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(54) **WIRELESS LOCAL AREA NETWORK (WLAN) TECHNOLOGY AND APPLICATIONS INCLUDING TECHNIQUES OF UNIVERSAL FREQUENCY TRANSLATION**

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See application file for complete search history.

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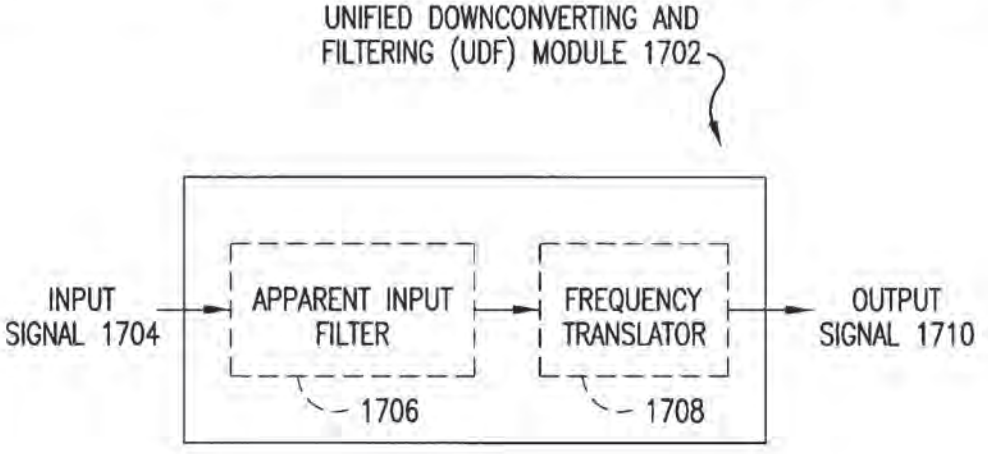
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(57) **ABSTRACT**

Frequency translation and applications of same are described herein, including wireless local area network (WLAN) applications such as IEEE Standard 802.11 WLANs. Such applications include, but are not limited to, frequency down-conversion, frequency up-conversion, enhanced signal reception, unified down-conversion and filtering, and combinations and applications of same.

57 Claims, 371 Drawing Sheets



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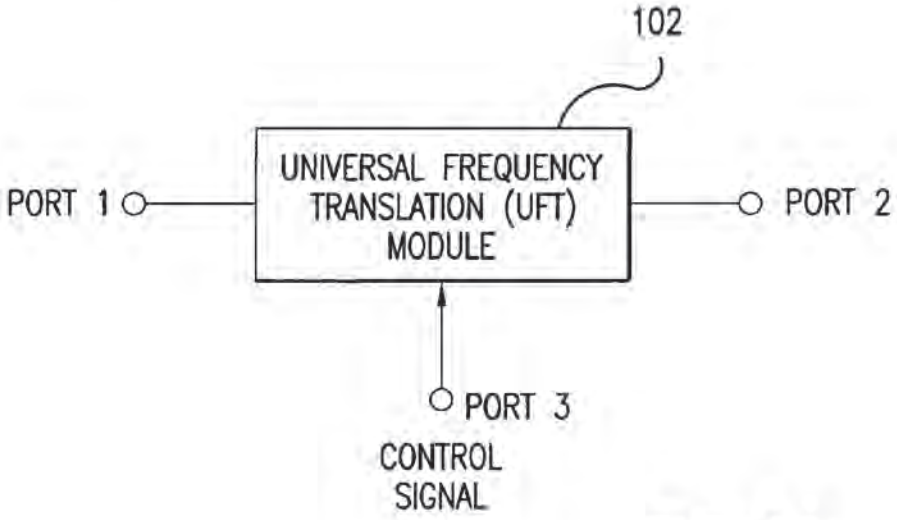

102
UNIVERSAL FREQUENCY TRANSLATION (UFT) MODULE
PORT 1
PORT 2
PORT 3
CONTROL SIGNAL

FIG. 1A

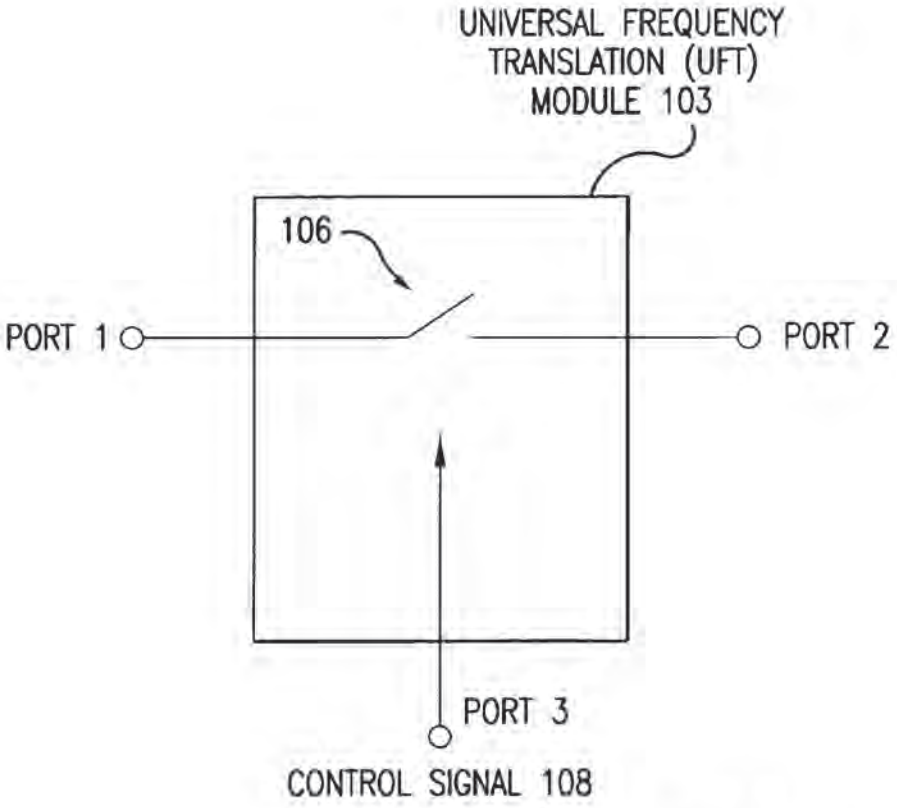

UNIVERSAL FREQUENCY TRANSLATION (UFT) MODULE 103
106
PORT 1
PORT 2
PORT 3
CONTROL SIGNAL 108

FIG. 1B

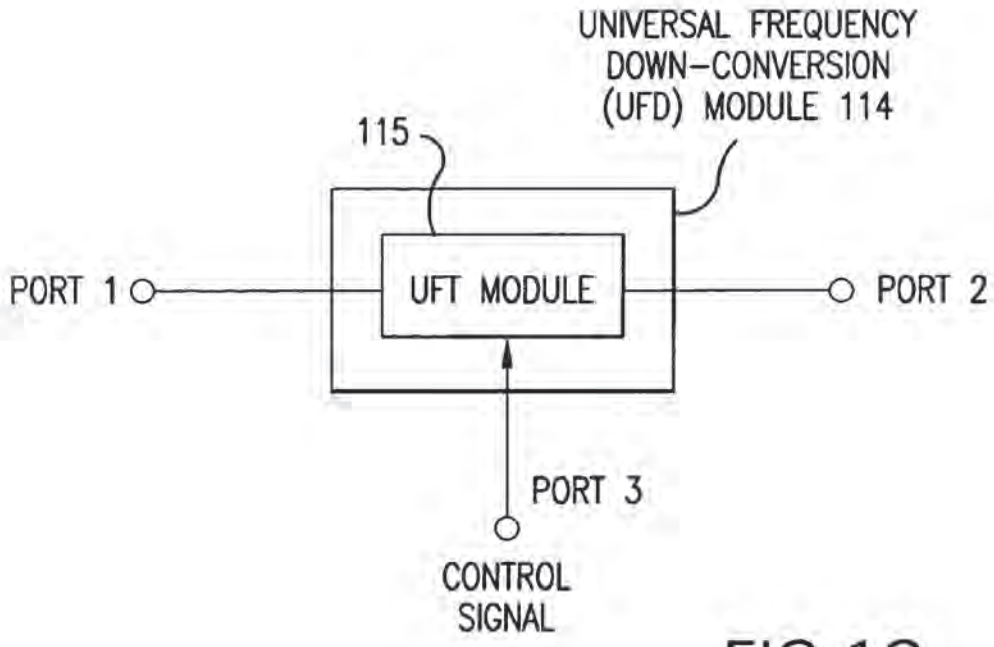

UNIVERSAL FREQUENCY
DOWN-CONVERSION
(UFD) MODULE 114
115
UFT MODULE
PORT 1
PORT 2
PORT 3
CONTROL
SIGNAL

FIG.1C

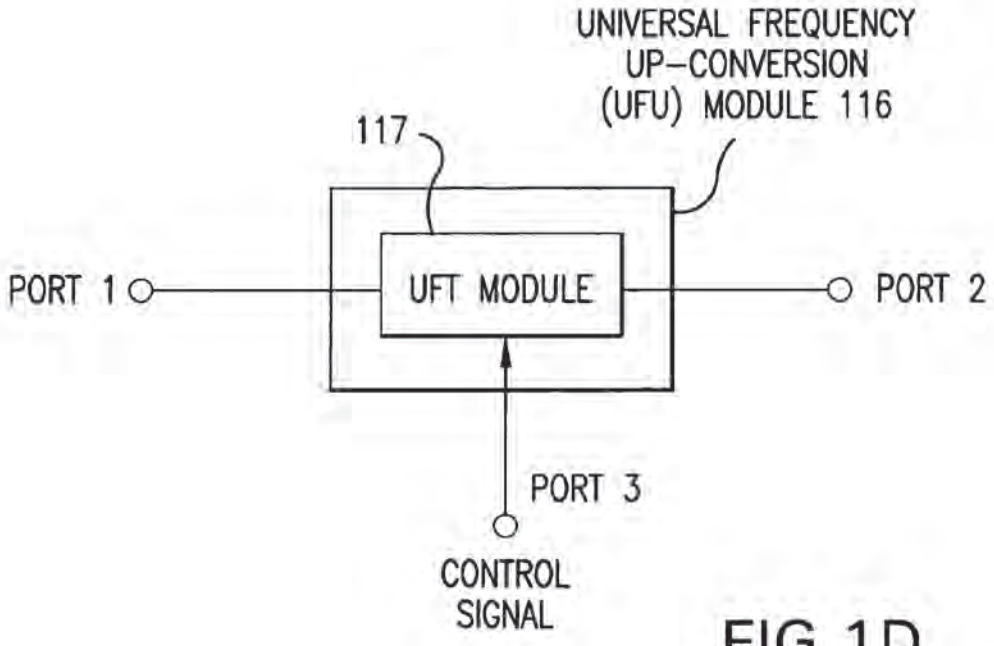

UNIVERSAL FREQUENCY
UP-CONVERSION
(UFU) MODULE 116
117
UFT MODULE
PORT 1
PORT 2
PORT 3
CONTROL
SIGNAL

FIG.1D

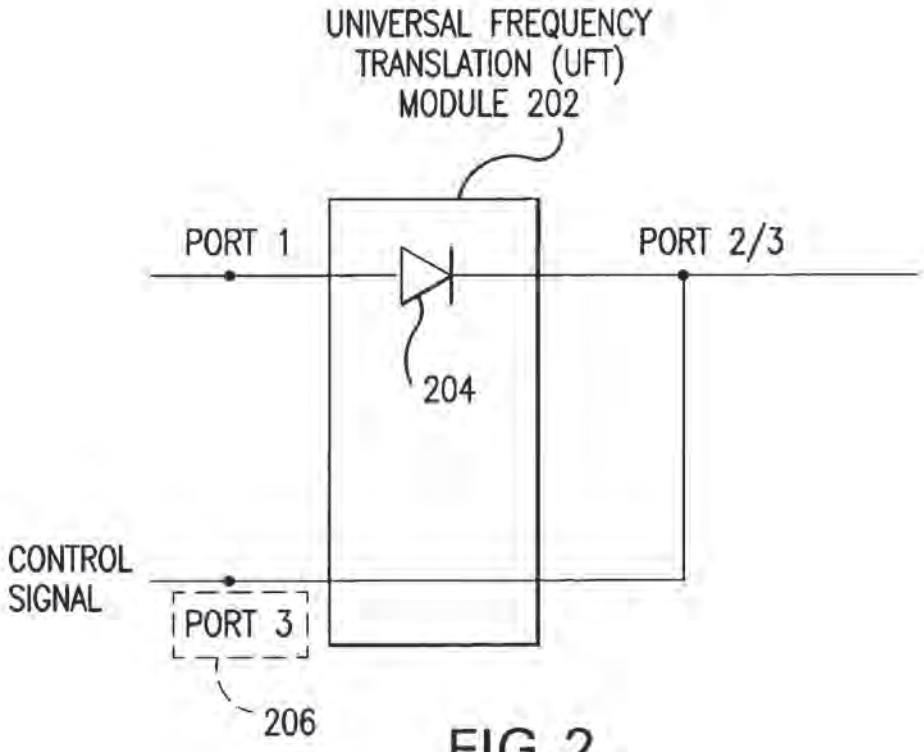

UNIVERSAL FREQUENCY
TRANSLATION (UFT)
MODULE 202
PORT 1
PORT 2/3
204
CONTROL
SIGNAL
PORT 3
206

FIG.2

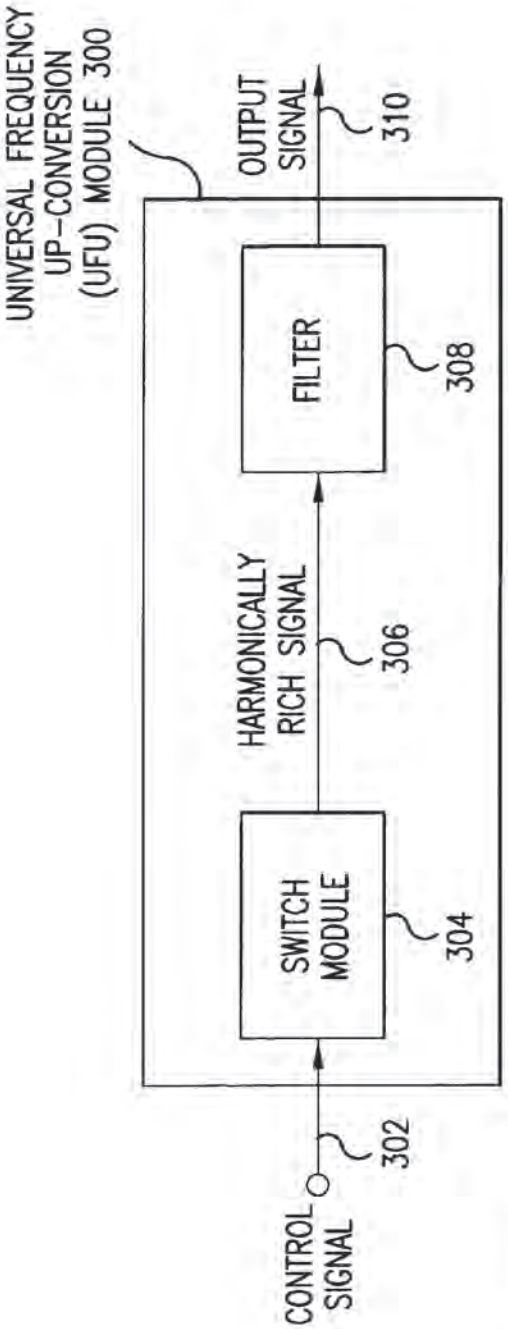

UNIVERSAL FREQUENCY
UP-CONVERSION
(UFU) MODULE 300
OUTPUT
SIGNAL
310
FILTER
308
HARMONICALLY
RICH SIGNAL
306
SWITCH
MODULE
304
CONTROL
SIGNAL
302

FIG.3

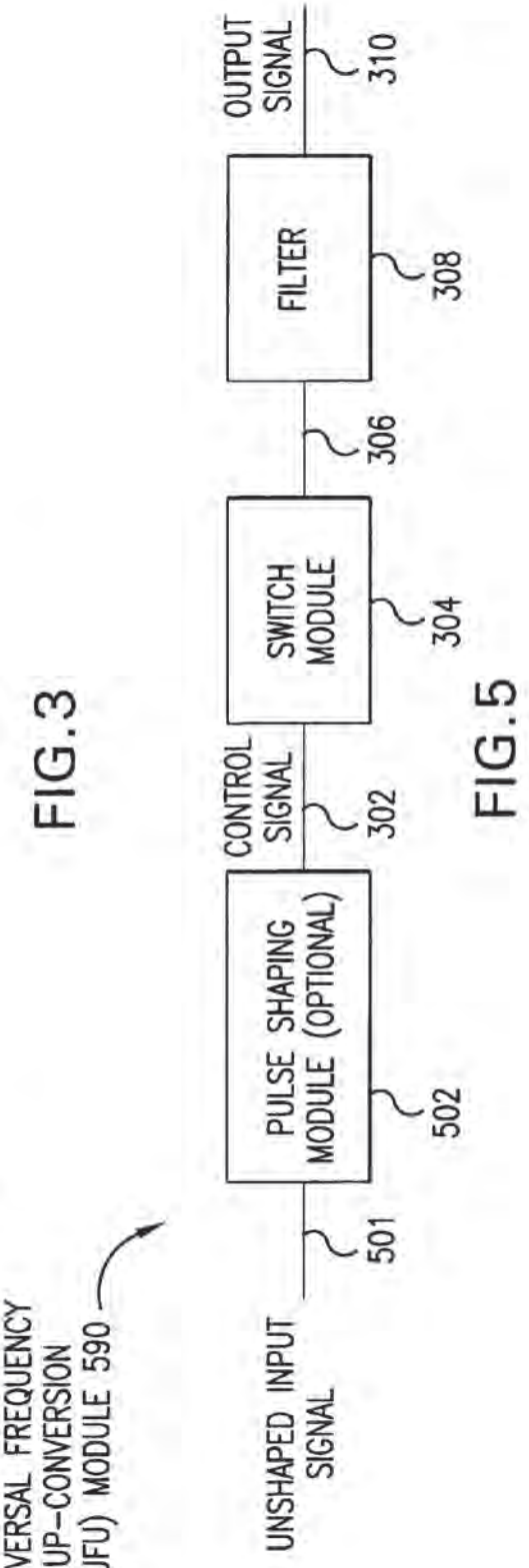

OUTPUT
SIGNAL
310
FILTER
308
306
SWITCH
MODULE
304
CONTROL
SIGNAL
302
PULSE SHAPING
MODULE (OPTIONAL)
502
501
UNSHAPED INPUT
SIGNAL
UNIVERSAL FREQUENCY
UP-CONVERSION
(UFU) MODULE 590

FIG.5

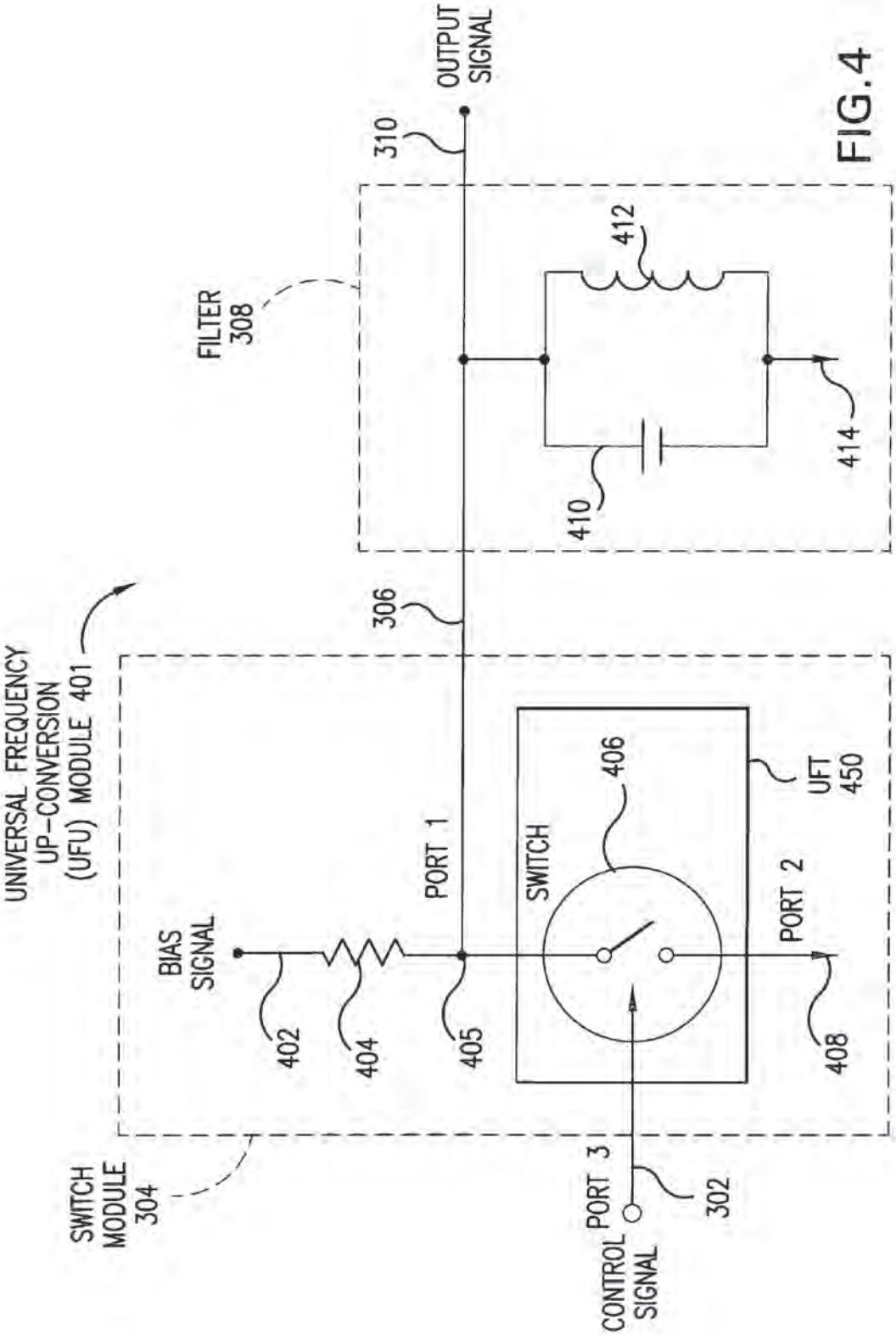

OUTPUT SIGNAL
310
FILTER 308
412
414
410
306
UNIVERSAL FREQUENCY UP-CONVERSION (UFU) MODULE 401
BIAS SIGNAL
402
404
405
PORT 1
SWITCH
406
PORT 2
UFT 450
408
SWITCH MODULE 304
PORT 3
302
CONTROL SIGNAL

FIG. 4

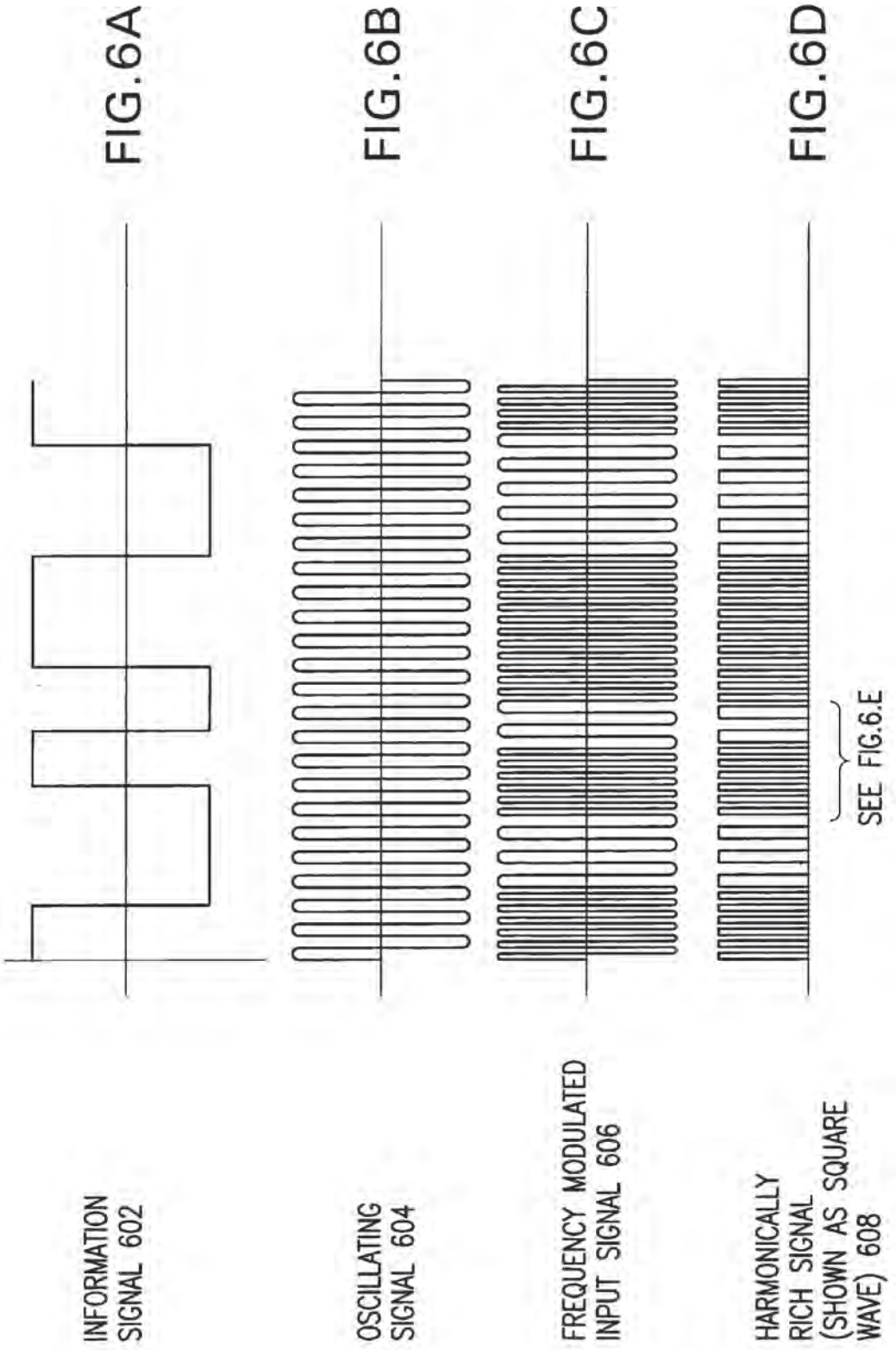

FIG.6A
FIG.6B
FIG.6C
FIG.6D
INFORMATION SIGNAL 602
OSCILLATING SIGNAL 604
FREQUENCY MODULATED INPUT SIGNAL 606
HARMONICALLY RICH SIGNAL (SHOWN AS SQUARE WAVE) 608
SEE FIG.6.E

