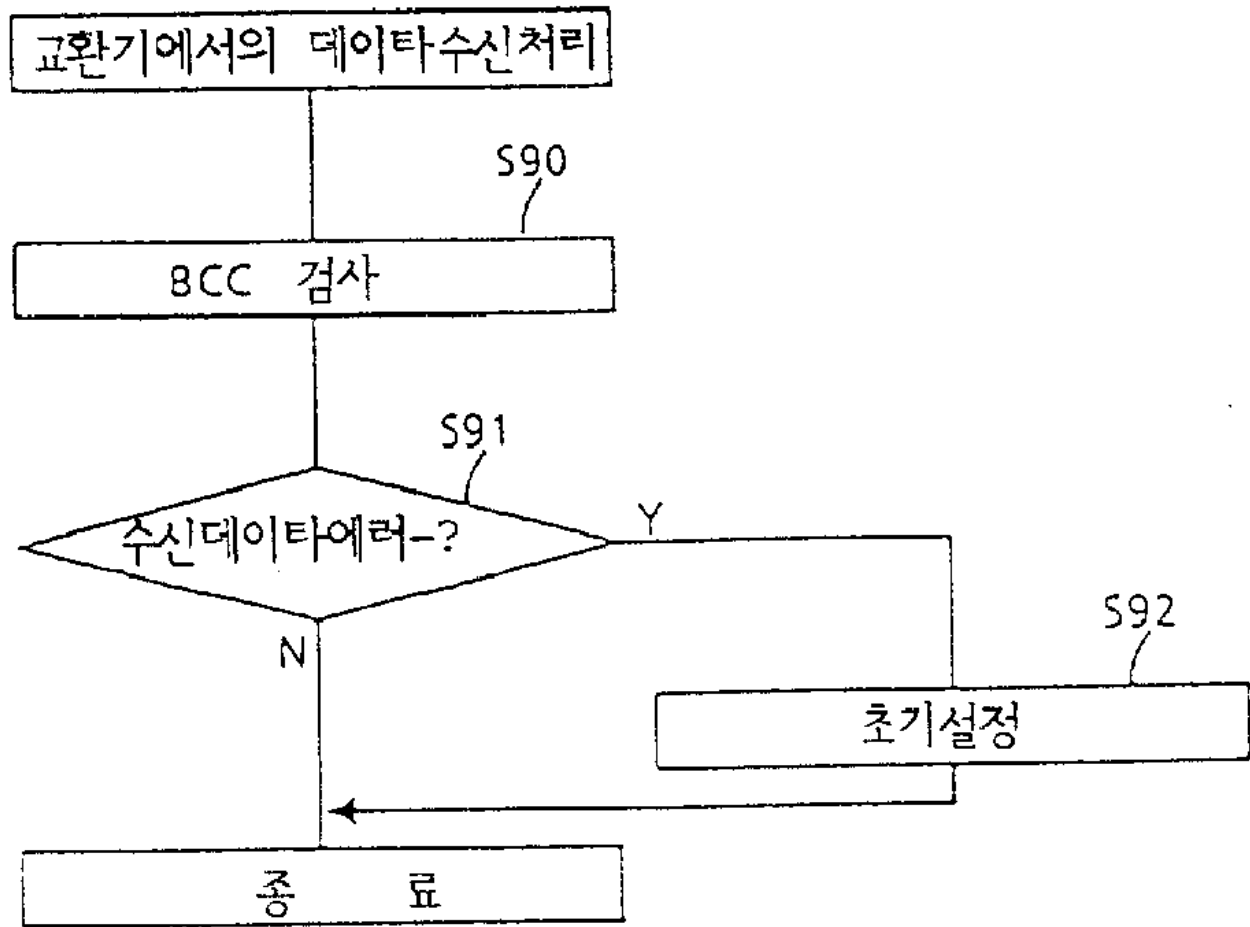




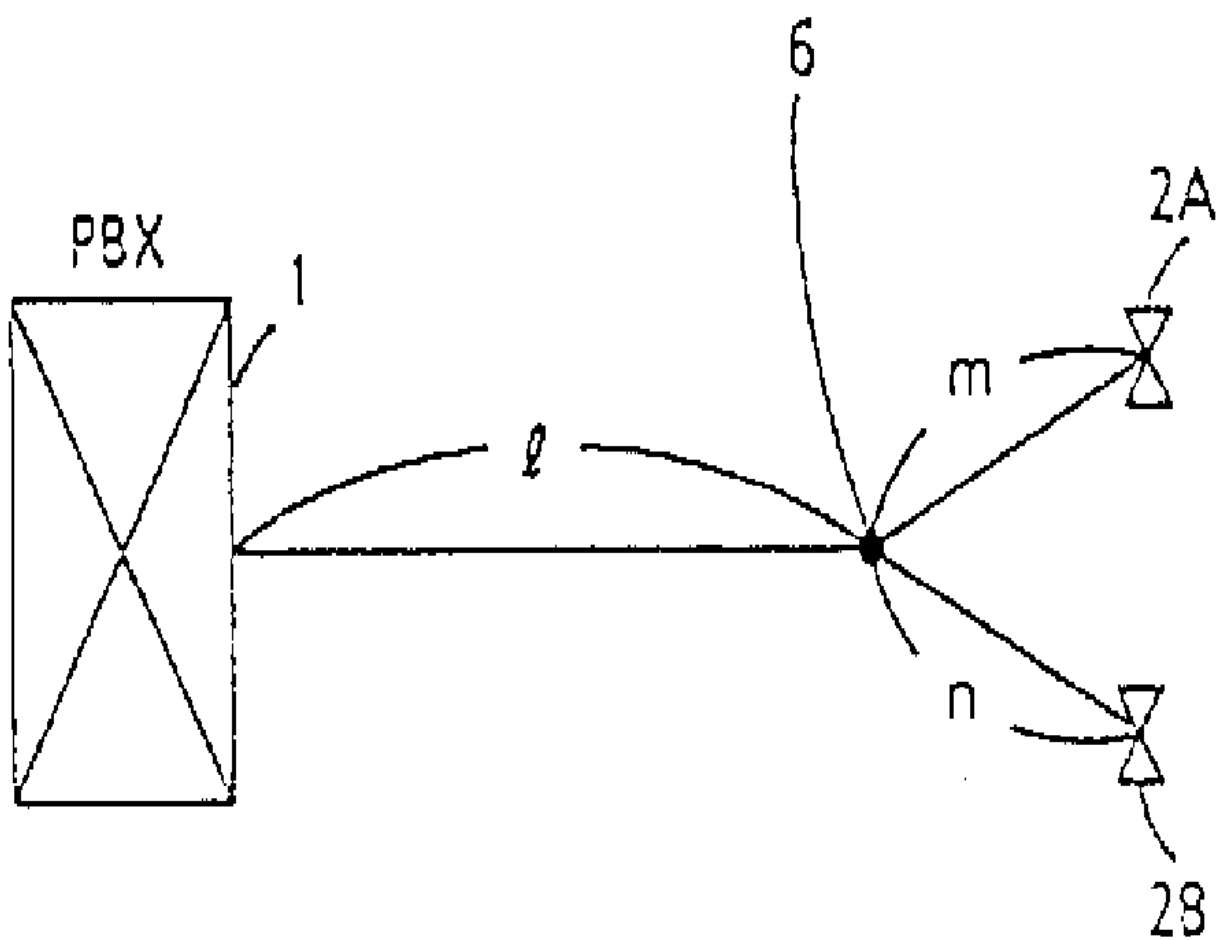




27



28



l		m, n
저항	선로길이	선로길이
20Ω	110m ($\phi 0.5$)	10m