FIG.6E

FIG.6F

FIG.6G

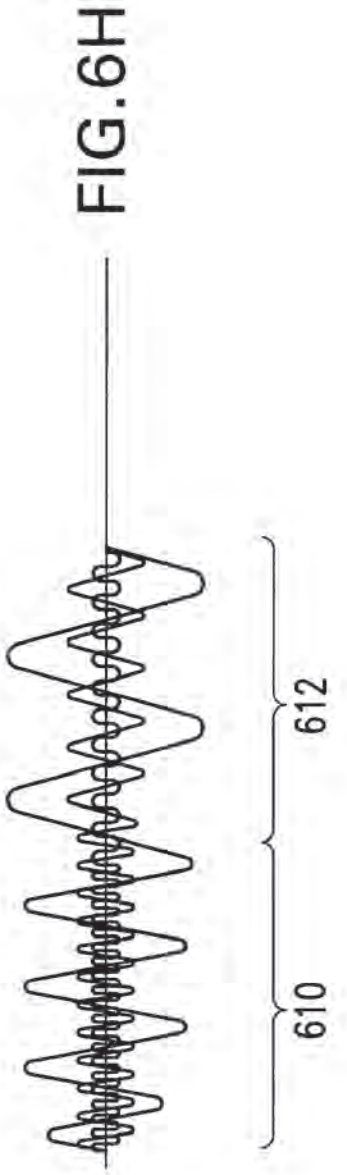

HARMONICS OF SIGNALS 610 AND 612 (SHOWN SIMULTANEOUSLY BUT NOT SUMMED)
610
612

FIG.6H

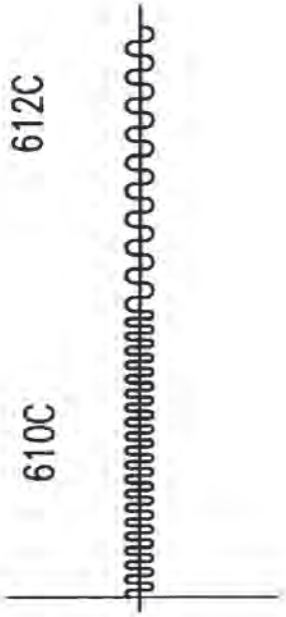

FILTERED OUTPUT SIGNAL 614
610C
612C

FIG.6I

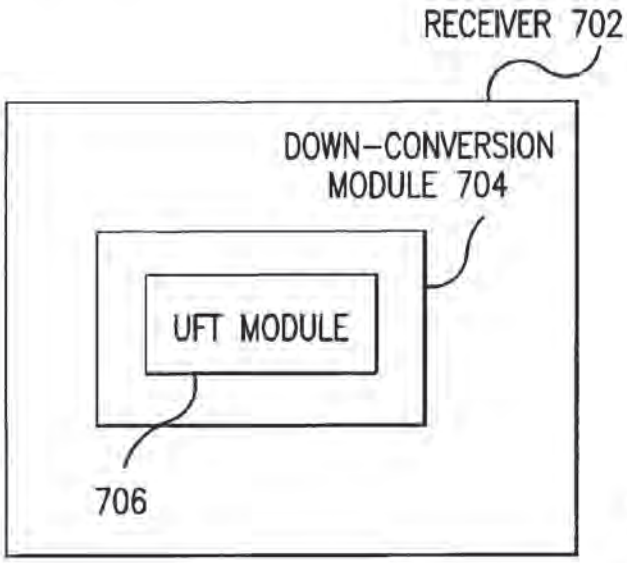


FIG.7

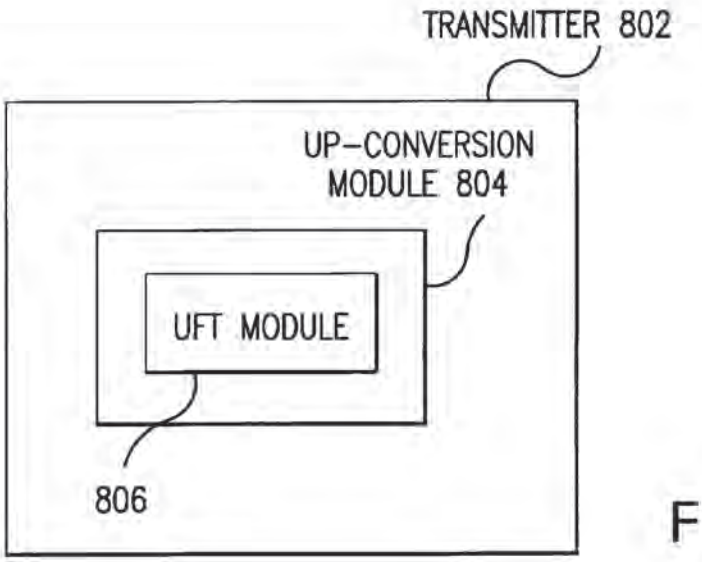


FIG.8

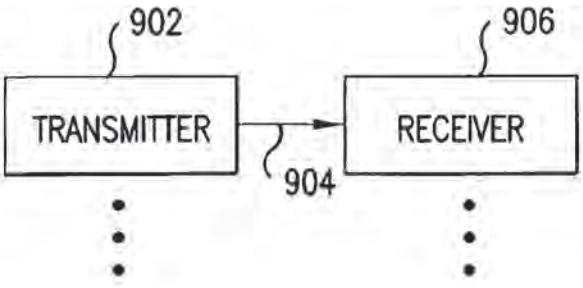


FIG.9

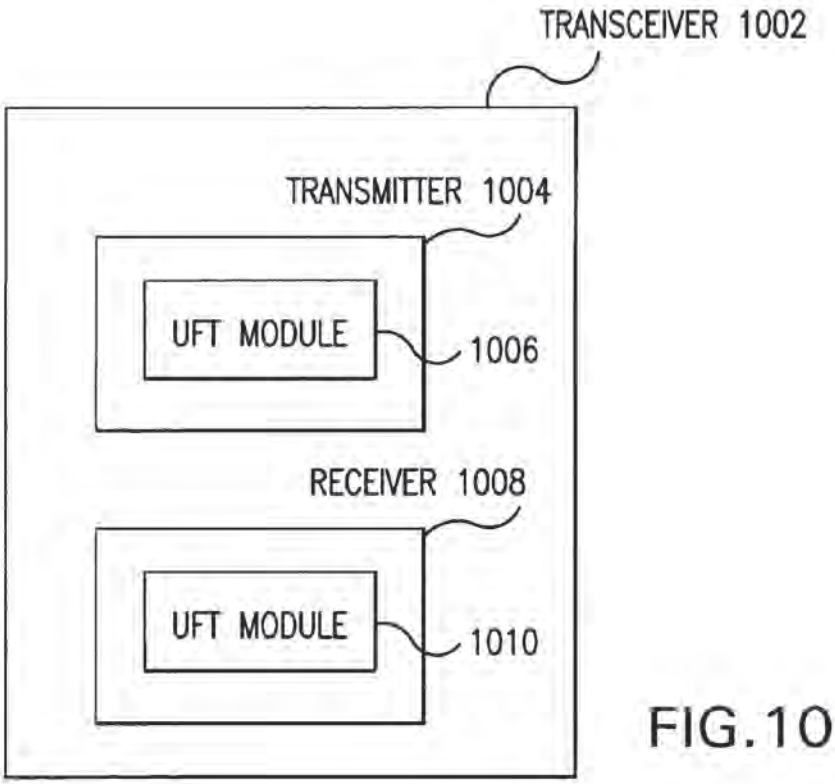

TRANSCEIVER 1002
TRANSMITTER 1004
UFT MODULE
1006
RECEIVER 1008
UFT MODULE
1010

FIG.10

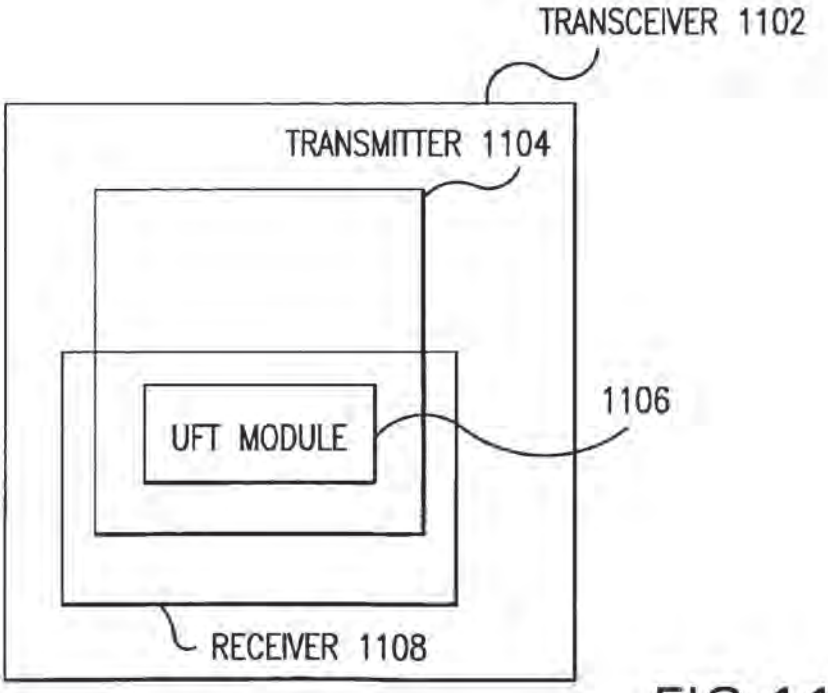

TRANSCEIVER 1102
TRANSMITTER 1104
UFT MODULE
1106
RECEIVER 1108

FIG.11

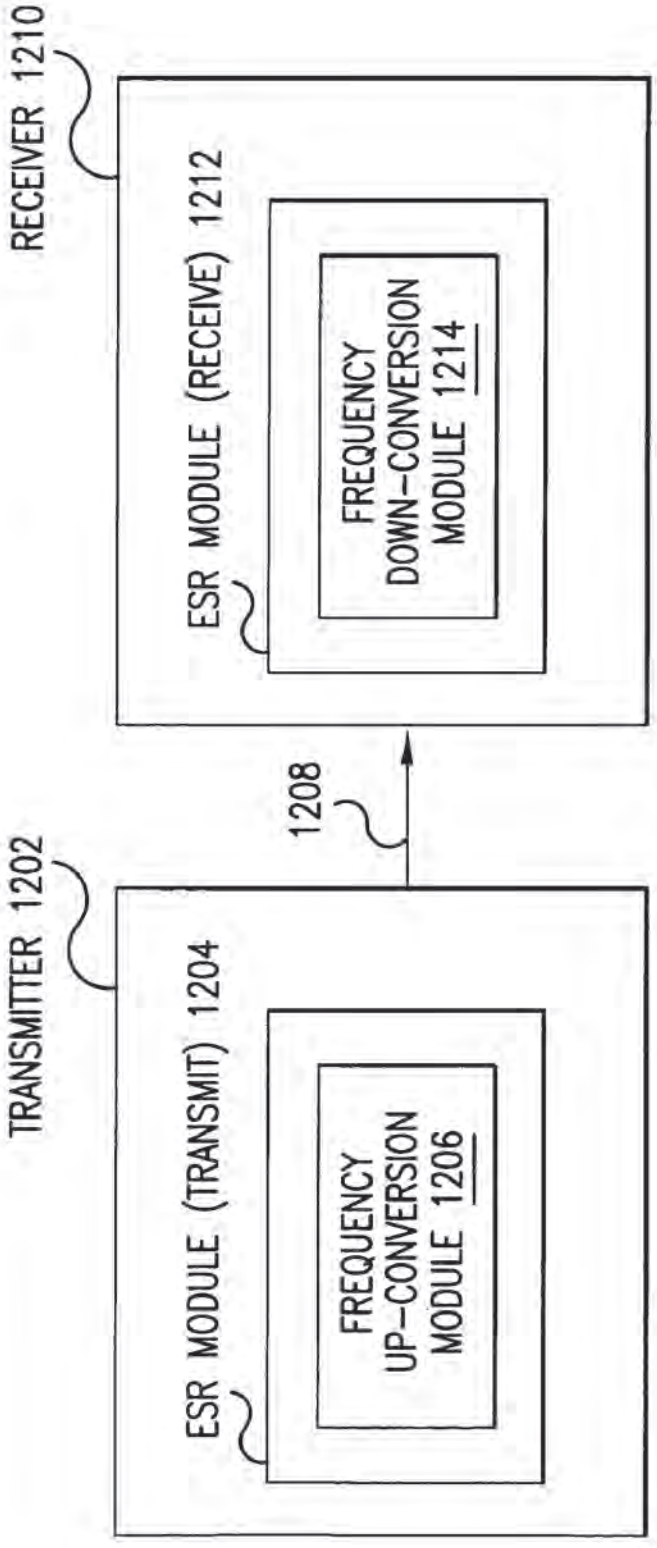

RECEIVER 1210
ESR MODULE (RECEIVE) 1212
FREQUENCY DOWN-CONVERSION MODULE 1214
1208
TRANSMITTER 1202
ESR MODULE (TRANSMIT) 1204
FREQUENCY UP-CONVERSION MODULE 1206

FIG. 12

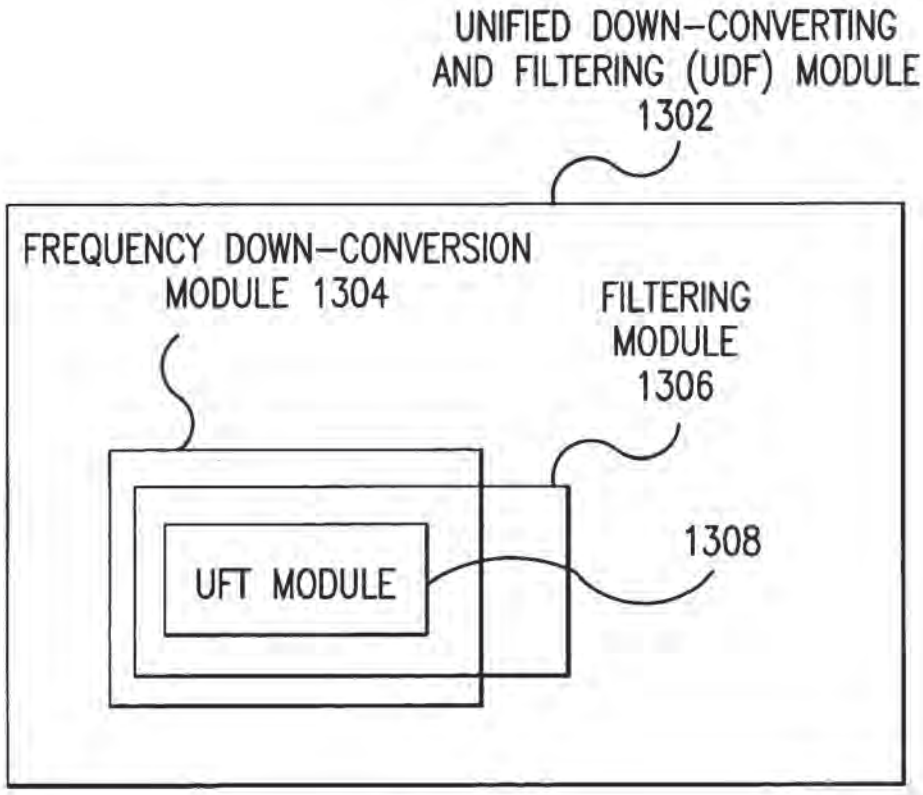

UNIFIED DOWN-CONVERTING
AND FILTERING (UDF) MODULE
1302
FREQUENCY DOWN-CONVERSION
MODULE 1304
FILTERING
MODULE
1306
1308
UFT MODULE

FIG. 13

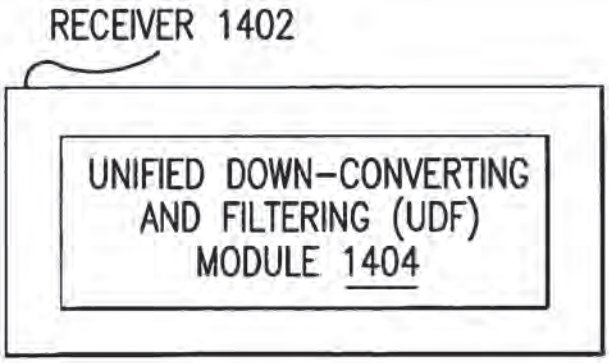

RECEIVER 1402
UNIFIED DOWN-CONVERTING
AND FILTERING (UDF)
MODULE 1404

FIG. 14

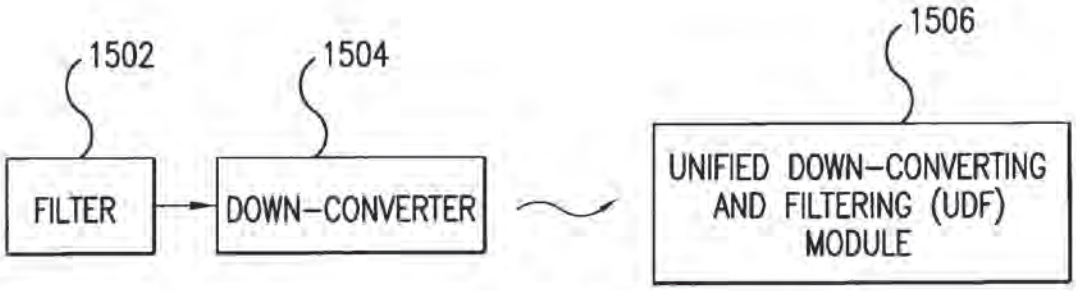


FIG.15A

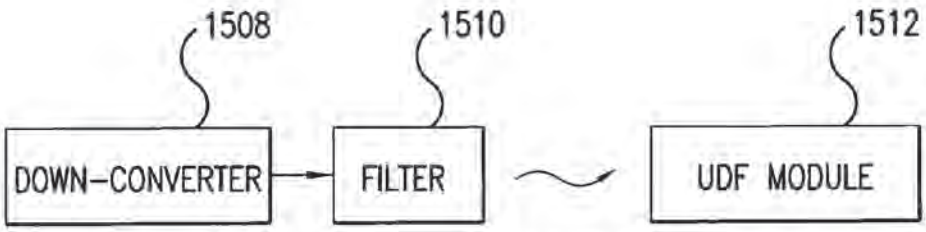


FIG.15B

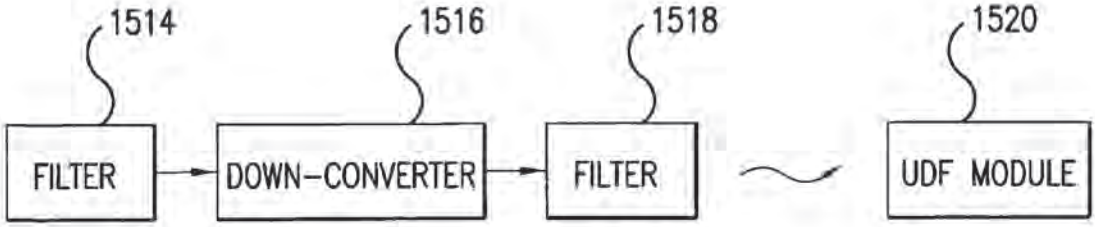


FIG.15C

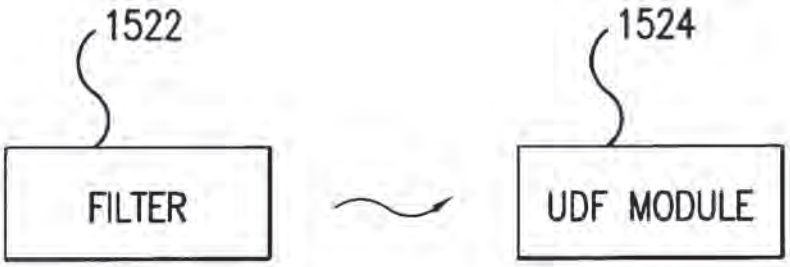


FIG.15D

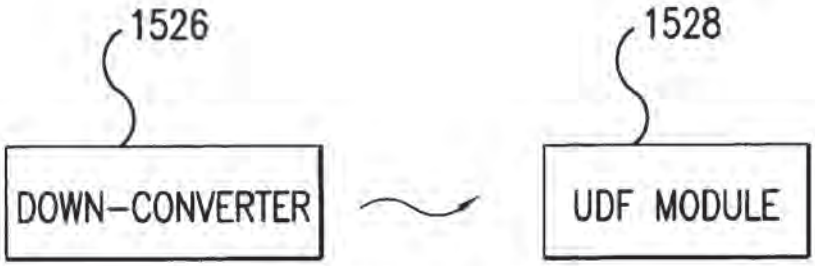


FIG.15E

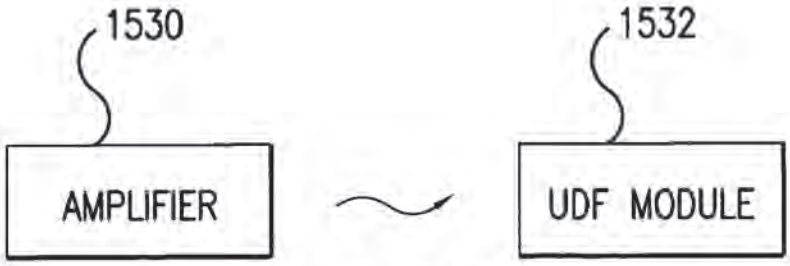


FIG.15F

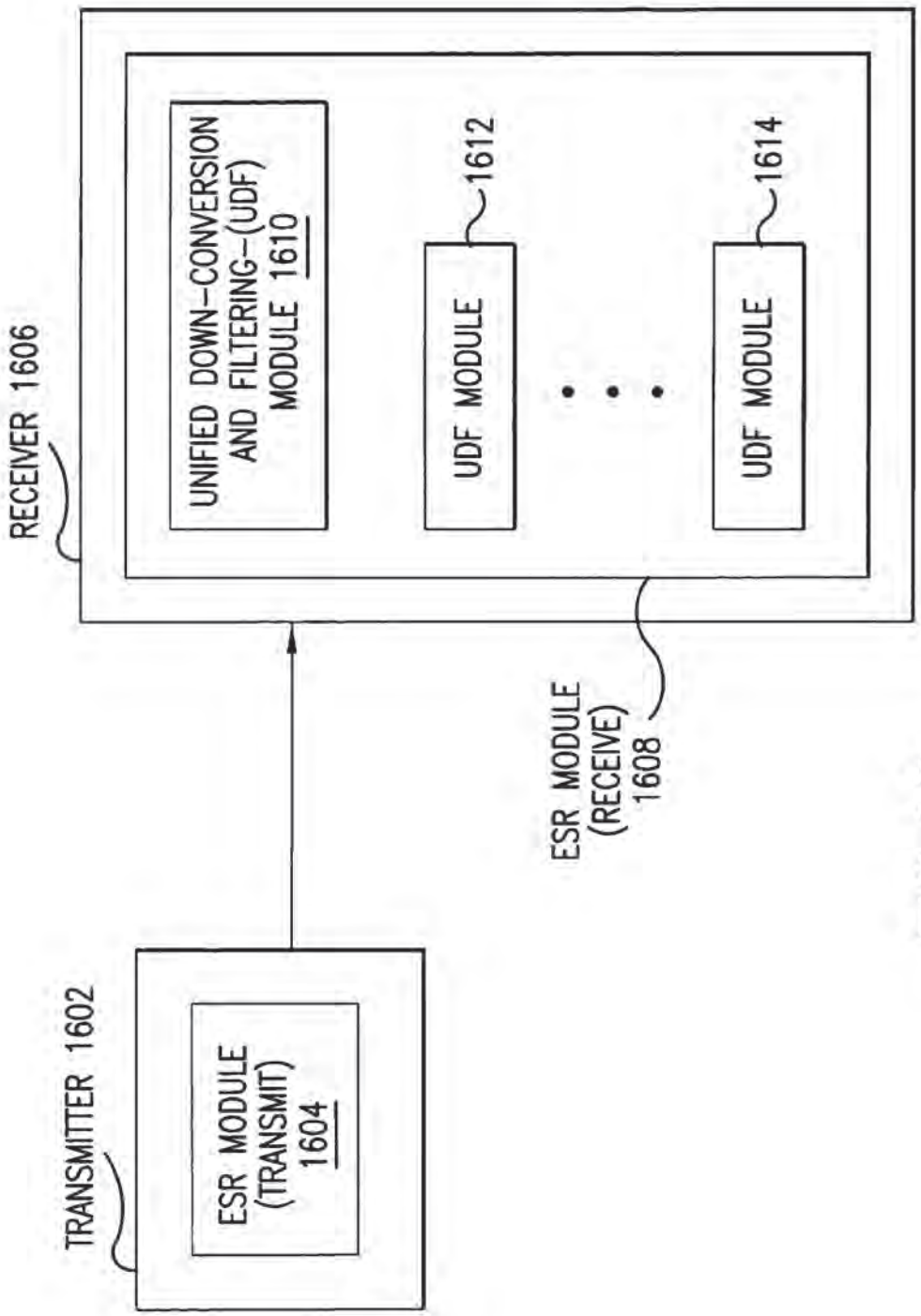

TRANSMITTER 1602
ESR MODULE (TRANSMIT) 1604
RECEIVER 1606
UNIFIED DOWN-CONVERSION AND FILTERING-(UDF) MODULE 1610
UDF MODULE
1612
UDF MODULE
1614
ESR MODULE (RECEIVE) 1608

FIG. 16

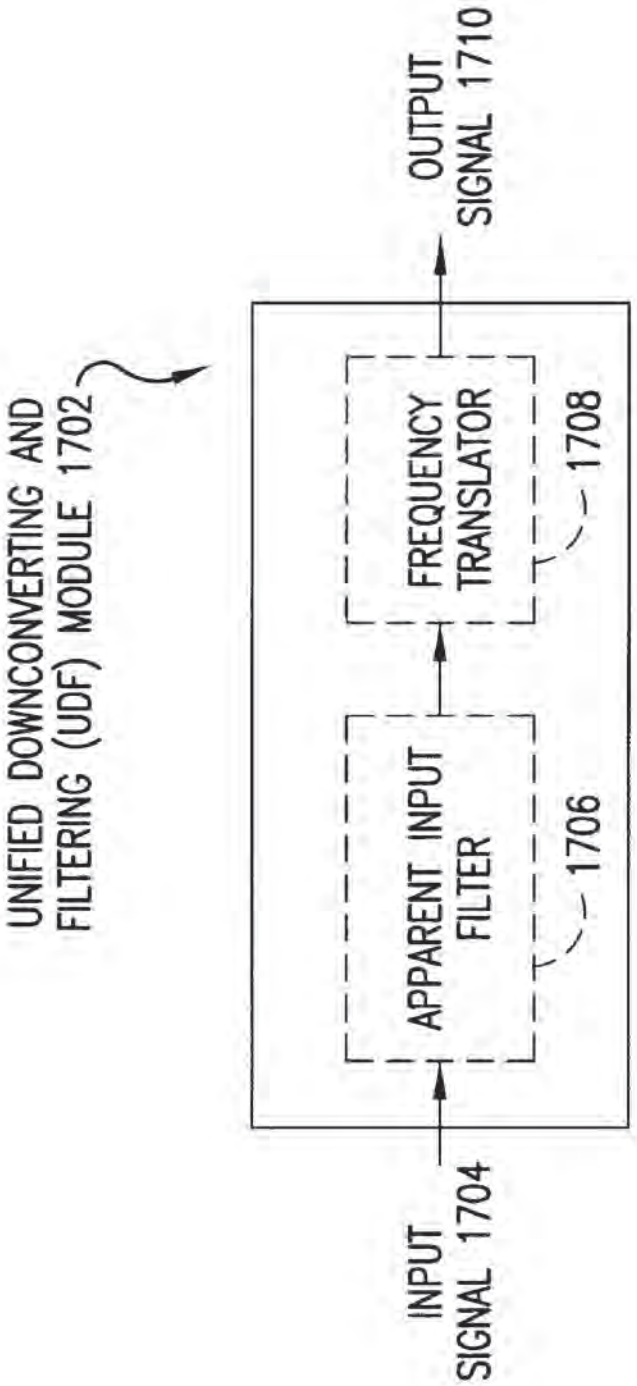

UNIFIED DOWNCONVERTING AND FILTERING (UDF) MODULE 1702
INPUT SIGNAL 1704
APPARENT INPUT FILTER
1706
FREQUENCY TRANSLATOR
1708
OUTPUT SIGNAL 1710

FIG.17

1802

TIME / NODE	t−1 (RISING EDGE OF ϕ_1)		t−1 (RISING EDGE OF ϕ_2)		t (RISING EDGE OF ϕ_1)		t (RISING EDGE OF ϕ_2)		t+1 (RISING EDGE OF ϕ_1)	
1902	VI_{t-1}	1804	VI_{t-1}	1808	VI_t	1816	VI_t	1826	VI_{t+1}	1838
1904	—		VI_{t-1}	1810	VI_{t-1}	1818	VI_t	1828	VI_t	1840
1906	VO_{t-1}	1806	VO_{t-1}	1812	VO_t	1820	VO_t	1830	VO_{t+1}	1842
1908	—		VO_{t-1}	1814	VO_{t-1}	1822	VO_t	1832	VO_t	1844
1910	—	1807	—		VO_{t-1}	1824	VO_{t-1}	1834	VO_t	1846
1912	—		—	1815	—		VO_{t-1}	1836	VO_{t-1}	1848
1918	—		—		—		—		VI_t − 0.1 * VO_t − 0.8 * VO_{t-1}	1850

FIG. 18

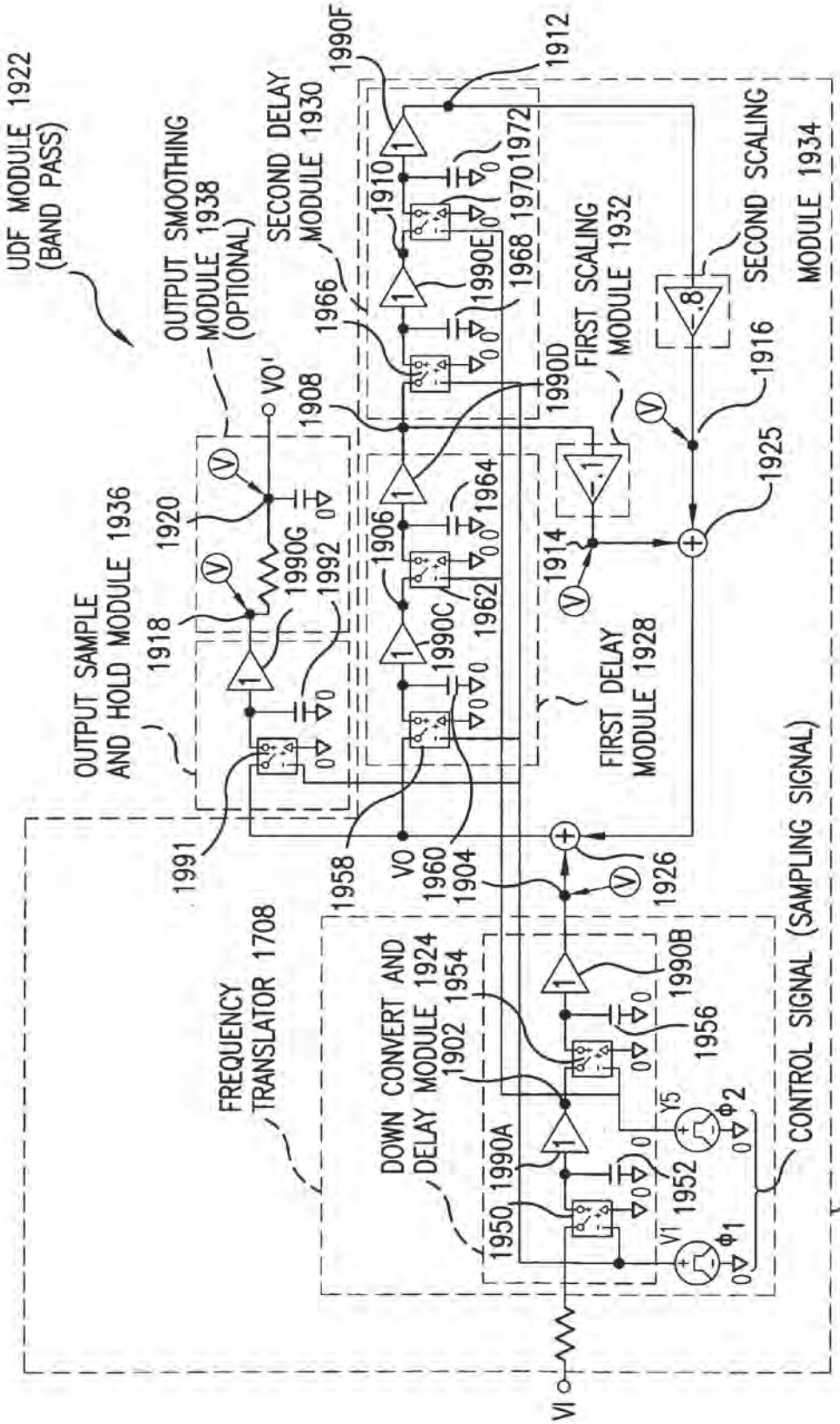

UDF MODULE 1922 (BAND PASS)
OUTPUT SAMPLE AND HOLD MODULE 1936
OUTPUT SMOOTHING MODULE 1938 (OPTIONAL)
SECOND DELAY MODULE 1930
FIRST SCALING MODULE 1932
SECOND SCALING MODULE 1934
FIRST DELAY MODULE 1928
FREQUENCY TRANSLATOR 1708
DOWN CONVERT AND DELAY MODULE 1924
CONTROL SIGNAL (SAMPLING SIGNAL)
INPUT FILTER 1706
VI
VO
VO'
1902
1904
1906
1908
1910
1912
1914
1916
1918
1920
1925
1926
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1990A
1990B
1990C
1990D
1990E
1990F
1990G
1991
1992
Y1
Y2
Y5
Φ1
Φ2
.1
.8

FIG.19

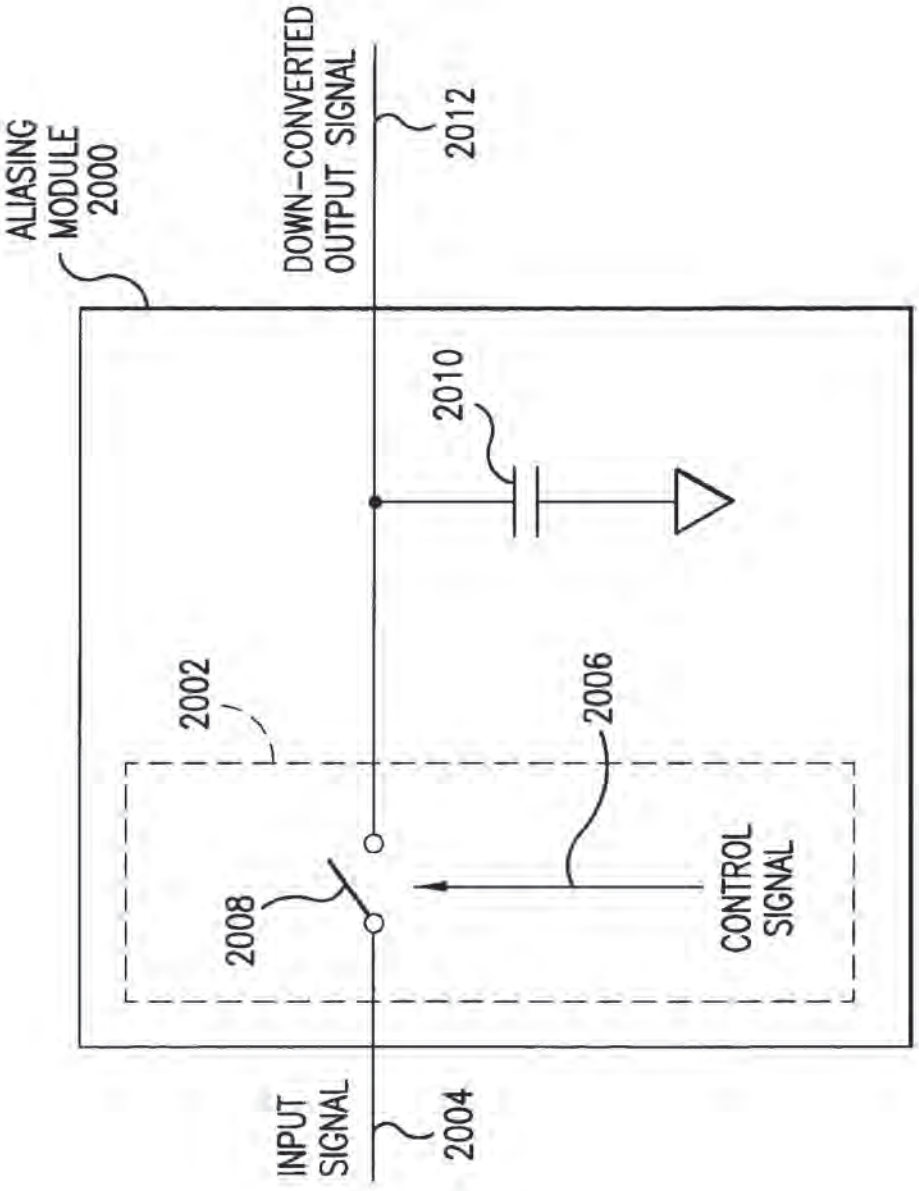

ALIASING MODULE 2000
DOWN-CONVERTED OUTPUT SIGNAL
2012
2010
2002
2006
2008
CONTROL SIGNAL
INPUT SIGNAL
2004

FIG.20A

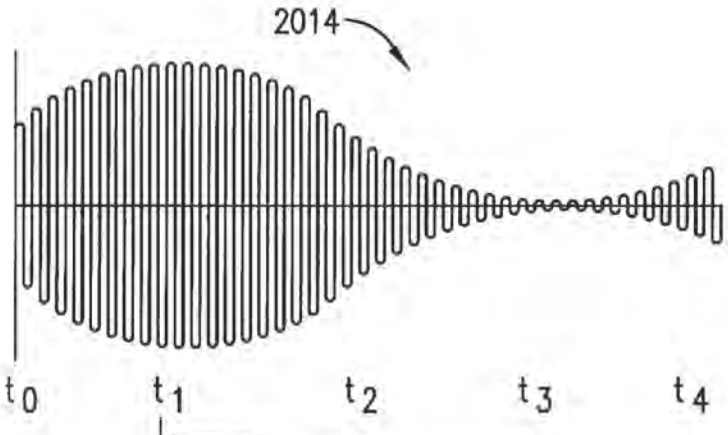


FIG.20B

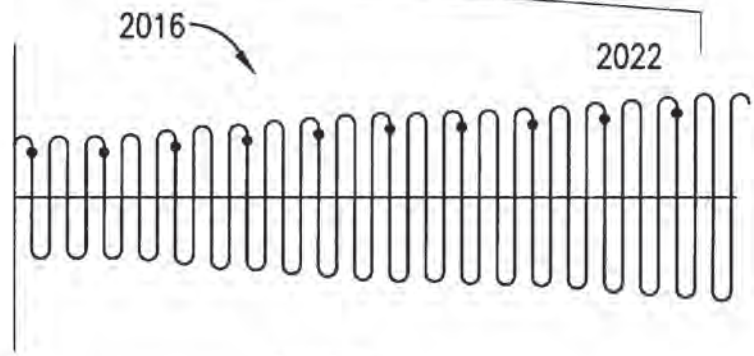


FIG.20C

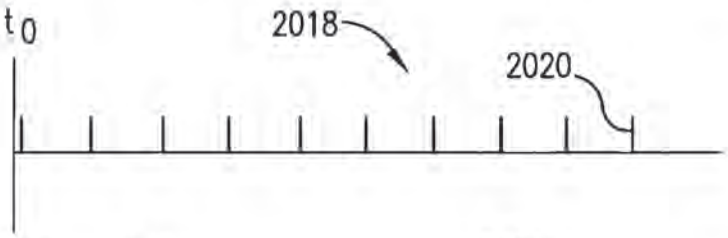


FIG.20D

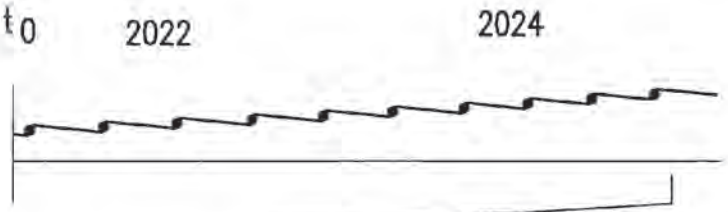


FIG.20E

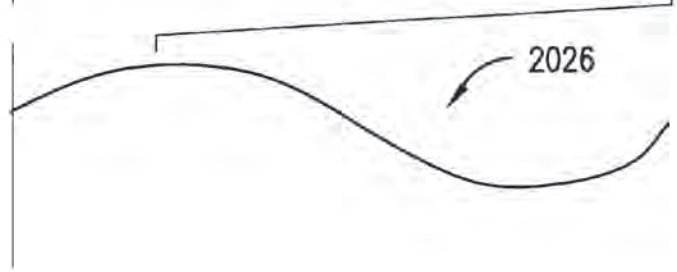


FIG.20F

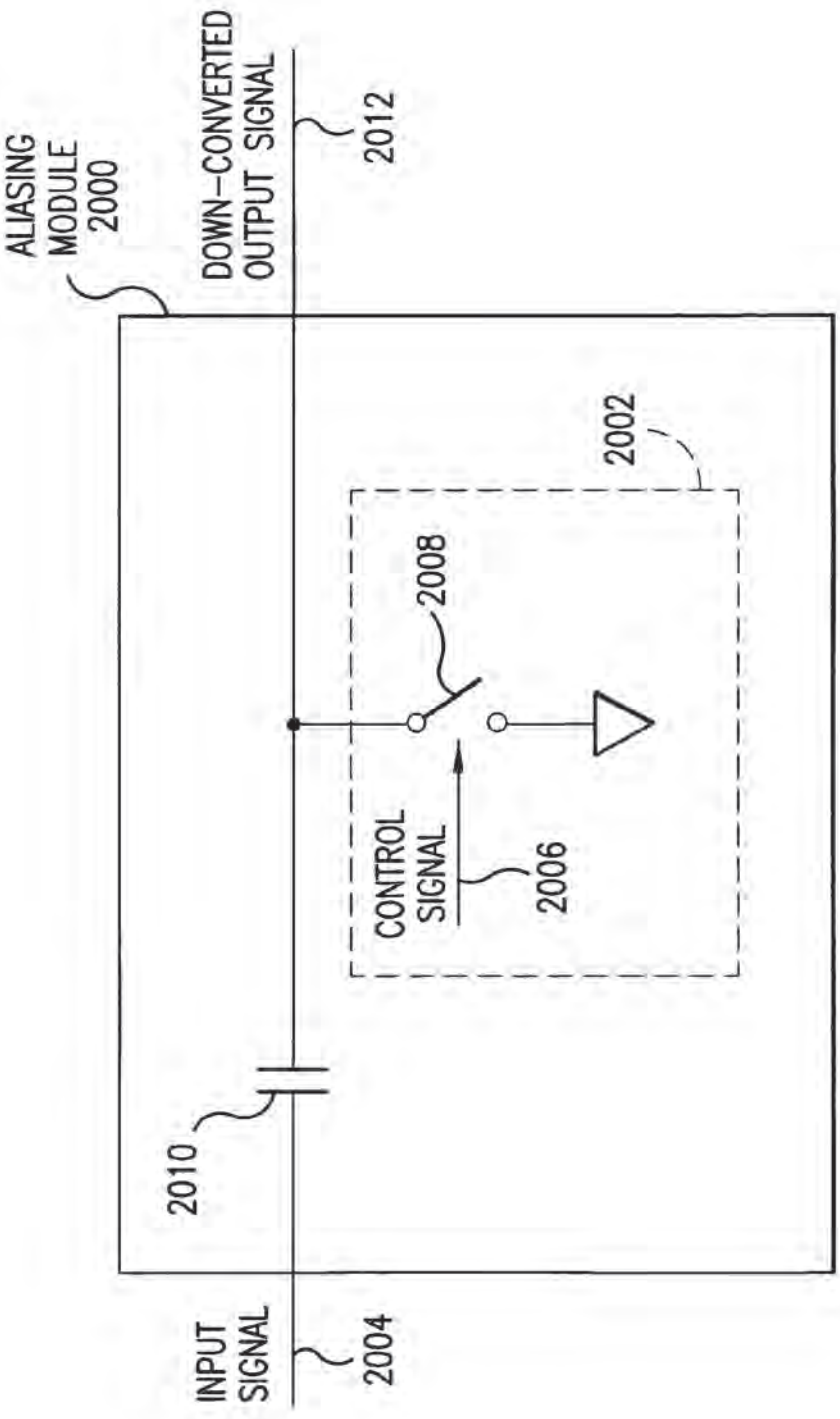

ALIASING MODULE 2000
DOWN-CONVERTED OUTPUT SIGNAL
2012
2002
2008
CONTROL SIGNAL
2006
2010
INPUT SIGNAL
2004

FIG.20G

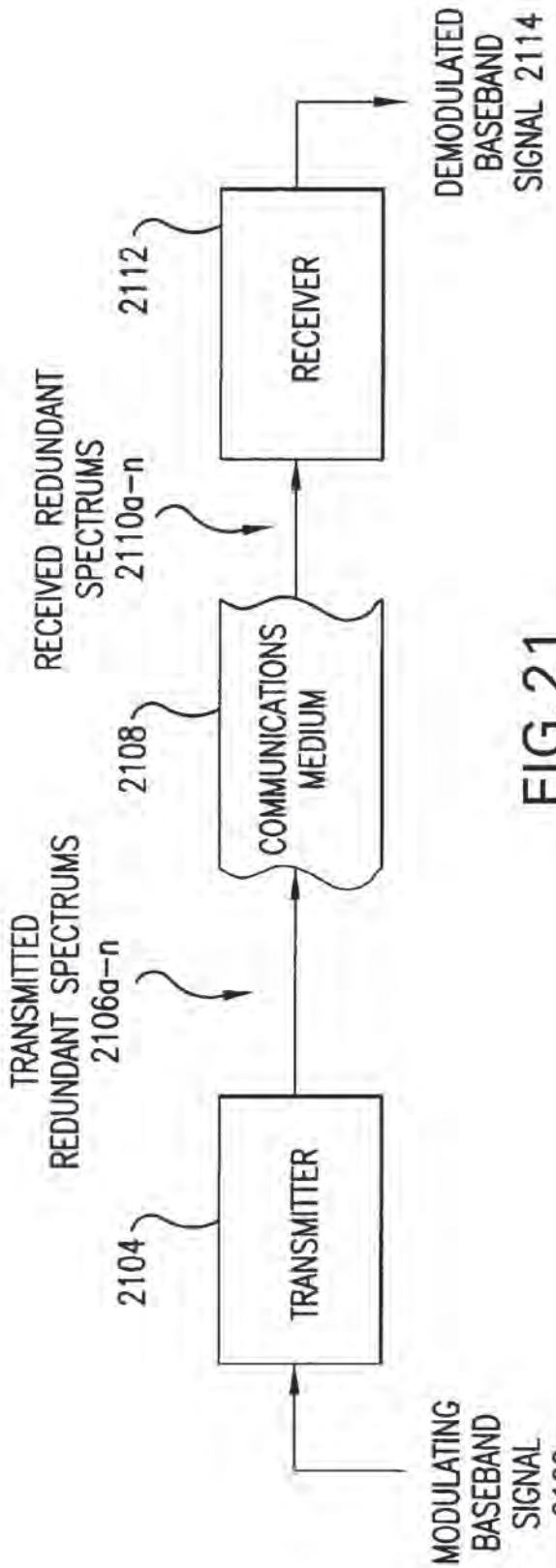

MODULATING BASEBAND SIGNAL 2102
2104
TRANSMITTER
TRANSMITTED REDUNDANT SPECTRUMS 2106a–n
2108
COMMUNICATIONS MEDIUM
RECEIVED REDUNDANT SPECTRUMS 2110a–n
2112
RECEIVER
DEMODULATED BASEBAND SIGNAL 2114

FIG.21

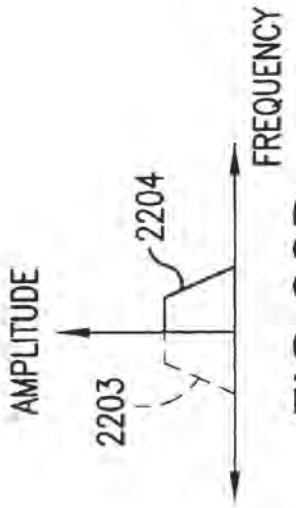


FIG.22B

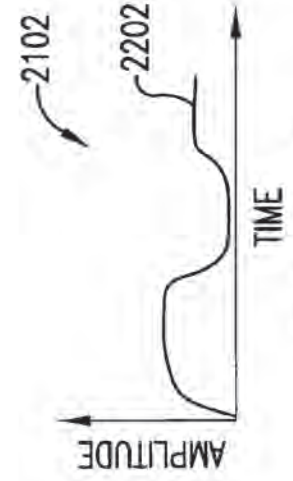


FIG.22A

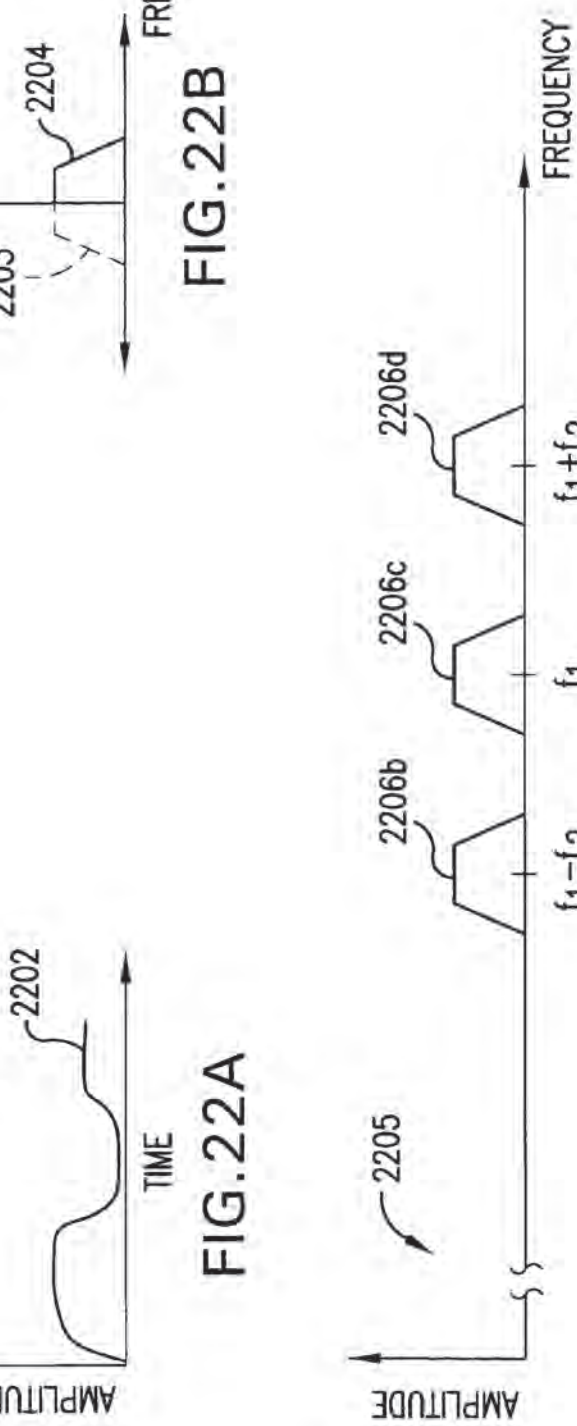


FIG.22C

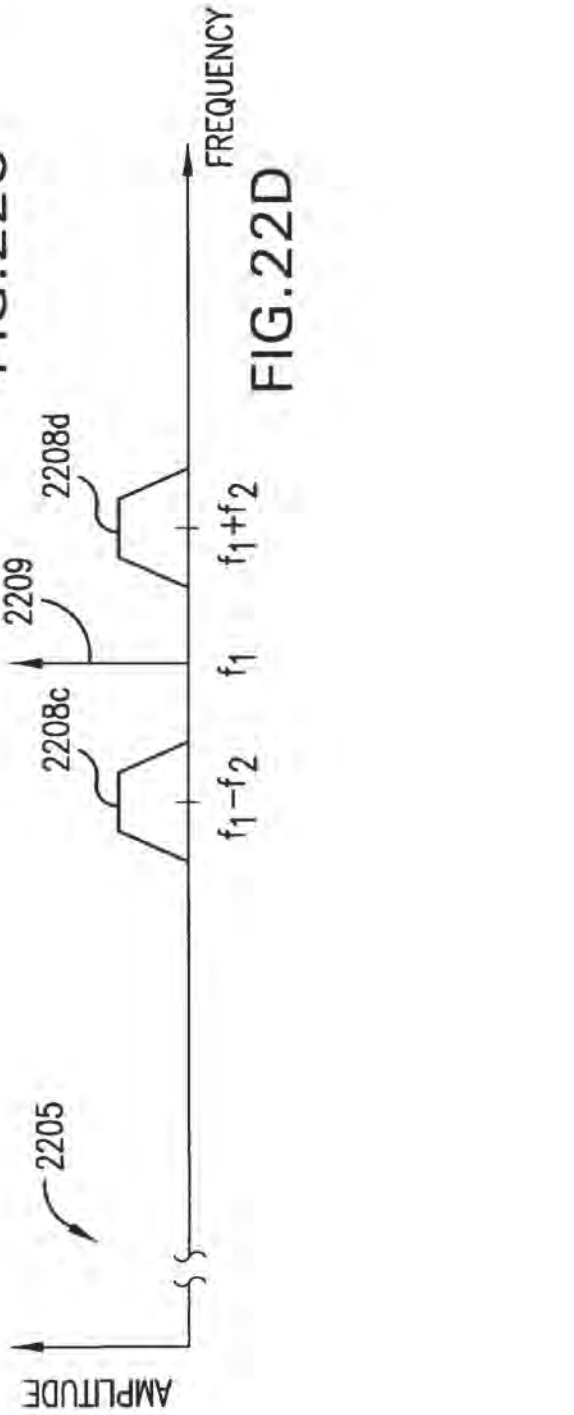


FIG.22D

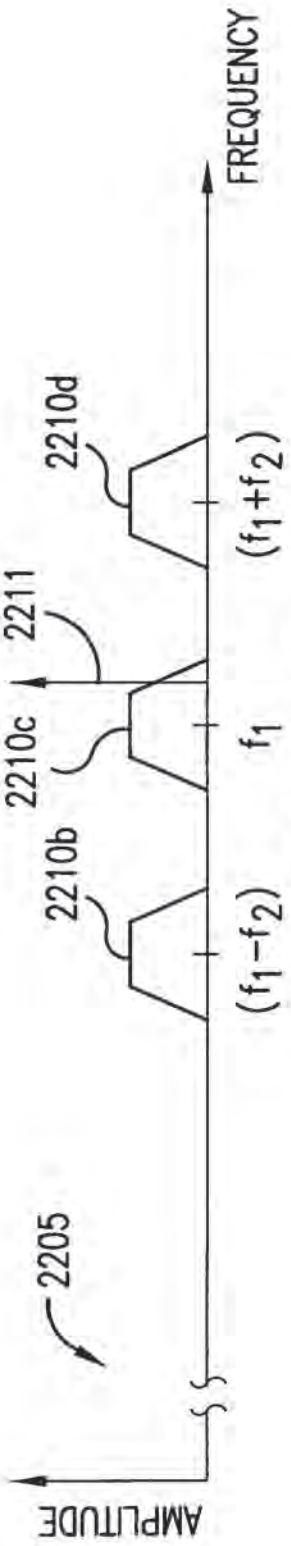


FIG.22E

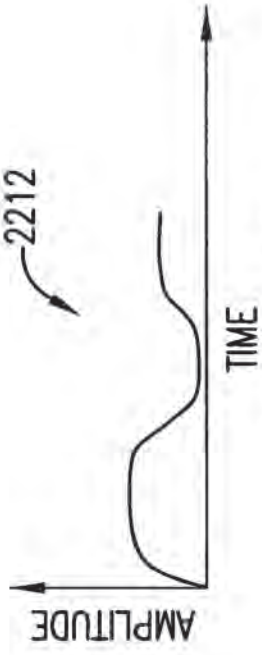


FIG.22F

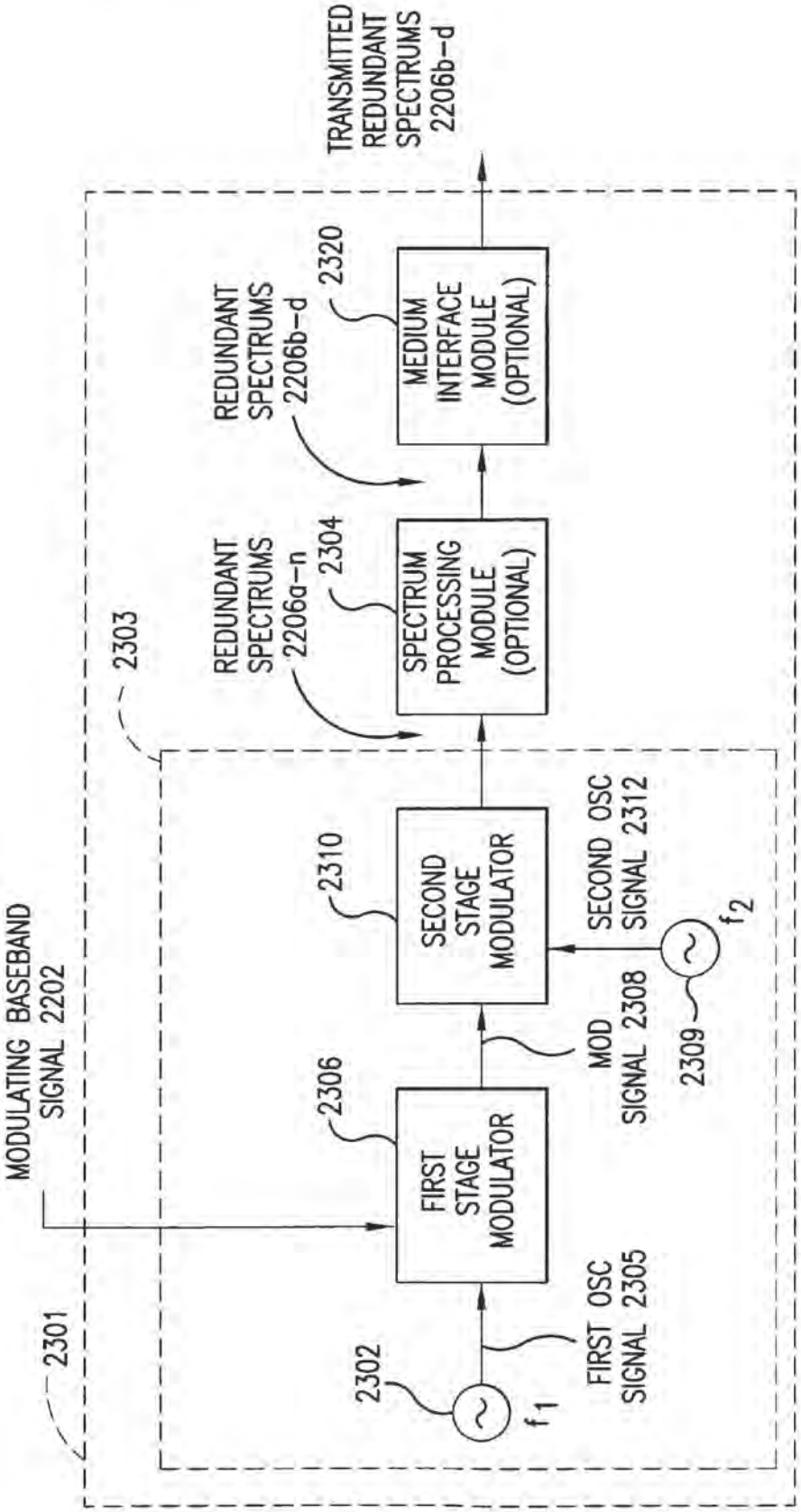

TRANSMITTED REDUNDANT SPECTRUMS 2206b–d
2320
MEDIUM INTERFACE MODULE (OPTIONAL)
REDUNDANT SPECTRUMS 2206b–d
2304
SPECTRUM PROCESSING MODULE (OPTIONAL)
REDUNDANT SPECTRUMS 2206a–n
2303
2310
SECOND STAGE MODULATOR
SECOND OSC SIGNAL 2312
f_2
2309
MOD SIGNAL 2308
2306
FIRST STAGE MODULATOR
MODULATING BASEBAND SIGNAL 2202
2301
2302
f_1
FIRST OSC SIGNAL 2305

FIG.23A

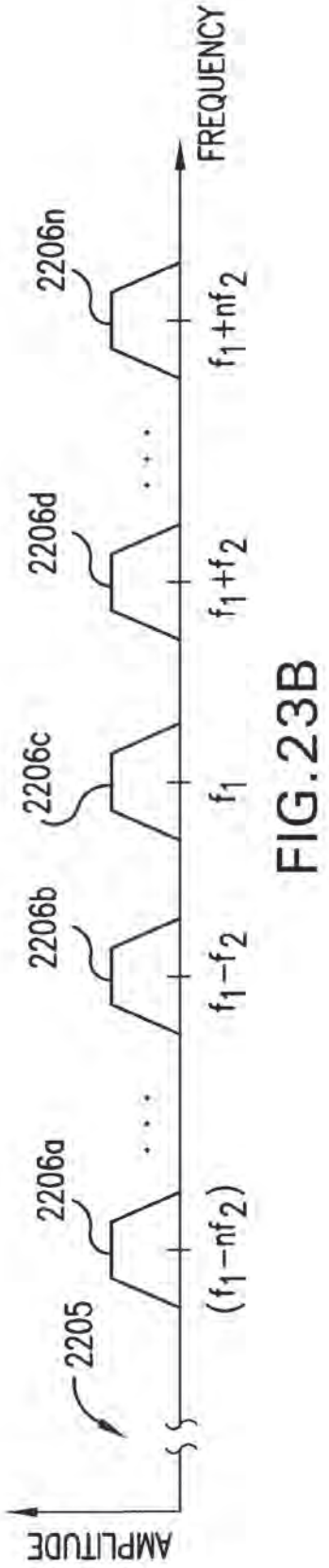


FIG.23B

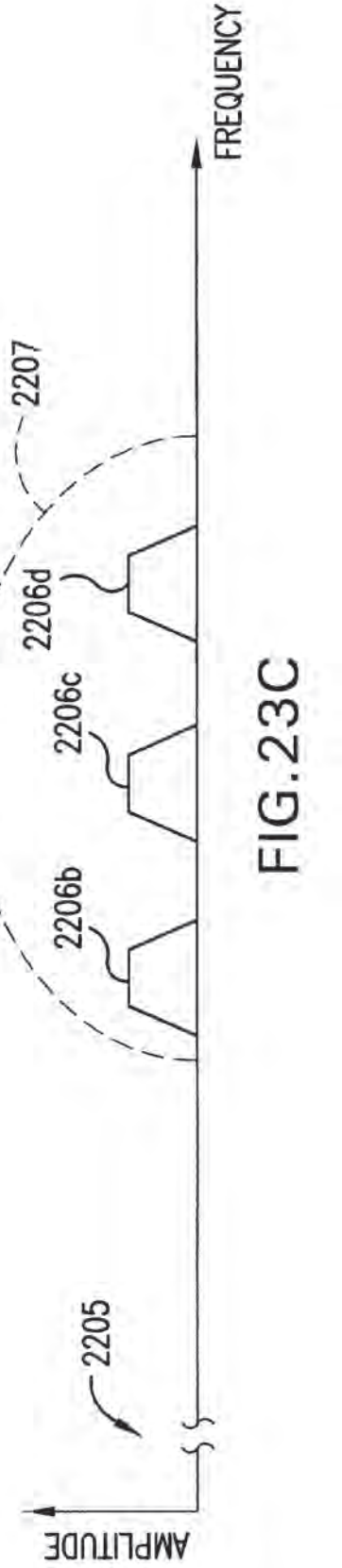


FIG.23C

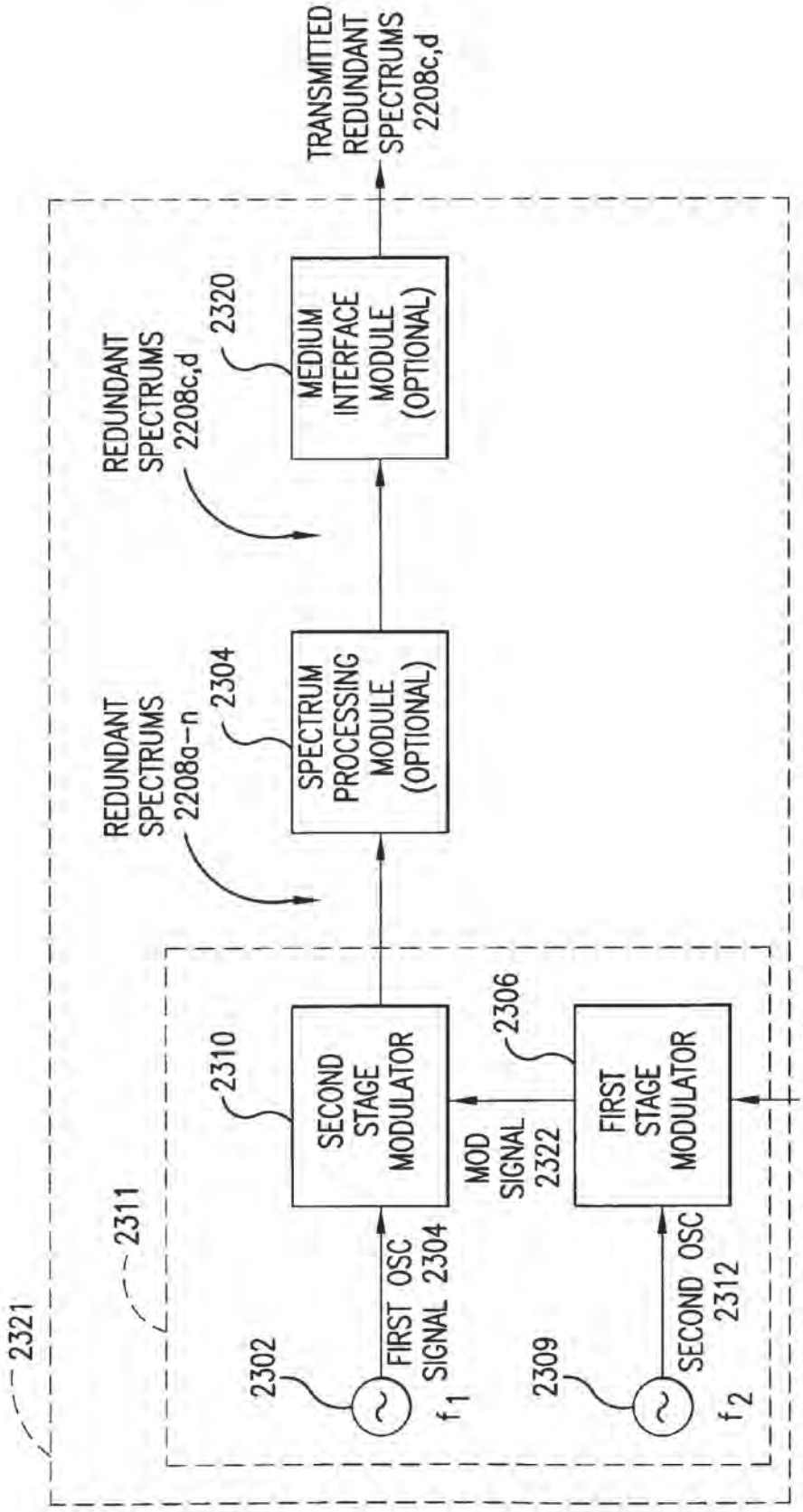

TRANSMITTED REDUNDANT SPECTRUMS 2208c,d
REDUNDANT SPECTRUMS 2208c,d
2320
MEDIUM INTERFACE MODULE (OPTIONAL)
REDUNDANT SPECTRUMS 2208a–n
2304
SPECTRUM PROCESSING MODULE (OPTIONAL)
2310
SECOND STAGE MODULATOR
2306
MOD SIGNAL 2322
FIRST STAGE MODULATOR
2311
2321
2302
FIRST OSC SIGNAL 2304
f_1
2309
SECOND OSC 2312
f_2
MODULATING BASEBAND SIGNAL 2202

FIG.23D

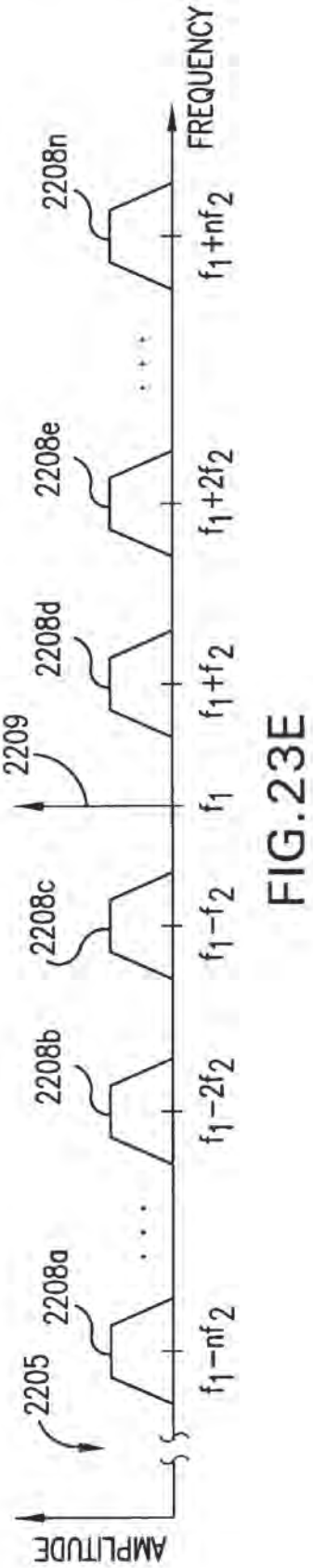


FIG.23E

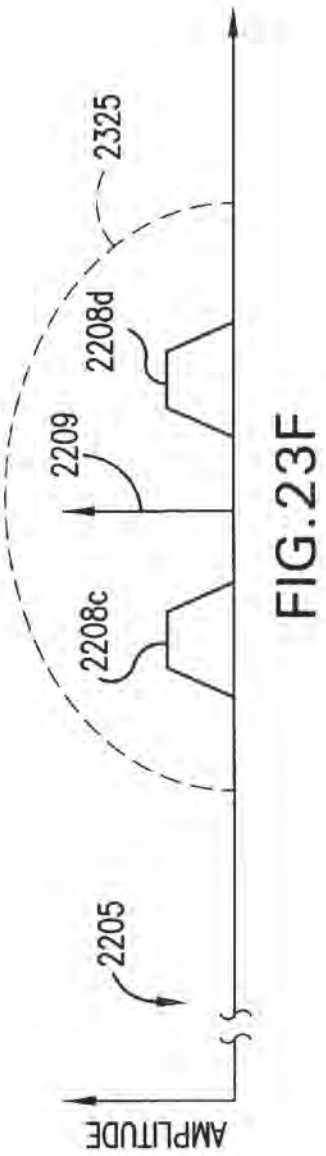


FIG.23F

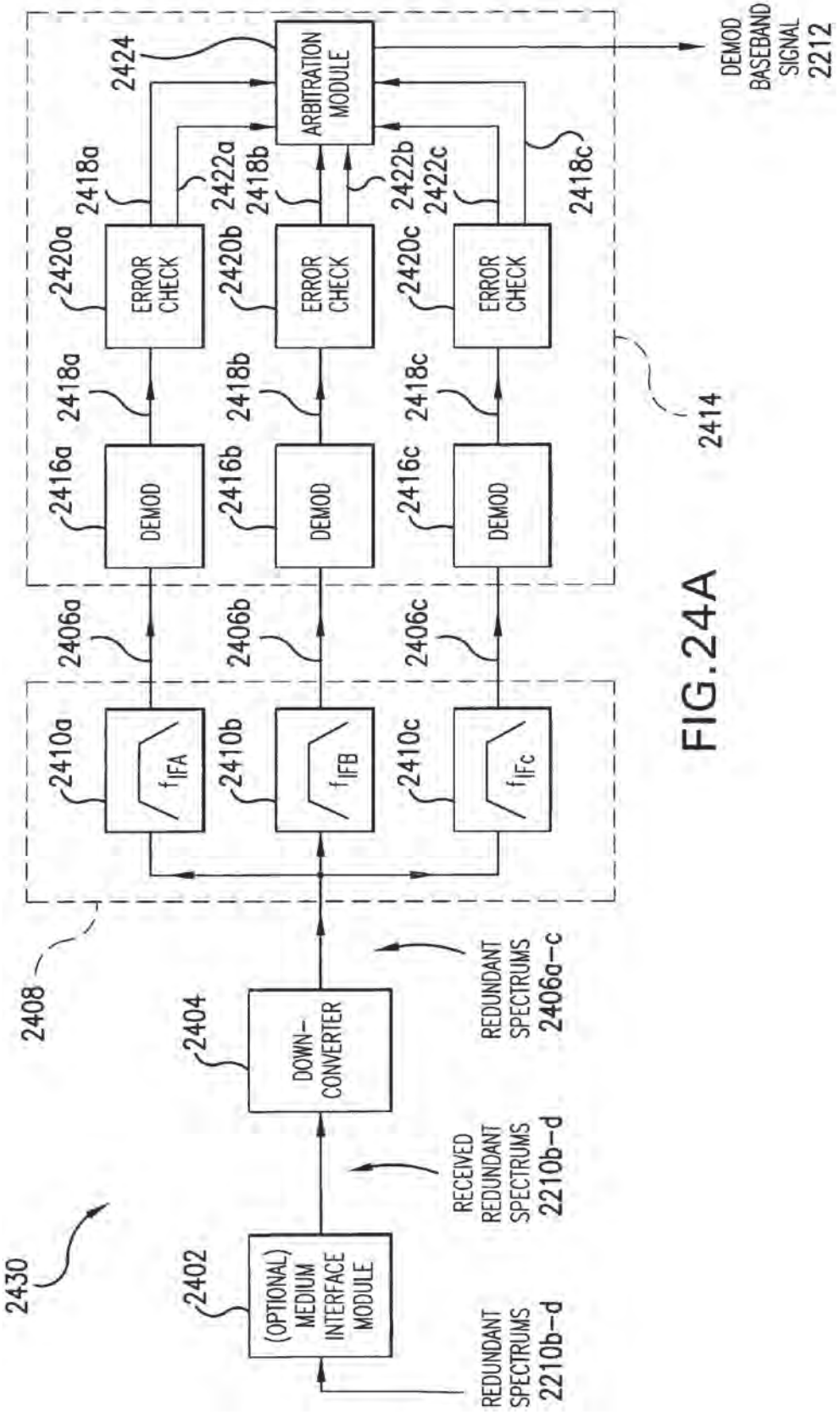

2430
2402
(OPTIONAL) MEDIUM INTERFACE MODULE
REDUNDANT SPECTRUMS 2210b–d
RECEIVED REDUNDANT SPECTRUMS 2210b–d
2404
DOWN-CONVERTER
REDUNDANT SPECTRUMS 2406a–c
2408
2410a
f_{IFA}
2410b
f_{IFB}
2410c
f_{IFC}
2406a
2406b
2406c
2414
2416a
DEMOD
2416b
DEMOD
2416c
DEMOD
2418a
2418b
2418c
2420a
ERROR CHECK
2420b
ERROR CHECK
2420c
ERROR CHECK
2422a
2422b
2422c
2424
ARBITRATION MODULE
DEMOD BASEBAND SIGNAL 2212

FIG. 24A

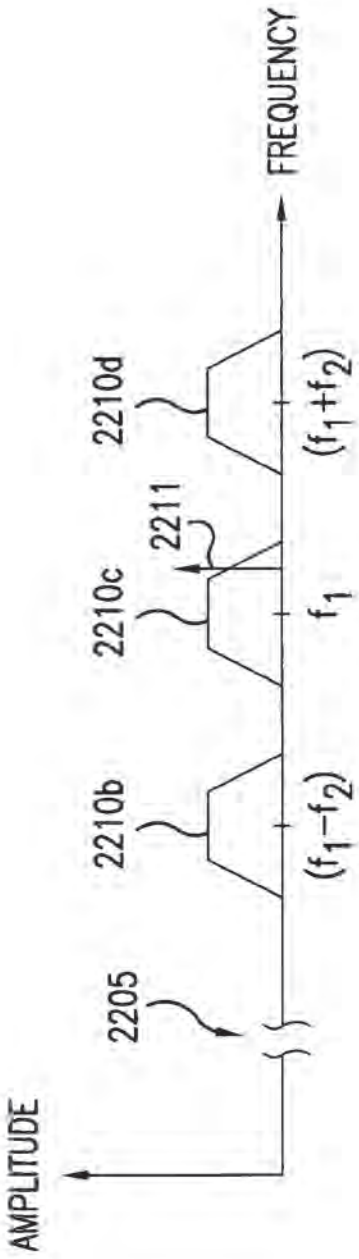


FIG.24B

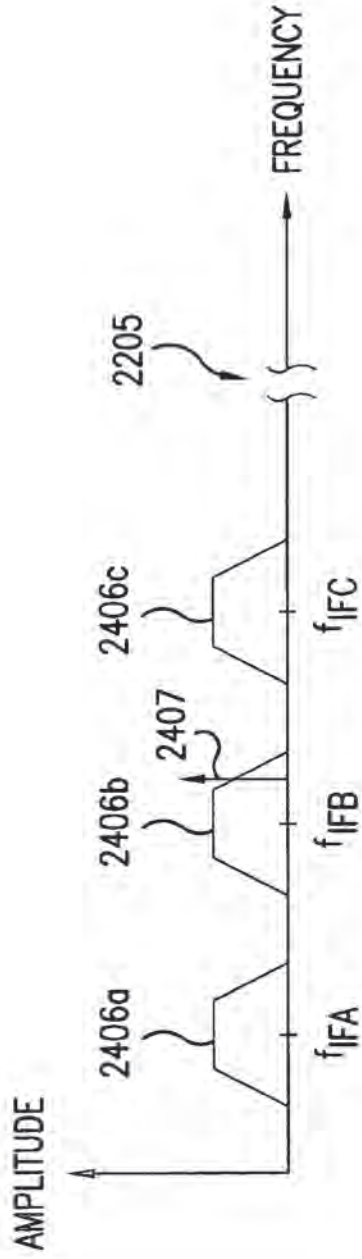


FIG.24C

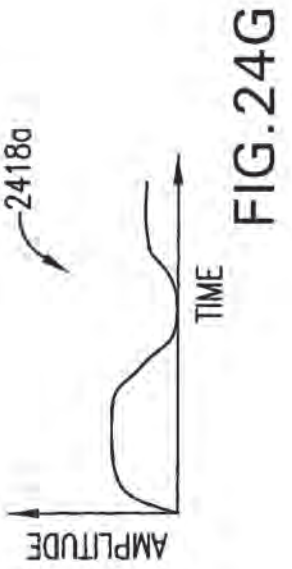


FIG.24G

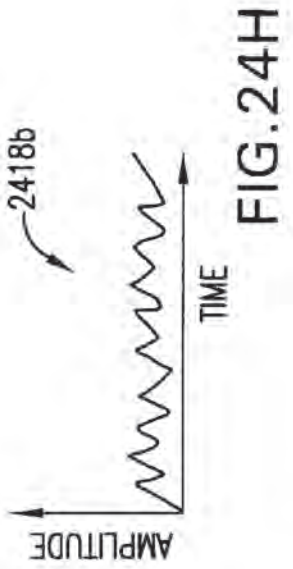


FIG.24H

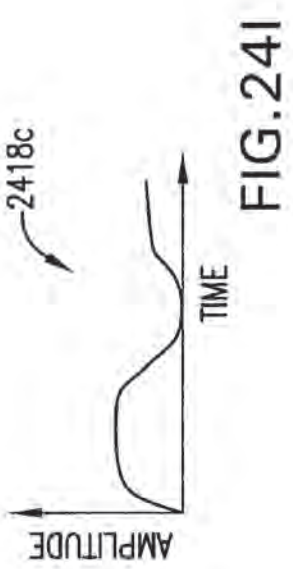


FIG.24I

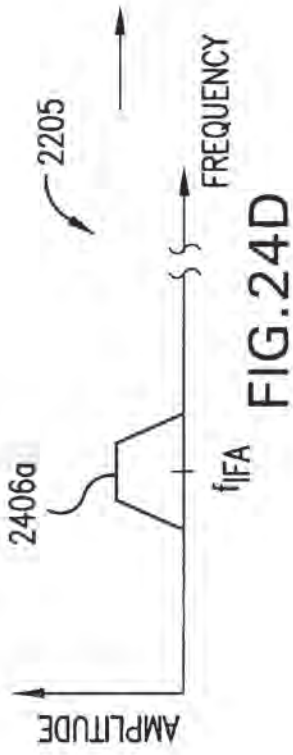


FIG.24D

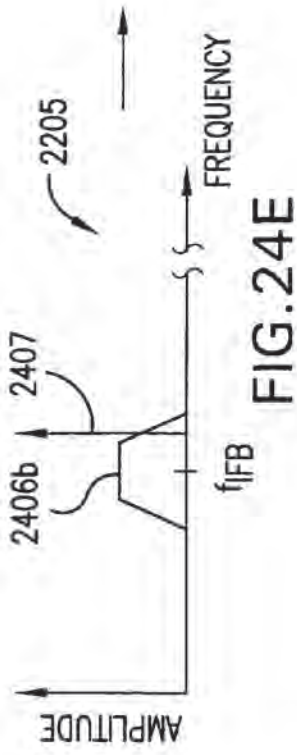


FIG.24E

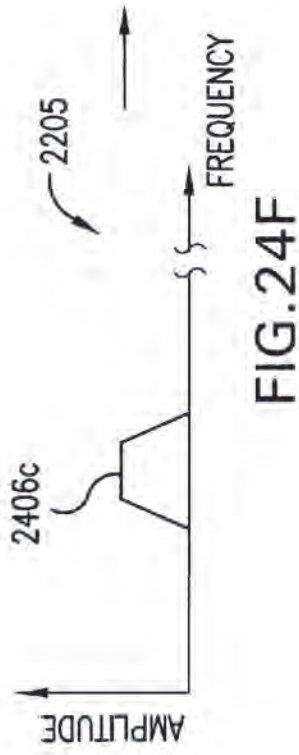


FIG.24F

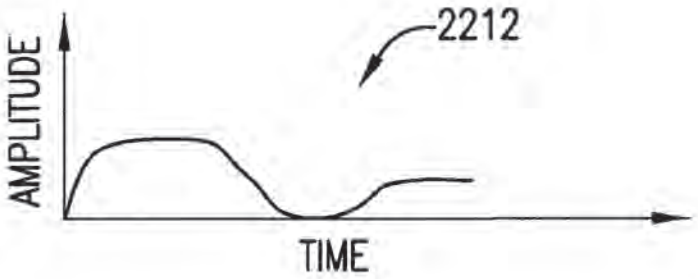


FIG.24J

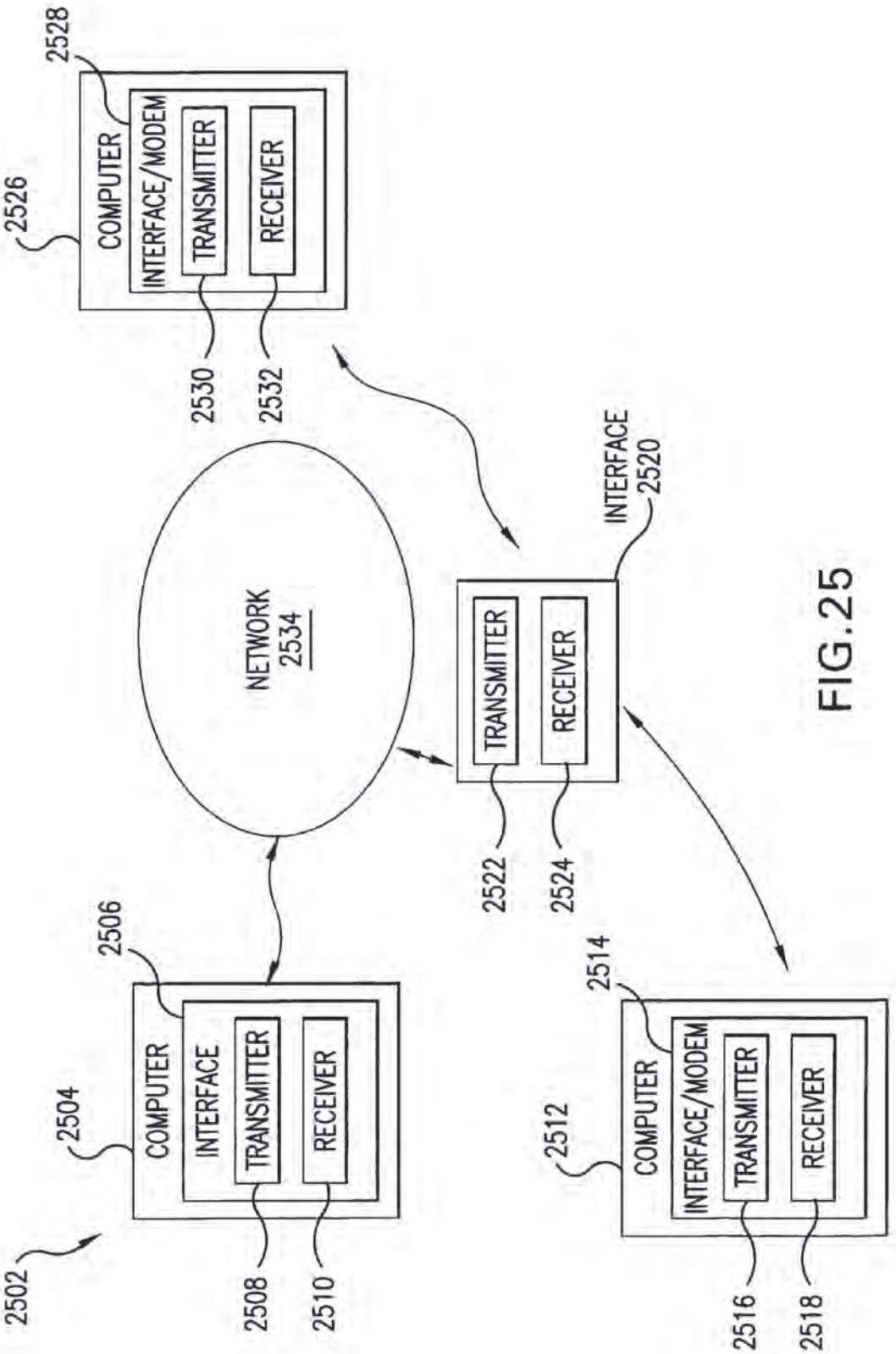

2528
COMPUTER
INTERFACE/MODEM
TRANSMITTER
RECEIVER
2526
2530
2532
NETWORK
2534
INTERFACE
2520
TRANSMITTER
RECEIVER
2522
2524
2506
2504
COMPUTER
INTERFACE
TRANSMITTER
RECEIVER
2502
2508
2510
2514
2512
COMPUTER
INTERFACE/MODEM
TRANSMITTER
RECEIVER
2516
2518

FIG.25

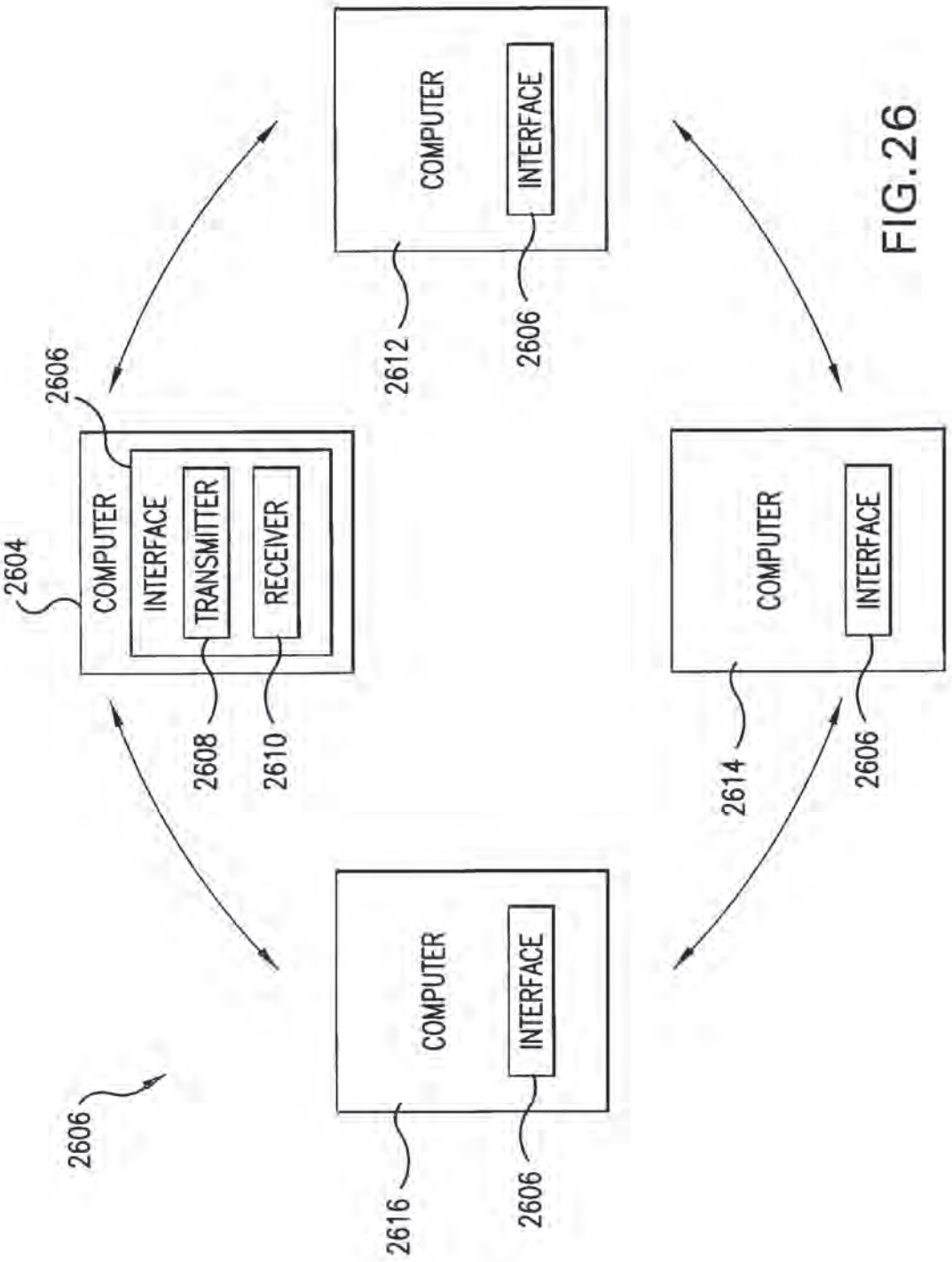

COMPUTER
INTERFACE
2606
2612
2606
COMPUTER
INTERFACE
TRANSMITTER
RECEIVER
2604
2606
2608
2610
COMPUTER
INTERFACE
2614
2606
COMPUTER
INTERFACE
2606
2616
2606

FIG.26

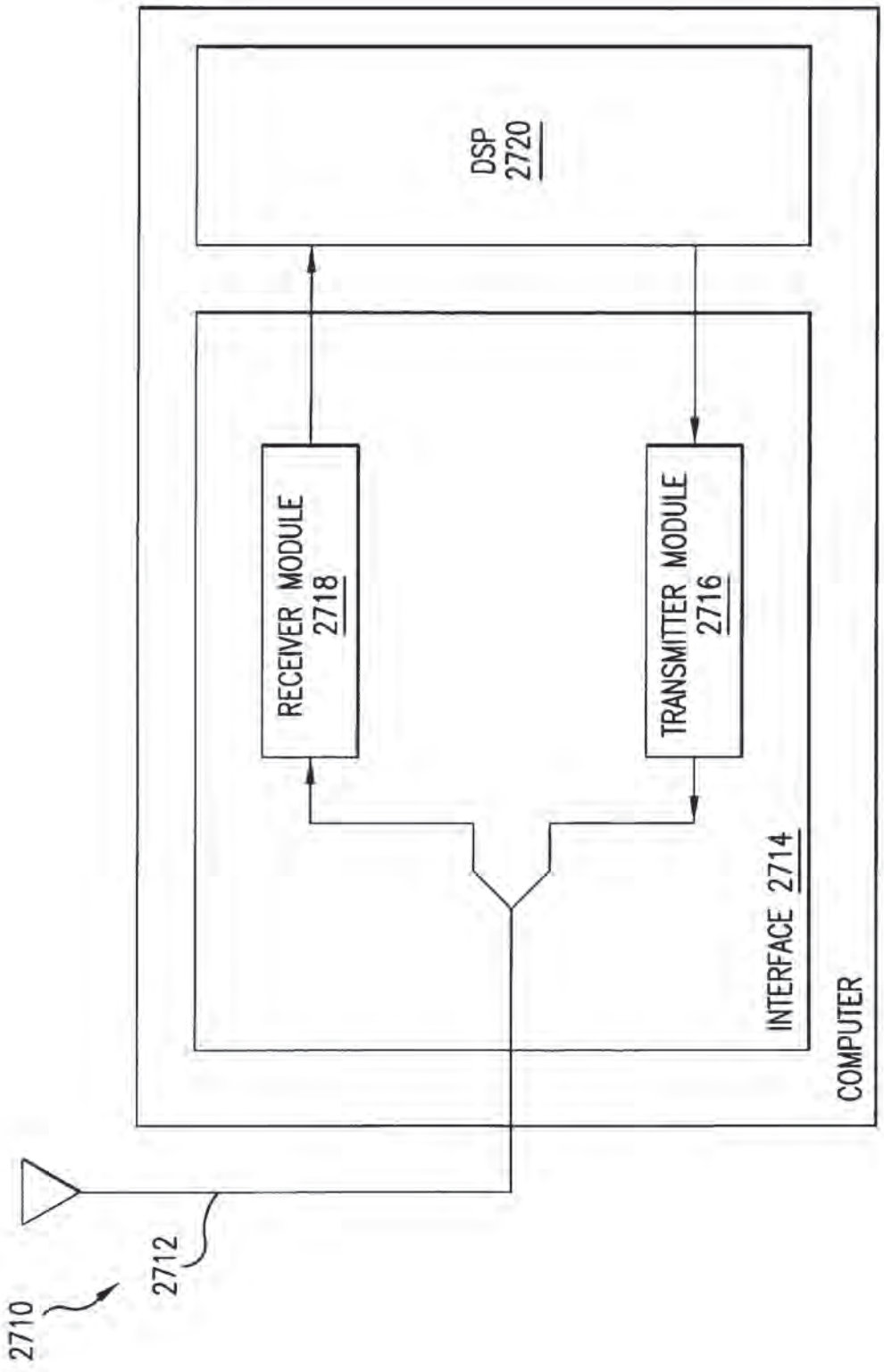

DSP
2720
RECEIVER MODULE
2718
TRANSMITTER MODULE
2716
INTERFACE 2714
COMPUTER
2712
2710

FIG.27

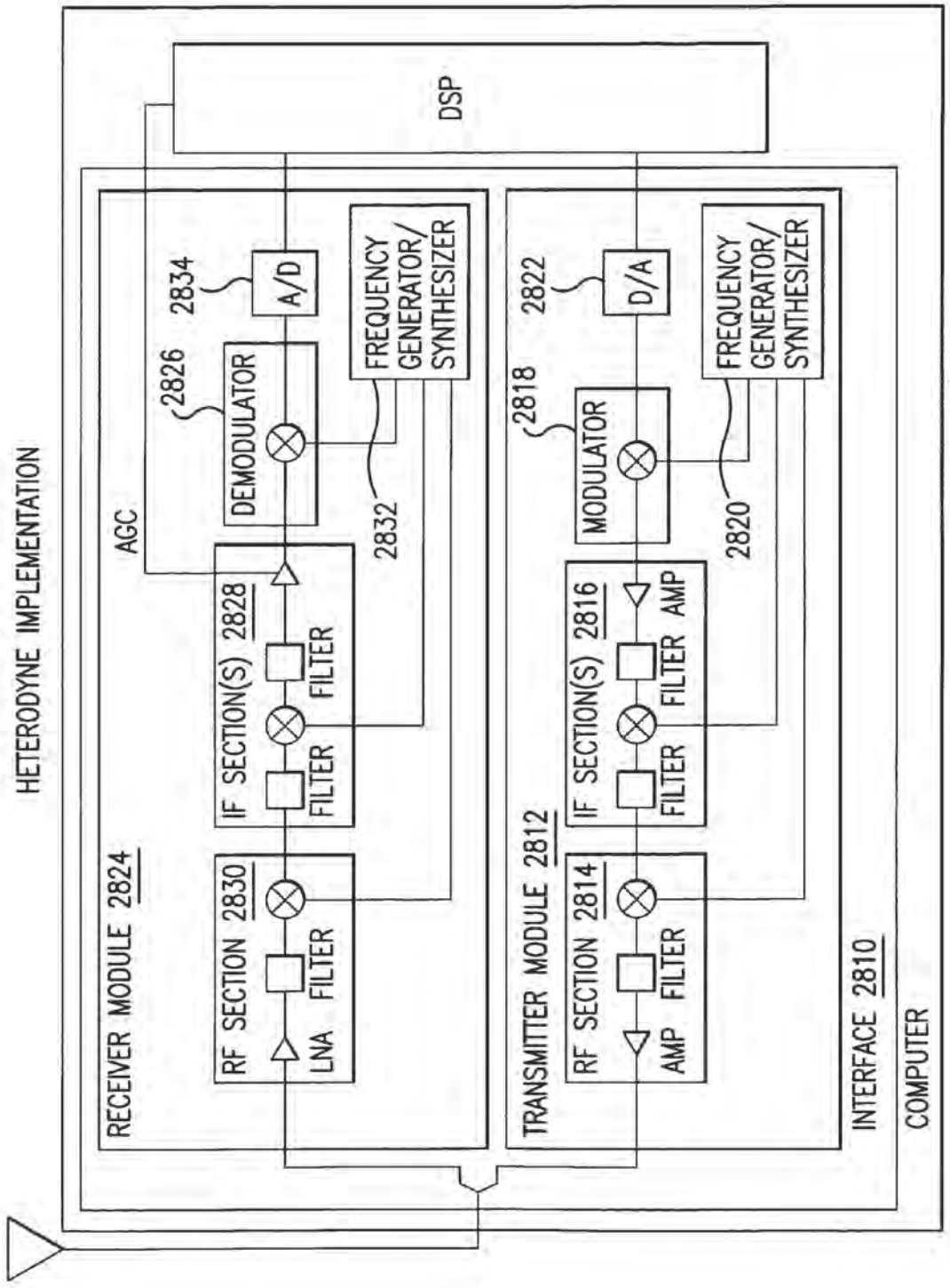

HETERODYNE IMPLEMENTATION
RECEIVER MODULE 2824
AGC
RF SECTION 2830
LNA FILTER
IF SECTION(S) 2828
FILTER
FILTER
DEMODULATOR
2826
2834
A/D
FREQUENCY GENERATOR/ SYNTHESIZER
2832
TRANSMITTER MODULE 2812
RF SECTION 2814
AMP FILTER
IF SECTION(S) 2816
FILTER
FILTER AMP
MODULATOR
2818
2822
D/A
FREQUENCY GENERATOR/ SYNTHESIZER
2820
DSP
INTERFACE 2810
COMPUTER

FIG.28

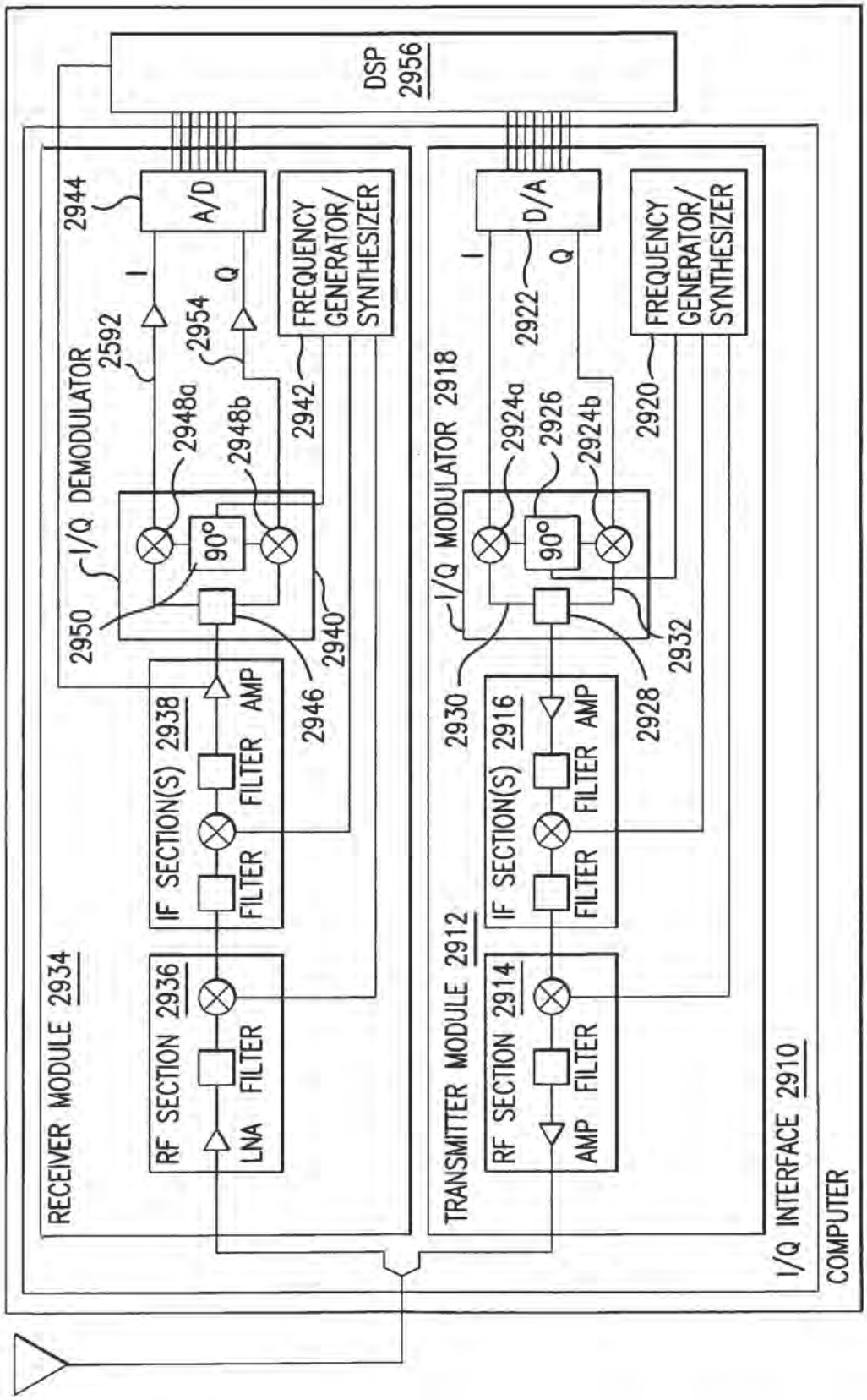

DSP 2956
RECEIVER MODULE 2934
TRANSMITTER MODULE 2912
I/Q INTERFACE 2910
COMPUTER
I/Q DEMODULATOR 2592
I/Q MODULATOR 2918
A/D 2944
D/A
FREQUENCY GENERATOR/ SYNTHESIZER 2942
FREQUENCY GENERATOR/ SYNTHESIZER 2920
I
Q
2954
2922
2948a
2948b
2924a
2926
2924b
90°
2950
2940
2946
2930
2932
2928
IF SECTION(S) 2938
FILTER
FILTER AMP
IF SECTION(S) 2916
RF SECTION 2936
LNA FILTER
RF SECTION 2914
AMP FILTER

FIG.29

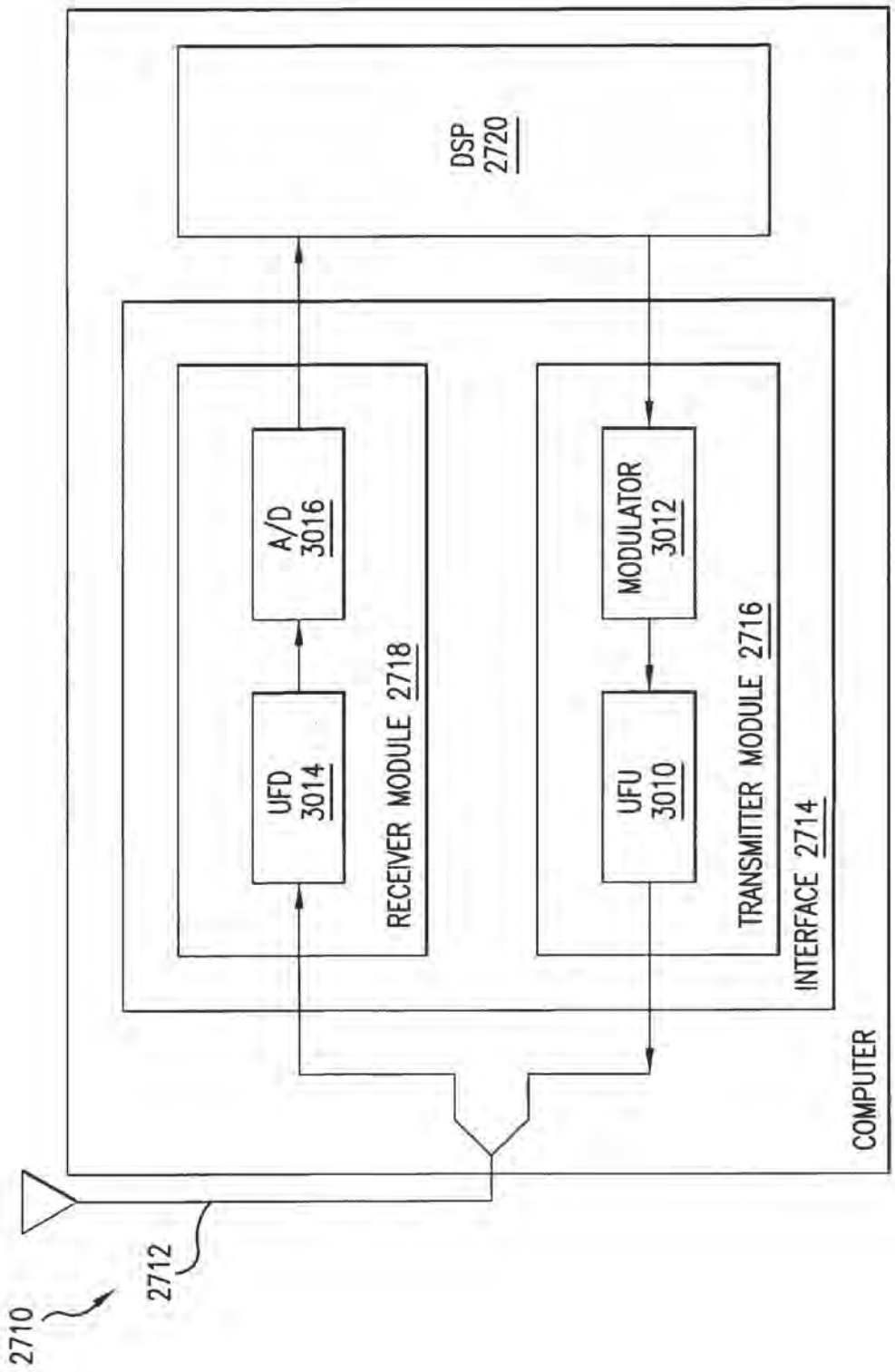

DSP
2720
A/D
3016
UFD
3014
RECEIVER MODULE 2718
MODULATOR
3012
UFU
3010
TRANSMITTER MODULE 2716
INTERFACE 2714
COMPUTER
2712
2710

FIG.30

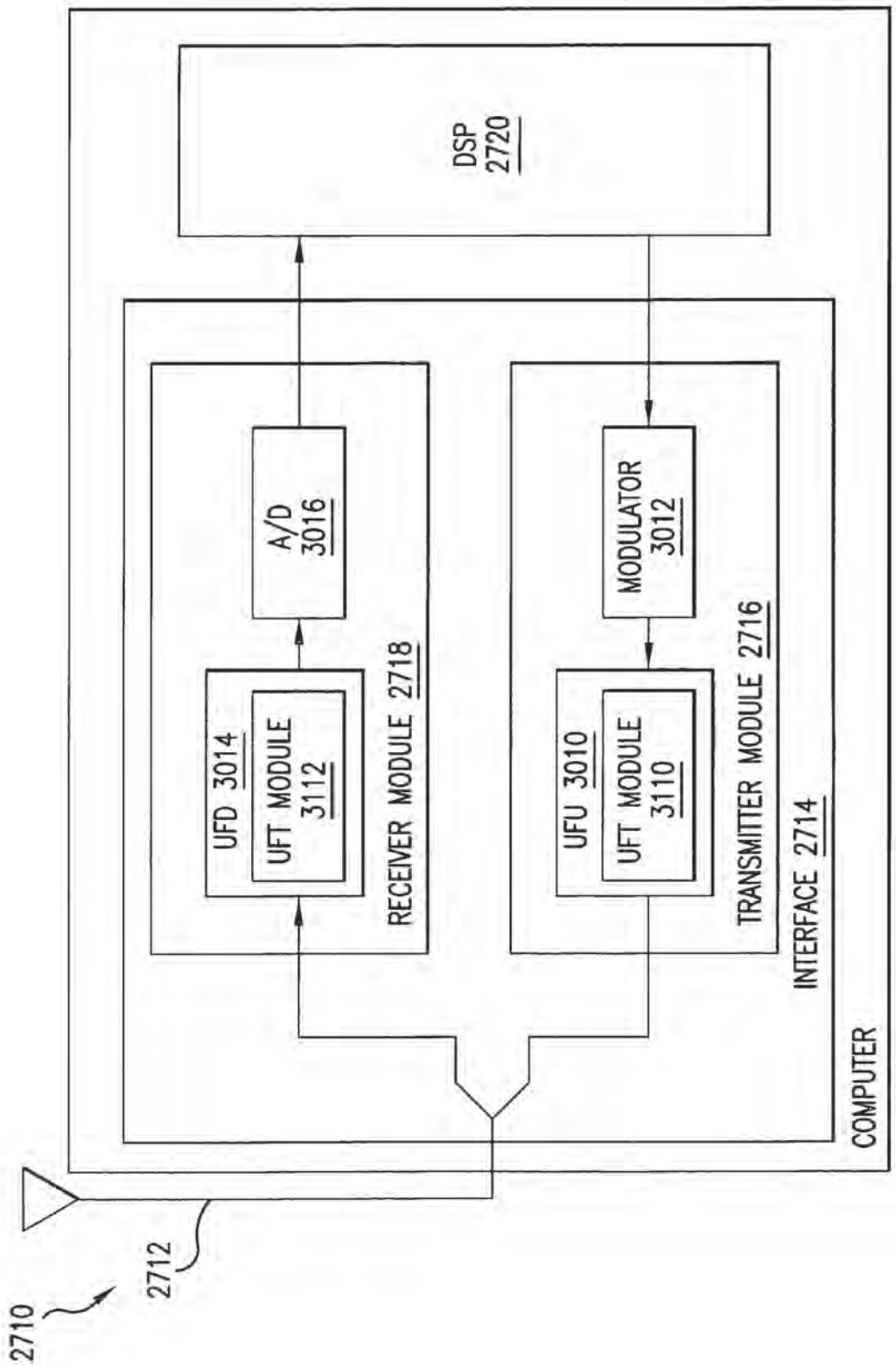

2710
2712
COMPUTER
INTERFACE 2714
TRANSMITTER MODULE 2716
RECEIVER MODULE 2718
UFU 3010
UFT MODULE 3110
MODULATOR 3012
UFD 3014
UFT MODULE 3112
A/D 3016
DSP 2720

FIG.31

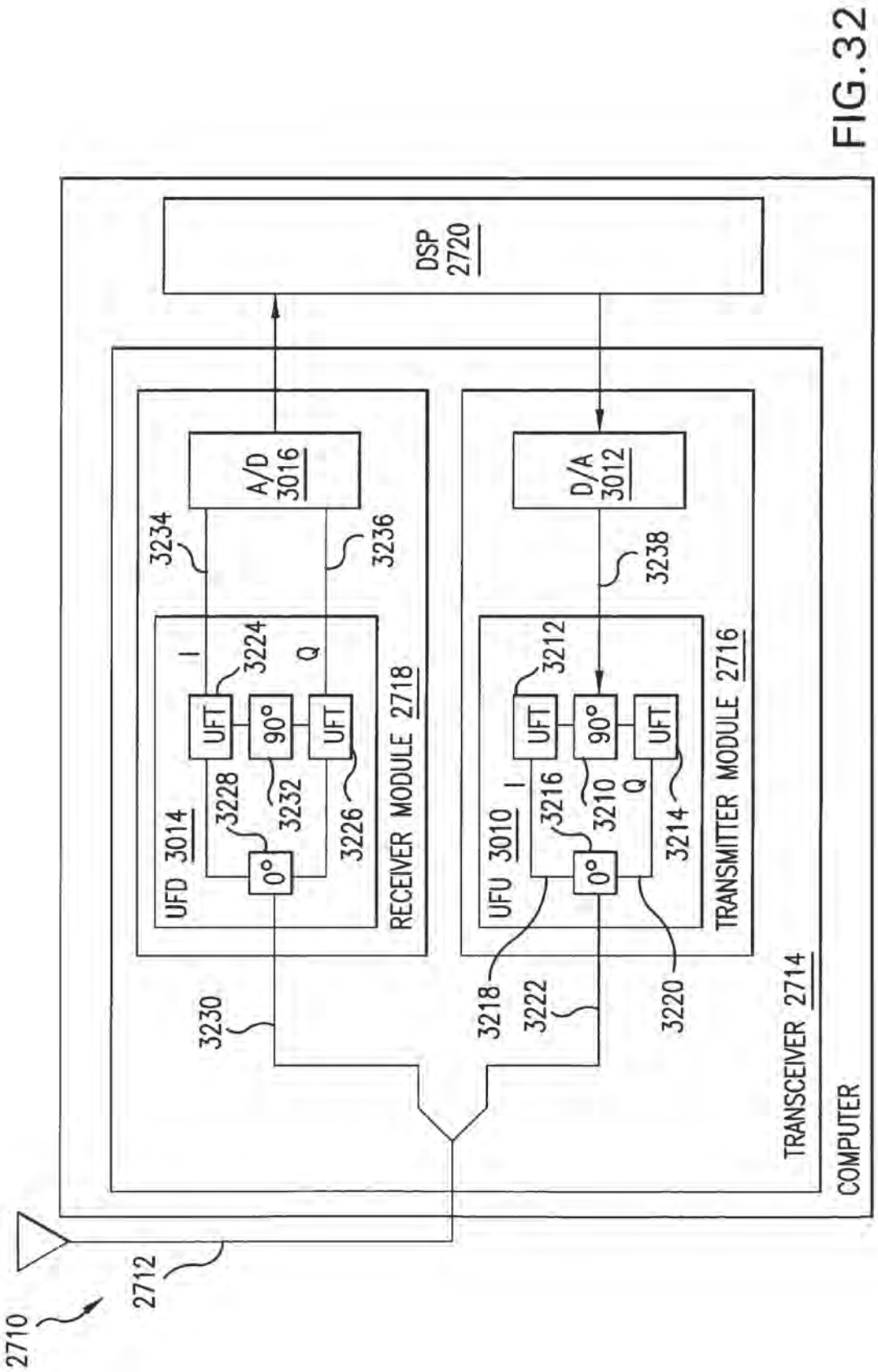

DSP 2720
A/D 3016
D/A 3012
3234
3236
3238
I
Q
3224
3212
UFT
90°
UFT
UFD 3014
3228
3232
3226
0°
RECEIVER MODULE 2718
UFU 3010
3216
3210
3214
TRANSMITTER MODULE 2716
3230
3218
3222
3220
TRANSCEIVER 2714
COMPUTER
2712
2710

FIG.32

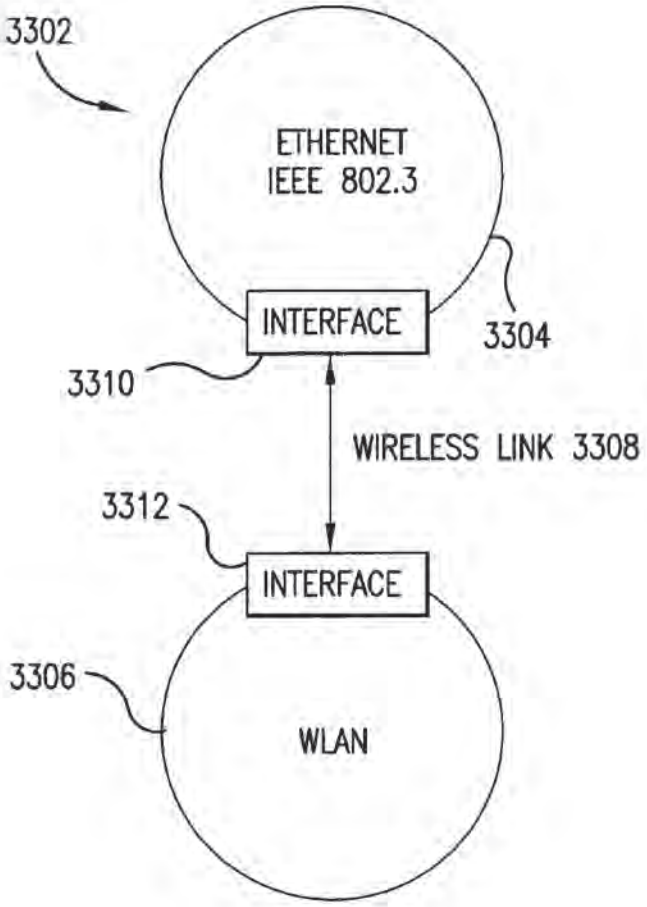

3302
ETHERNET
IEEE 802.3
INTERFACE
3304
3310
WIRELESS LINK 3308
3312
INTERFACE
3306
WLAN

FIG.33

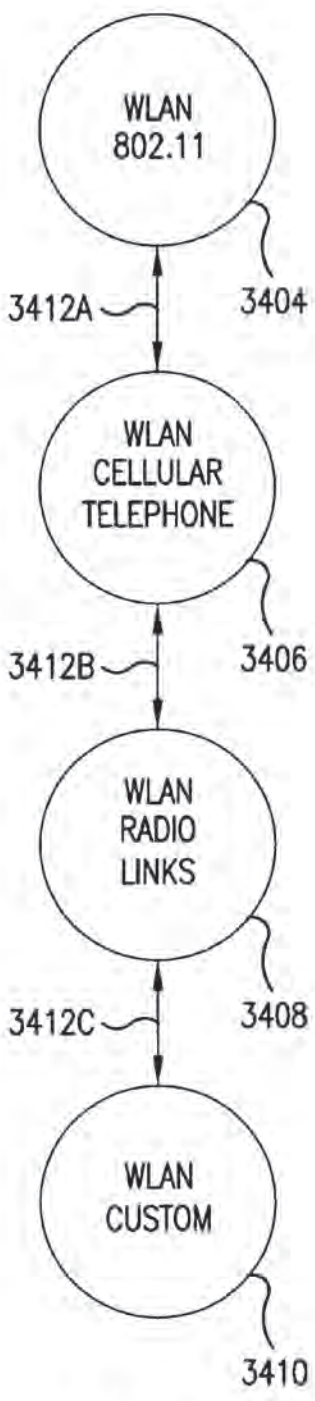

3402
WLAN
802.11
3412A
3404
WLAN
CELLULAR
TELEPHONE
3412B
3406
WLAN
RADIO
LINKS
3412C
3408
WLAN
CUSTOM
3410

FIG.34

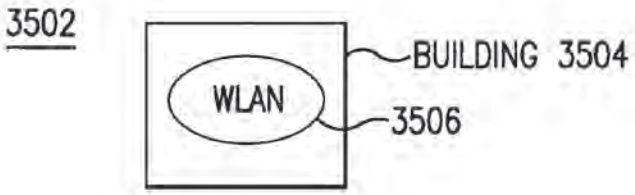


FIG.35

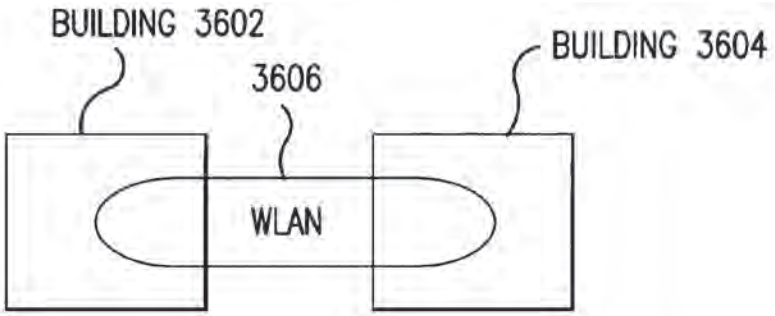


FIG.36

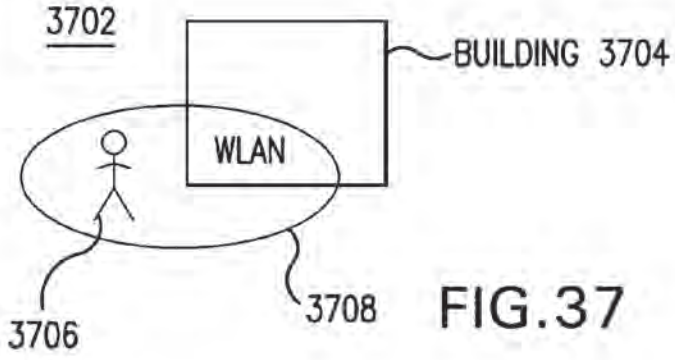


FIG.37



FIG.38

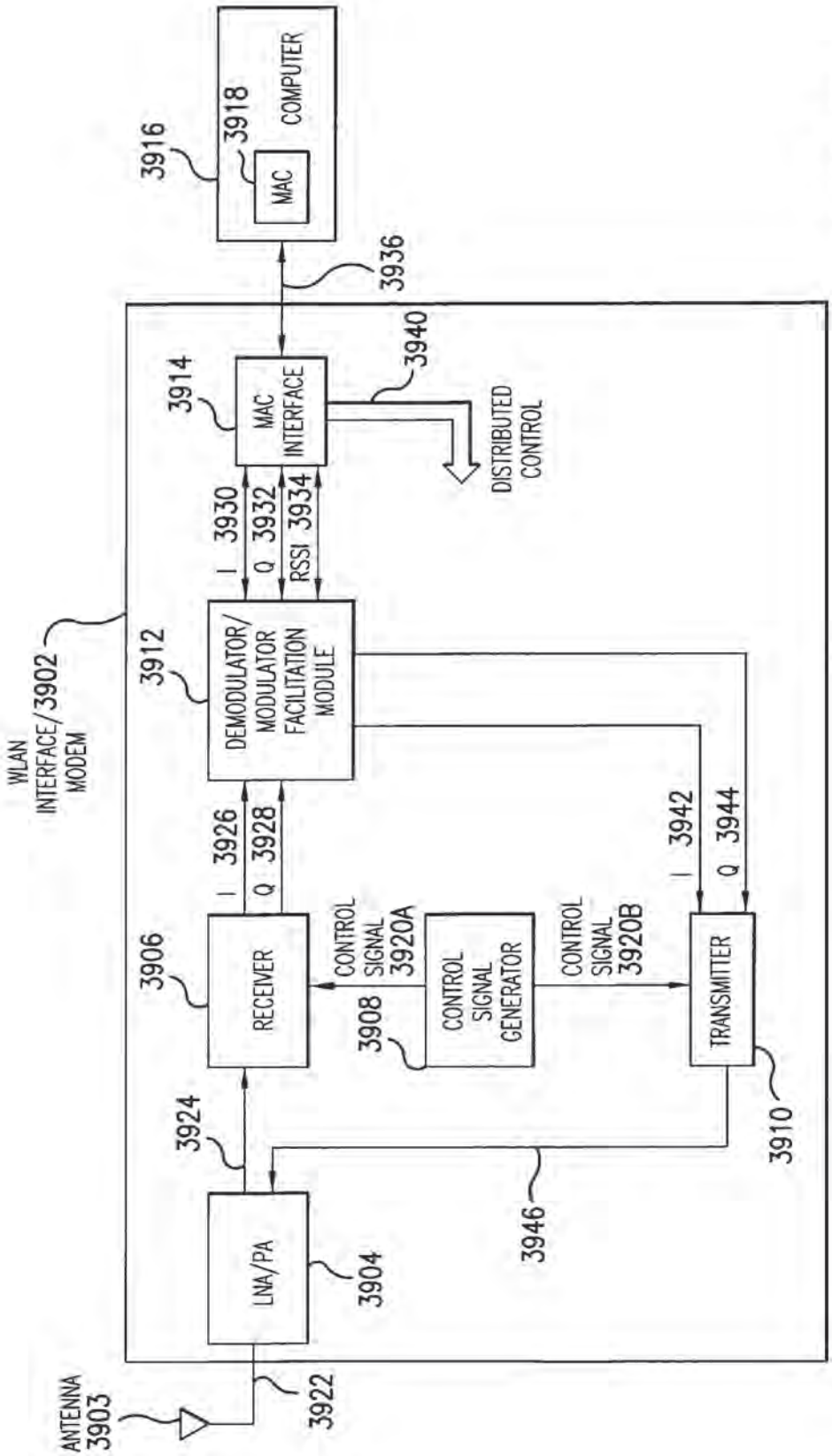

3916
3918
COMPUTER
MAC
3936
3940
3914
MAC INTERFACE
DISTRIBUTED CONTROL
I 3930
Q 3932
RSSI 3934
WLAN INTERFACE/MODEM 3902
3912
DEMODULATOR/ MODULATOR FACILITATION MODULE
I 3926
Q 3928
I 3942
Q 3944
3906
RECEIVER
CONTROL SIGNAL 3920A
3908
CONTROL SIGNAL GENERATOR
CONTROL SIGNAL 3920B
TRANSMITTER
3910
3924
3946
LNA/PA
3904
ANTENNA 3903
3922

FIG.39

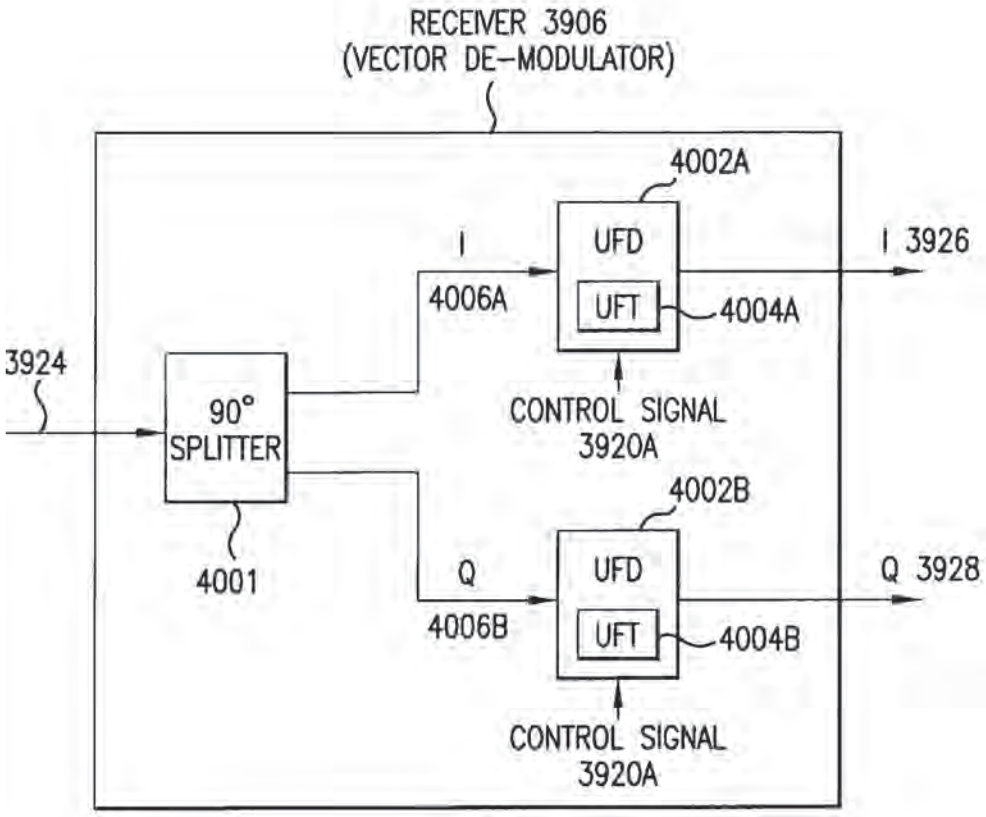

RECEIVER 3906
(VECTOR DE-MODULATOR)
4002A
UFD
UFT
4004A
I
4006A
I 3926
3924
90°
SPLITTER
4001
CONTROL SIGNAL
3920A
4002B
UFD
UFT
4004B
Q
4006B
Q 3928
CONTROL SIGNAL
3920A

FIG.40

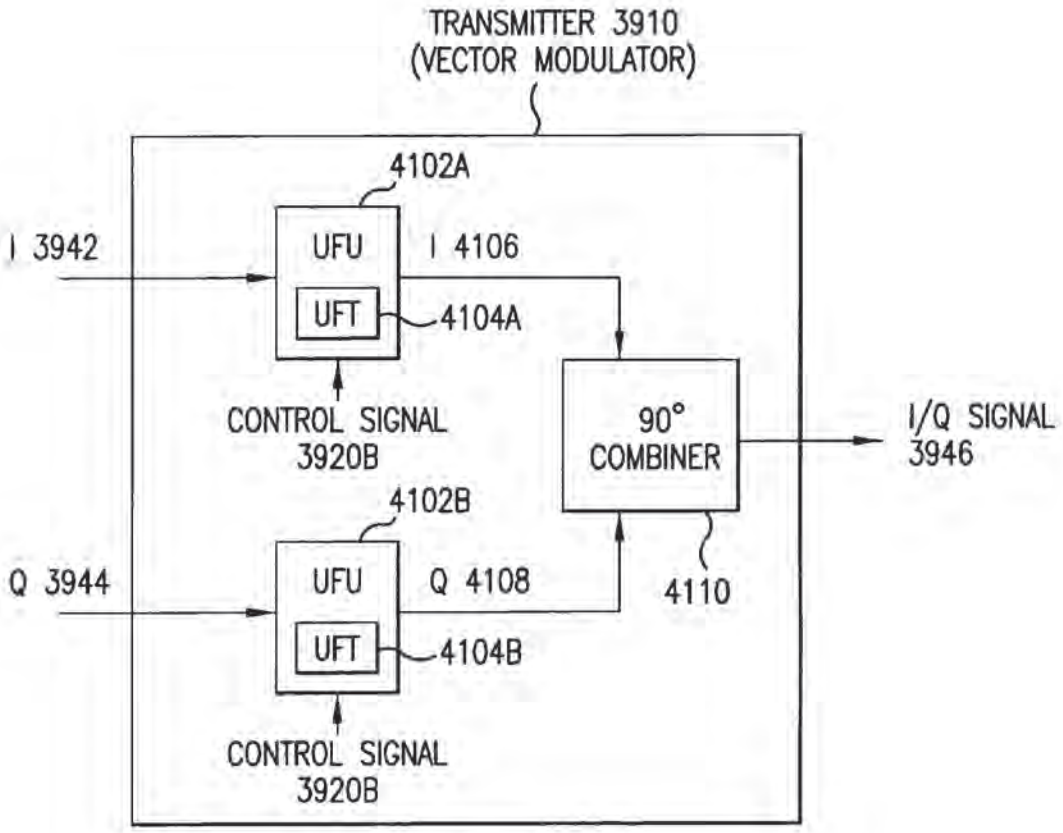

TRANSMITTER 3910
(VECTOR MODULATOR)
4102A
I 3942
UFU
I 4106
UFT
4104A
CONTROL SIGNAL
3920B
90°
COMBINER
I/Q SIGNAL
3946
4102B
Q 3944
UFU
Q 4108
4110
UFT
4104B
CONTROL SIGNAL
3920B

FIG.41

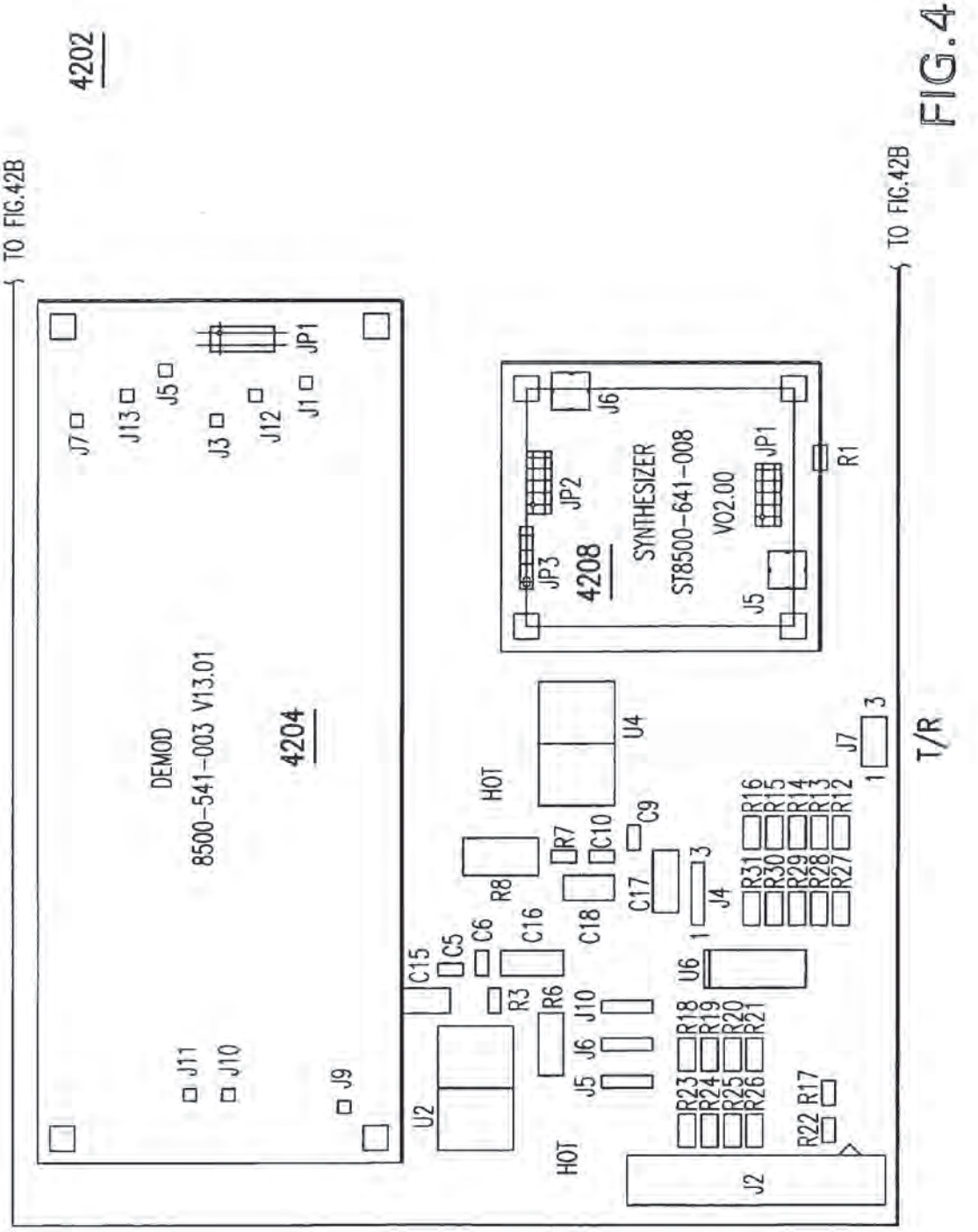

4202
TO FIG.42B
TO FIG.42B
DEMOD
8500-541-003 V13.01
4204
4208
SYNTHESIZER
ST8500-641-008
V02.00
HOT
HOT
T/R
J1
J2
J3
J4
J5
J6
J7
J9
J10
J11
J12
J13
JP1
JP2
JP3
U2
U4
U6
R1
R3
R6
R7
R8
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
C5
C6
C9
C10
C15
C16
C17
C18

FIG.42A

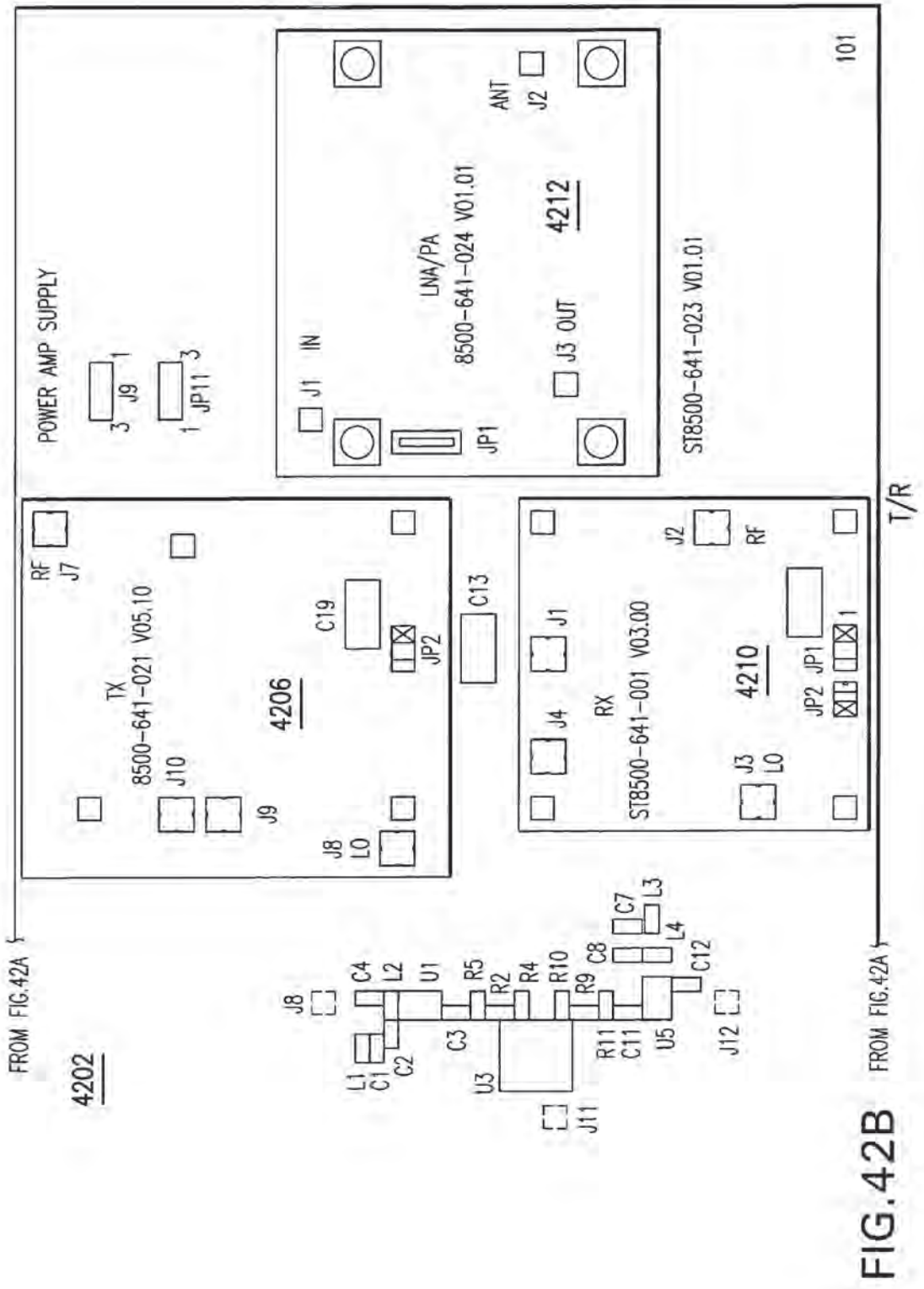

101
POWER AMP SUPPLY
J9
JP11
LNA/PA
8500-641-024 V01.01
4212
ANT
J2
J1 IN
J3 OUT
JP1
ST8500-641-023 V01.01
RF
J7
TX
8500-641-021 V05.10
J10
J9
4206
C19
JP2
C13
J8
LO
J4
J1
RX
ST8500-641-001 V03.00
4210
J2
RF
J3
LO
JP2
JP1
T/R
FROM FIG.42A
4202
FROM FIG.42A
J8
C4
L2
U1
R5
R2
R4
R10
R9
C8
C7
L3
L4
C12
J12
L1
C1
C2
C3
U3
R11
C11
U5
J11

FIG.42B

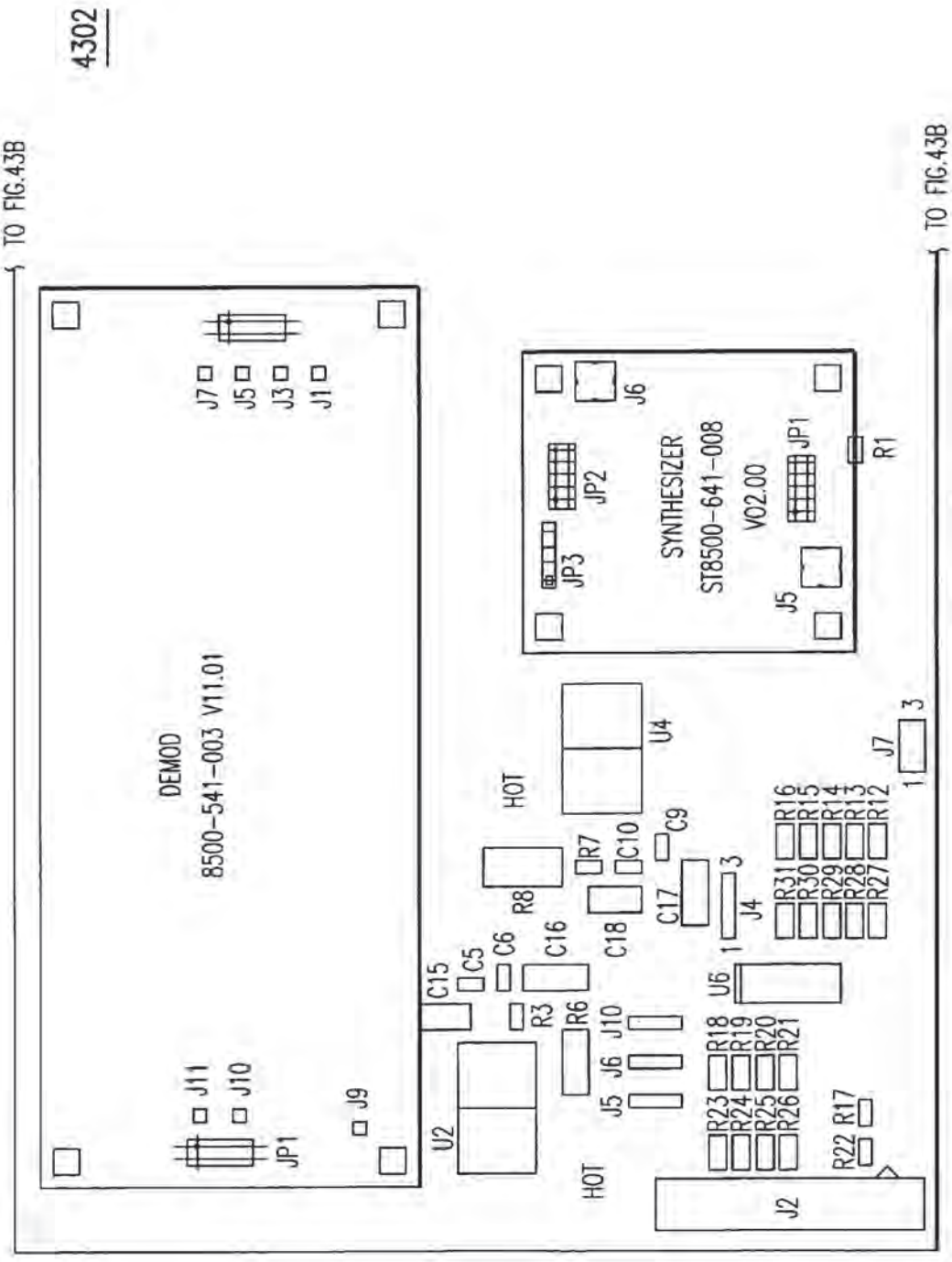

4302
TO FIG.43B
TO FIG.43B
DEMOD
8500-541-003 V11.01
SYNTHESIZER
ST8500-641-008
V02.00
RECEIVE
HOT
HOT
J1
J3
J5
J7
J9
J10
J11
JP1
JP2
JP3
J2
J4
J5
J6
J7
U2
U4
U6
R1
R3
R6
R7
R8
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
C5
C6
C9
C10
C15
C16
C17
C18

FIG.43A

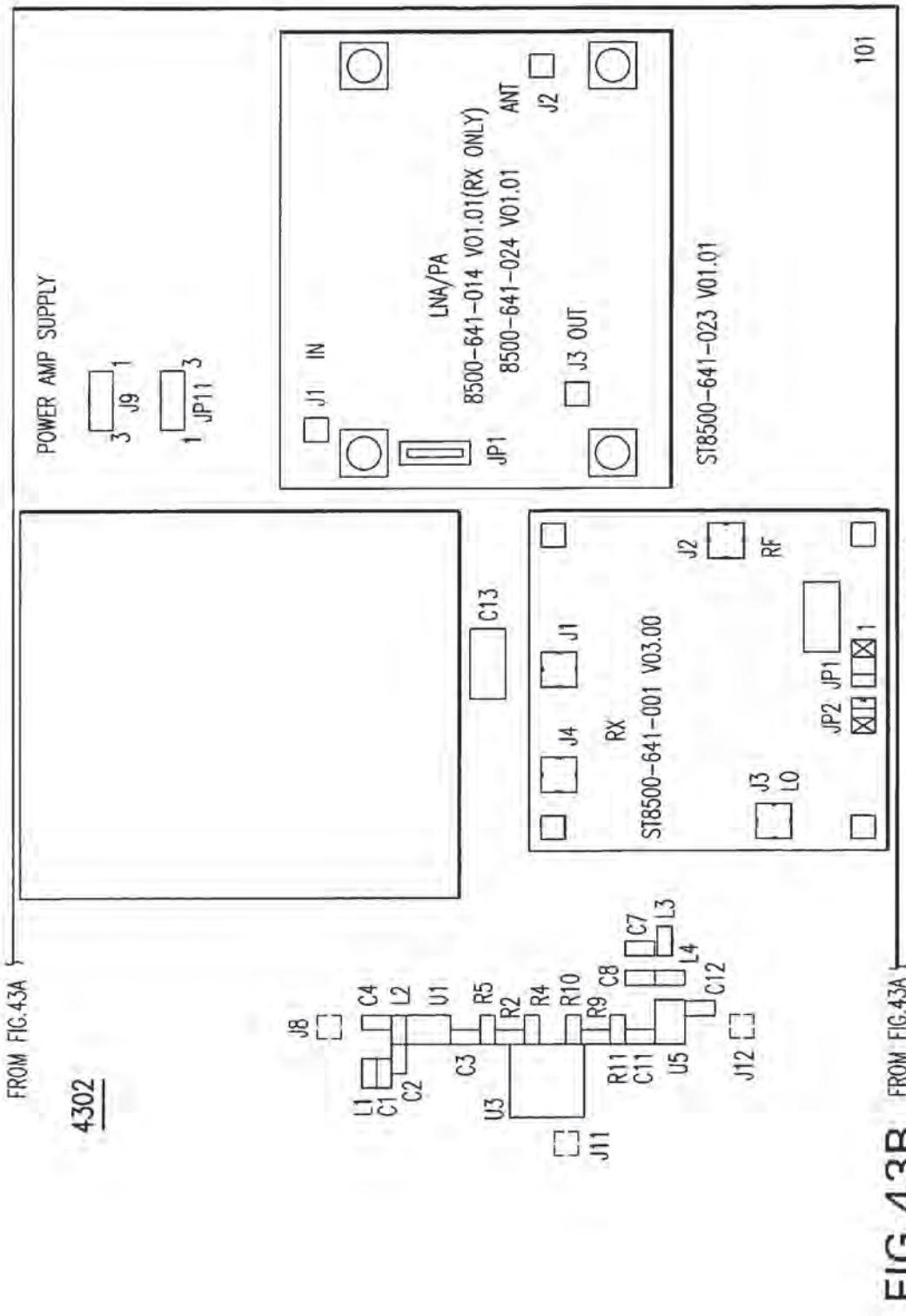

FROM FIG.43A
4302
POWER AMP SUPPLY
J9
JP11
J1 IN
LNA/PA
8500-641-014 V01.01(RX ONLY)
8500-641-024 V01.01
JP1
J3 OUT
ANT
J2
ST8500-641-023 V01.01
101
C13
J1
J4
RX
ST8500-641-001 V03.00
J2
RF
J3
LO
JP2 JP1
RECEIVE
FROM FIG.43A
J8
C4
L2
U1
R5
R2
R4
R10
R9
C8
C7
L3
L4
C12
J12
L1
C1
C2
C3
U3
J11
R11
C11
U5

FIG.43B

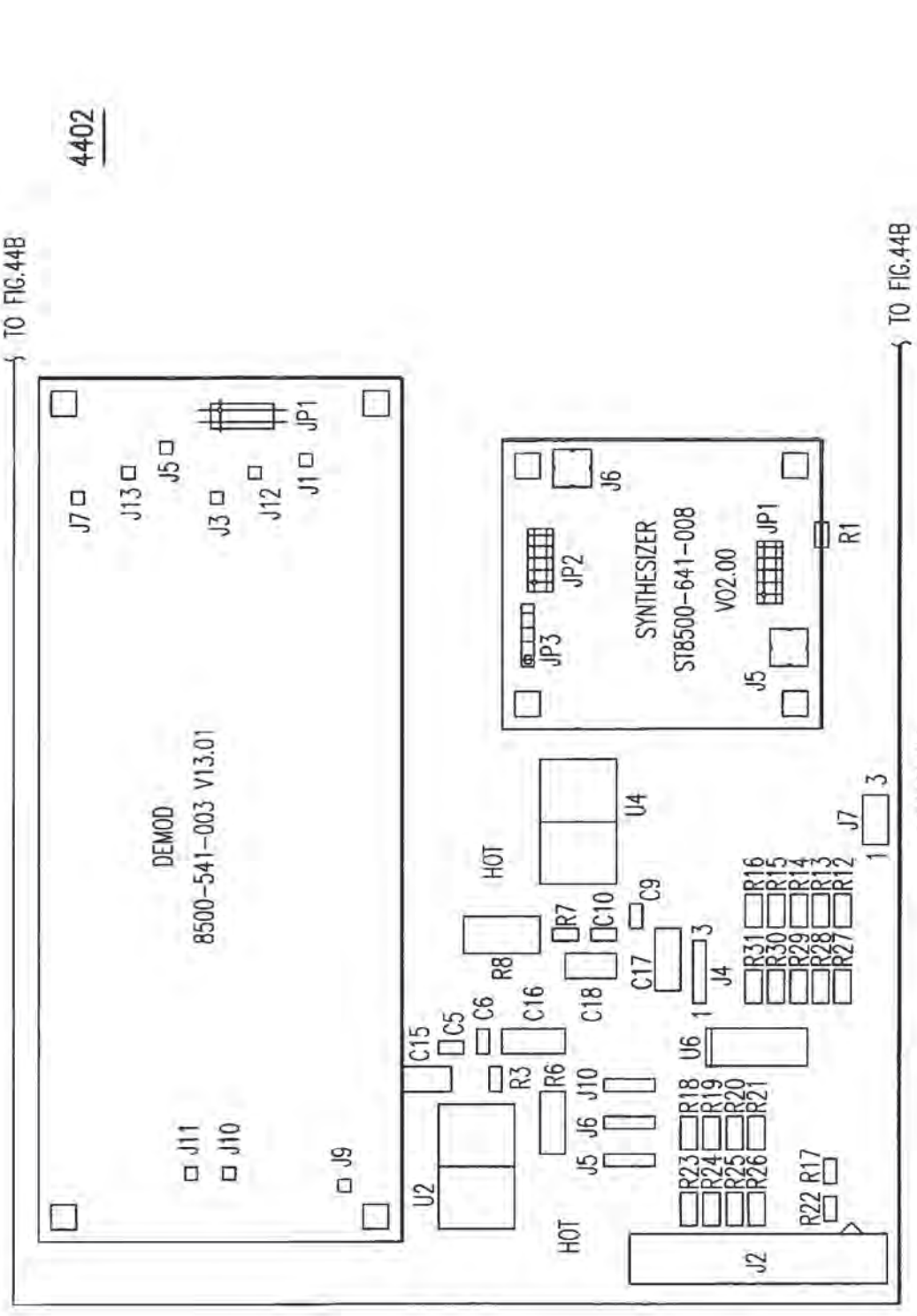

4402
TO FIG.44B
TO FIG.44B
DEMOD
8500-541-003 V13.01
SYNTHESIZER
ST8500-641-008
V02.00
TRANSMIT
HOT
HOT
J7
J13
J5
J3
J12
J1
JP1
J11
J10
J9
U2
C15
C5
C6
R3
C16
R6
J10
J6
J5
R18
R19
R20
R21
R23
R24
R25
R26
R22
R17
R8
C18
R7
C10
C9
C17
U6
J4
U4
JP3
JP2
J6
J5
JP1
R1
J7
R31
R30
R29
R28
R27
R16
R15
R14
R13
R12
J2

FIG.44A

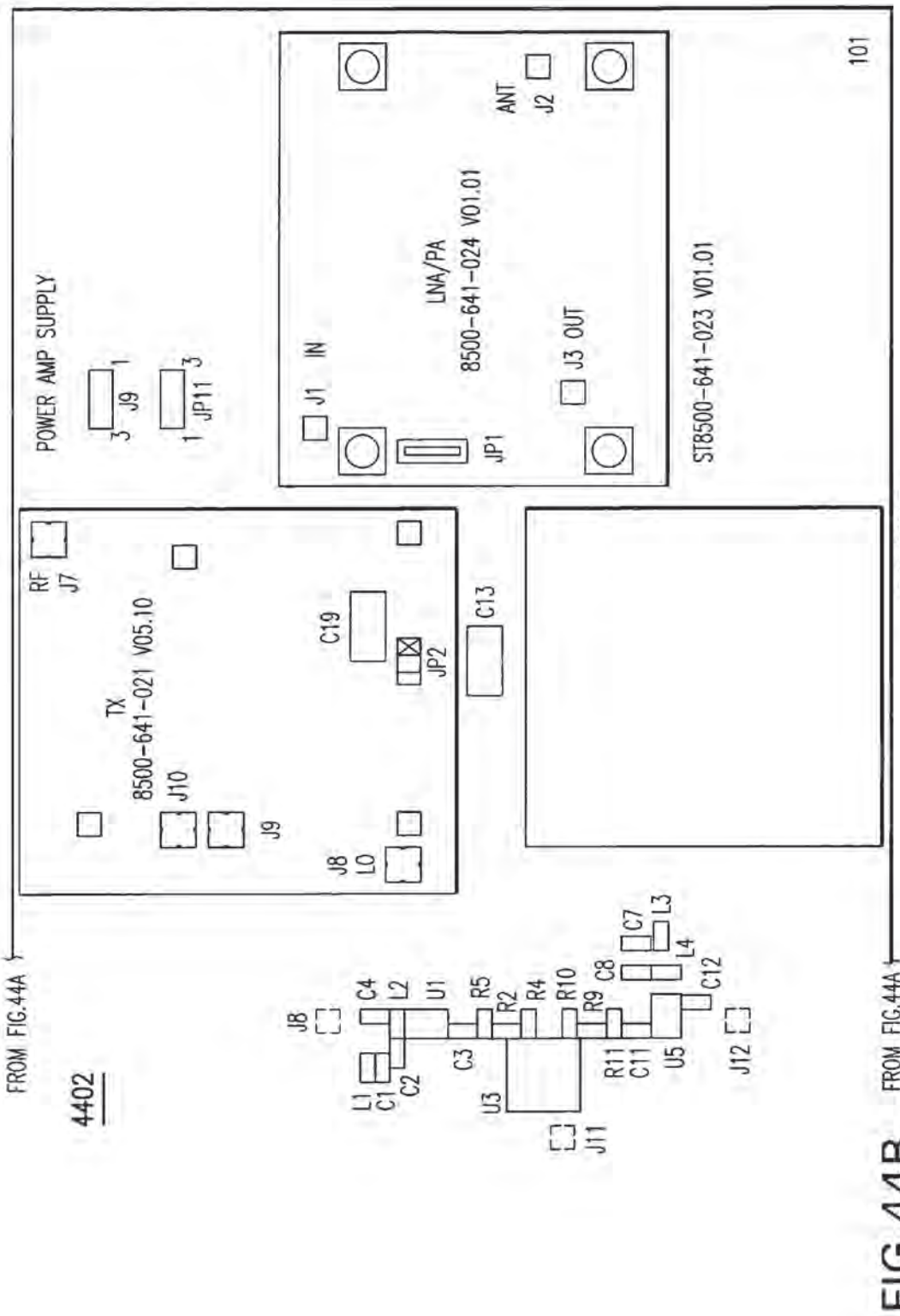

FROM FIG.44A
4402
POWER AMP SUPPLY
J9
JP11
J1 IN
LNA/PA
8500-641-024 V01.01
JP1
J3 OUT
ANT
J2
ST8500-641-023 V01.01
101
RF
J7
TX
8500-641-021 V05.10
J10
J9
J8
LO
C19
JP2
C13
TRANSMIT
FROM FIG.44A
J8
C4
L2
U1
R5
R2
R4
R10
R9
C8
C7
L3
L4
C12
J12
L1
C1
C2
C3
U3
J11
R11
C11
U5

FIG.44B

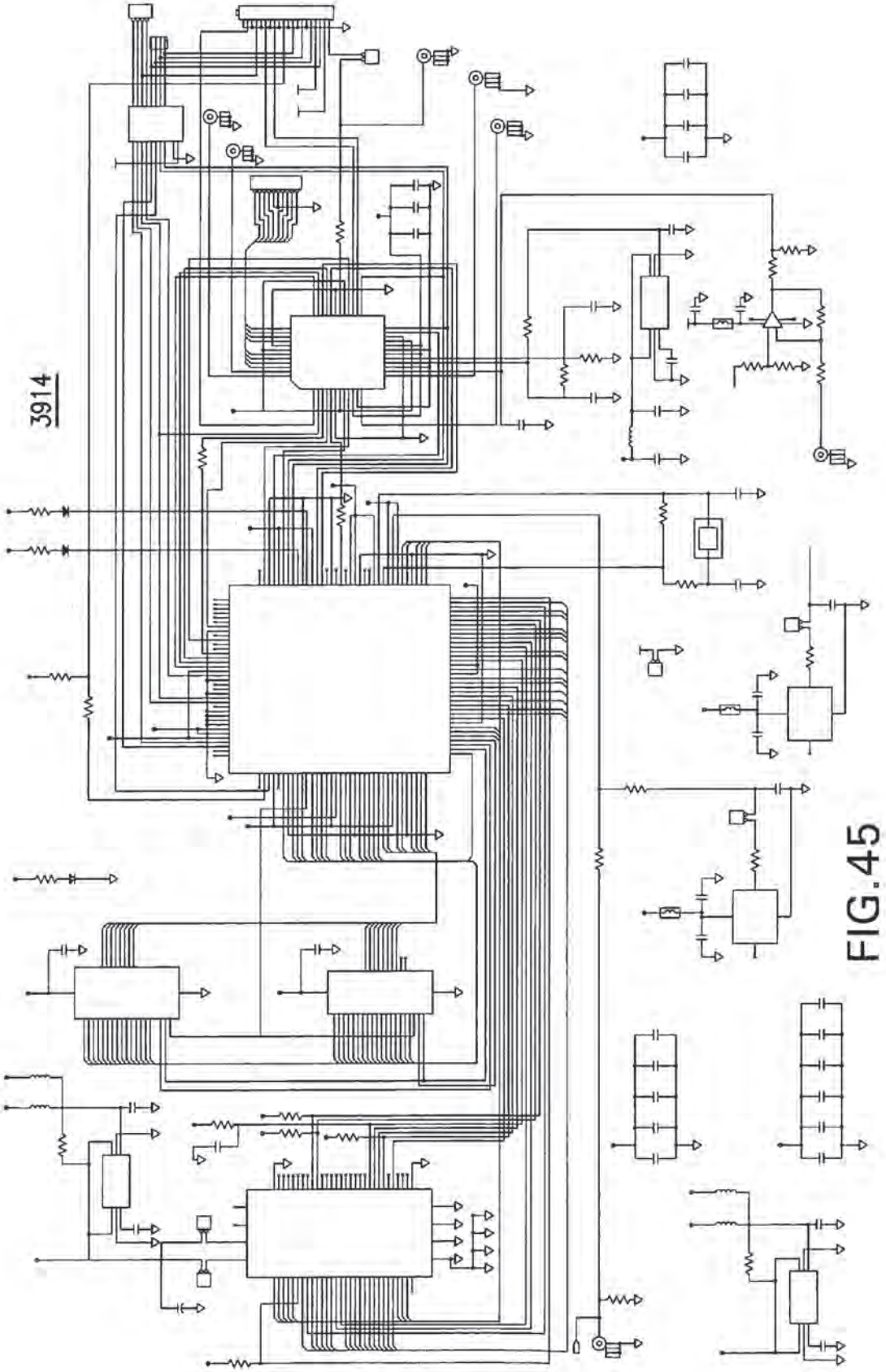


FIG.45

Item	Quantity	Reference	Part Description	Part Number	Manufacturer
1	1	C123	10uF CAP 6032, TANTALUM,20%	TAJT106K010R	KEMET
2	3	C263, C273, C275, C282	4.7uF CAP 6032, TANTALUM,20%	T491A475M006AS	KEMET
3	25	C120, C125, C126, C127, C128, C136, C137, C138, C139, C140, C141, C142, C143, C144, C145, C147, C148, C149, C264, C272, C274, C279, C280, C281, C283	0.1uF CAP 0603,X7R,10%	GRM39X7R104K050AD	MURATA
4	3	C146, C269, C276	.01uF CAP 0603,X7R,10%	GRM39X7R103K050AD	MURATA
5	5	C124, C132, C133, C271, C278	100pF CAP 0603,X7R,10%	GRM39C0G101K050AD	MURATA
6	1	C129	47pF CAP 0603,X7R,10%	GRM39C0G470J100AD	MURATA
7	2	C270, C277	27pF CAP 0603,X7R,10%	GRM39C0G270K050AD	MURATA
8	1	C130	22pF CAP 0603,X7R,10%	GRM39C0G220K050AD	MURATA
9	1	C131	10pF CAP 0603,X7R,10%	GMR39C0G100D050AD	MURATA
10	1	DS1	LED GREEN	597-3311-420	DIALIGHT
11	1	DS2	LED YELLOW	597-3401-420	DIALIGHT
12	1	DS3	LED RED	597-3111-420	DIALIGHT
13	6	JP12, JP13, JP14, JP15, JP16, JP17	CONNECTOR HEADER 2PIN	2MS-19-33-01	SPECIALITY ELECTRONICS
14	1	JP11	CONNECTOR HEADER 4PIN	100/VH/TM1SQ/W.100/4	BLKCON

FIG.46A

15	7	J16, J20, J21, J22, J23, J24, J25	CONNECTOR 82MMCX	82MMCX-50-0-1	HUBER/SHUNER	
16	1	J18	CONNECTOR HEADER 10	TMS-110-01-G-S	SAMTEC	
17	1	J19	CONNECTOR WITH EJECTOR	EHT-1-10-01-S-D	SAMTEC	
18	1	P1	CONNECTOR 34X2PCMCIA	DICMJ-68S-SPC-M08	ITT CANON	
19	7	L59, L60, L61, L63, L64, L65, L66	FERRITE BEAD	BLM11A121S	MURATA	
20						
21	1	R112	10M, RESISTOR, 0603, 5%			
22	1	R114	390K, RESISTOR, 0603, 5%	ERJ-3GSYJ394V	PANASONIC	
23	1	R105	100K, RESISTOR, 0603, 5%	ERJ-3GSYJ104V	PANASONIC	
24	4	R106, R107, R108, R111	15K, RESISTOR, 0603, 5%	ERJ-3GSYJ153V	PANASONIC	
25	1	R116	9.1K, RESISTOR, 0603, 5%	ERJ-3GSYJ912V	PANASONIC	
26	1	R115	8.2K, RESISTOR, 0603, 5%	ERJ-3GSYJ822V	PANASONIC	
27	1	R113	3.9K, RESISTOR, 0603, 5%	ERJ-3GSYJ392V	PANASONIC	
28	1	R101	750, RESISTOR, 0630, 5%	ERJ-3GSYJ751V	PANASONIC	
29	1	R110	560, RESISTOR, 0603, 5%	ERJ-3GSYJ561V	PANASONIC	
30	2	R99, R100	330, RESISTOR, 0603, 5%	ERJ-3GSYJ331V	PANASONIC	
31	1	R119	50, RESISTOR, 0603, 5%	ERJ-3GSYJ500V	PANASONIC	
32	2	R128, R129	10, RESISTOR, 0603, 5%	ERJ-3GSYJ100V	PANASONIC	
33	8	R102, R103, R104, R109, R117, R118, R120, R127,	0, RESISTOR, 0603, 5%	RMJ3221J000ZT 3GSYJ000V	ERJ KOA PANASONIC	
34	6	R121, R122, R123, R124, R125, R126	TBD, RESISTOR, 0603, 5%	R	PANASONIC	
35	1	U10	SRAM	KM62256DLTG-5L M5M5256CVP-55LL	SAMSUNG MITSUBUSHI	
36	1	U12	MAC	AM79C930	AMD	

FIG.46B

37	1	U13	BASEBAND PROCESSOR	HFA3842A1	HARRIS
38	1	U14	FLASH RAM	AM29F010-55EC	AMD
39	1	U15	32 KHz CRYSTAL	CX-6V-SM2-32.768KHzC/1	STATEK
40	2	U45	BUS BUFFER	DS3862	NATIONAL
41	1	U48	REGULATOR 3.5 V	TK11235BMC	TOKO
42	1	U49	22MHz OSCILLATOR	FOX F3346-22MHz	FOX
43	1	U50	2 VOLT REFERENCE	TK11220BMC	TOKO
44	1	U51	40MHz OSCILLATOR	CXO-M-10N-40MHz A/1	STATEK

FIG.46C

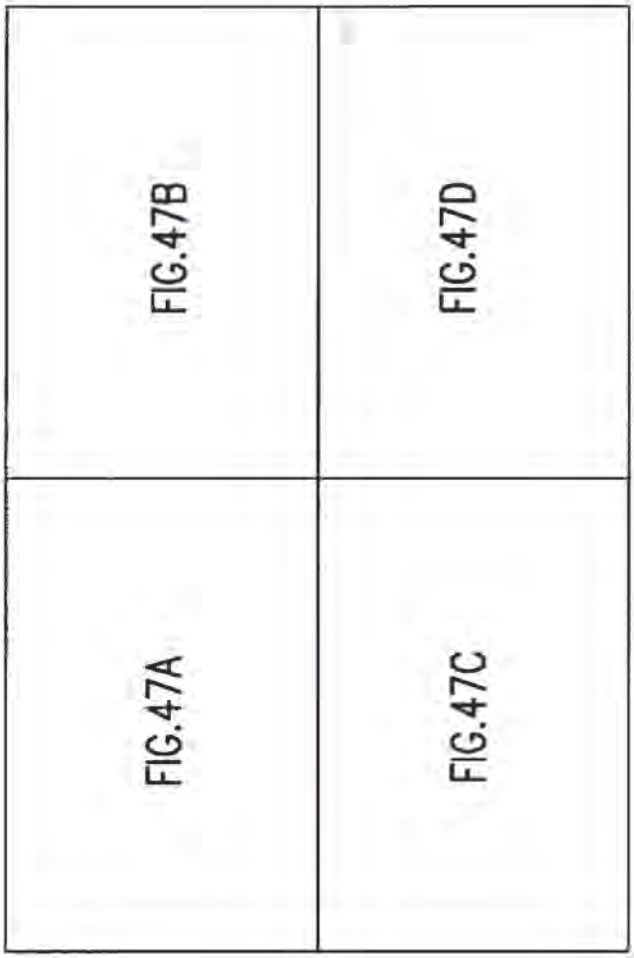


FIG.47

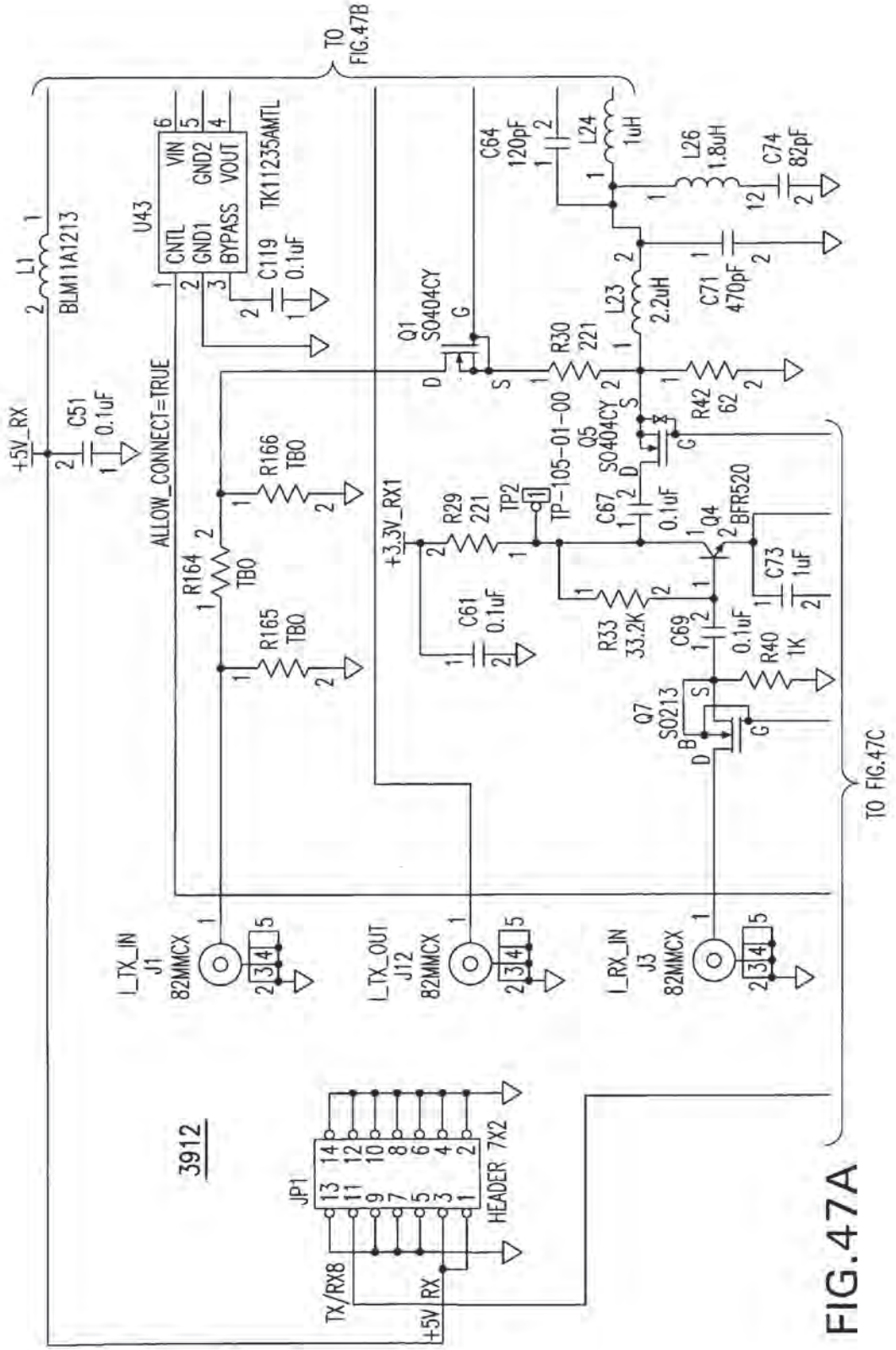

TO FIG.47B
+5V_RX
C51 0.1uF
L1 BLM11A1213
U43 TK11235AMTL
CNTL GND1 BYPASS VIN GND2 VOUT
C119 0.1uF
ALLOW_CONNECT=TRUE
R164 TBD
R165 TBD
R166 TBD
+3.3V_RX1
R29 221
TP2 TP-105-01-00
C61 0.1uF
R33 33.2K
C69 0.1uF
R40 1K
C67 0.1uF
C73 1uF
Q1 SO404CY
Q5 SO404CY
Q4 BFR520
Q7 SO213
R30 221
R42 62
L23 2.2uH
C64 120pF
L24 1uH
L26 1.8uH
C71 470pF
C74 82pF
I_TX_IN J1 82MMCX
I_TX_OUT J12 82MMCX
I_RX_IN J3 82MMCX
JP1 HEADER 7X2
TX/RX8
RX
+5V
3912
TO FIG.47C

FIG.47A

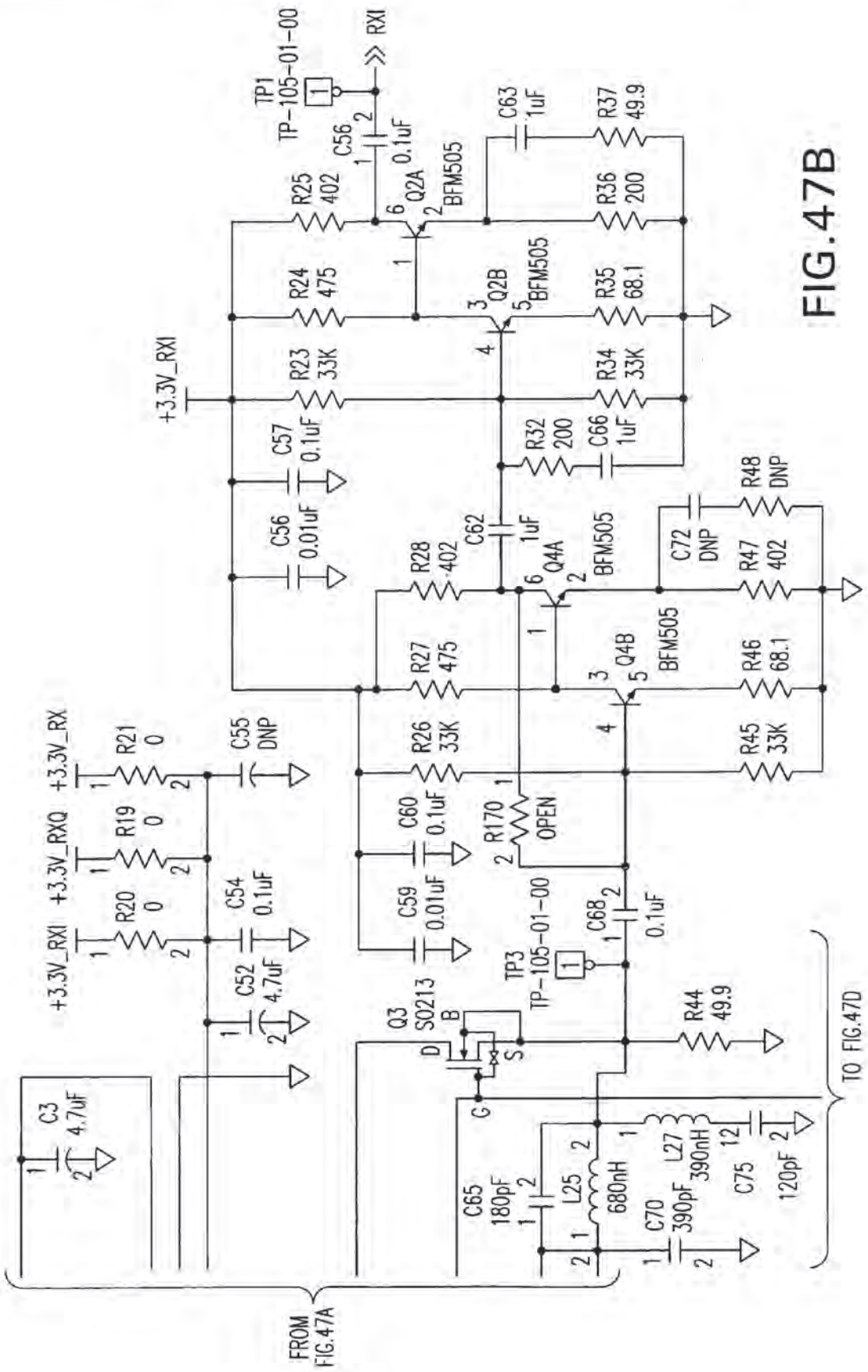

FROM FIG.47A
TO FIG.47D
C3 4.7uF
C52 4.7uF
C54 0.1uF
C55 DNP
C56 0.01uF
C57 0.1uF
C59 0.01uF
C60 0.1uF
C63 1uF
C65 180pF
C66 1uF
C68 0.1uF
C70 390pF
C72 DNP
C75 120pF
L25 680nH
L27 390nH
R19 0
R20 0
R21 0
R23 33K
R24 475
R25 402
R26 33K
R27 475
R28 402
R32 200
R34 33K
R35 68.1
R36 200
R37 49.9
R44 49.9
R45 33K
R46 68.1
R47 402
R48 DNP
R170 OPEN
Q2A BFM505
Q2B BFM505
Q4A BFM505
Q4B BFM505
Q3 SO213
TP1 TP-105-01-00
TP3 TP-105-01-00
+3.3V_RX
+3.3V_RXQ
+3.3V_RXI
RXI

FIG.47B

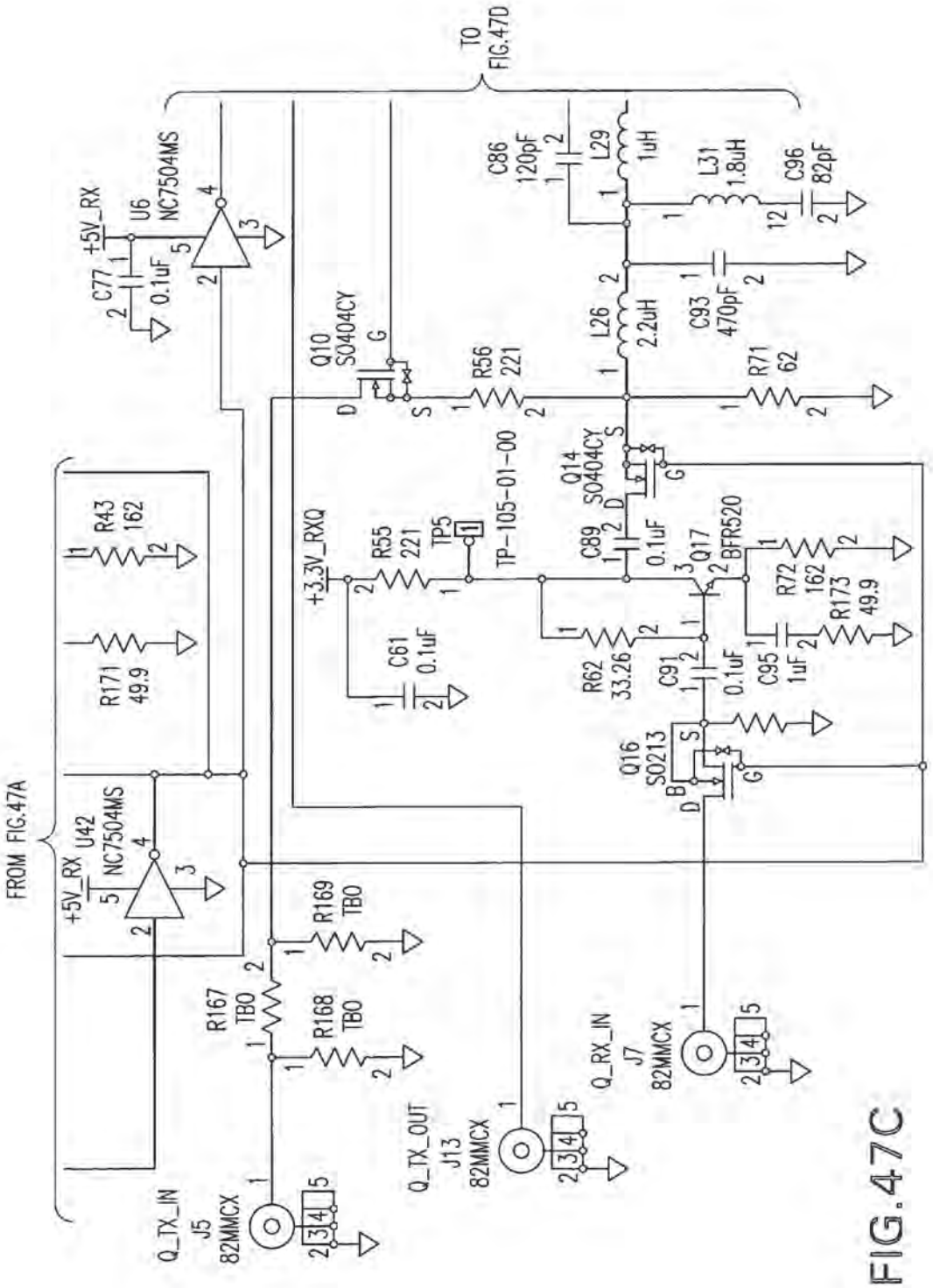

TO FIG.47D
FROM FIG.47A
+5V_RX
U6 NC7504MS
C77 0.1uF
Q10 S0404CY
R56 221
L26 2.2uH
C86 120pF
L29 1uH
L31 1.8uH
C96 82pF
C93 470pF
R71 62
Q14 S0404CY
TP5 TP-105-01-00
C89 0.1uF
Q17 BFR520
R72 162
R173 49.9
+3.3V_RXQ
R55 221
C61 0.1uF
R62 33.26
C91 0.1uF
C95 1uF
Q16 S0213
R43 162
R171 49.9
U42 NC7504MS
R169 TBO
R167 TBO
R168 TBO
Q_TX_IN J5 82MMCX
Q_TX_OUT J13 82MMCX
Q_RX_IN J7 82MMCX

FIG.47C

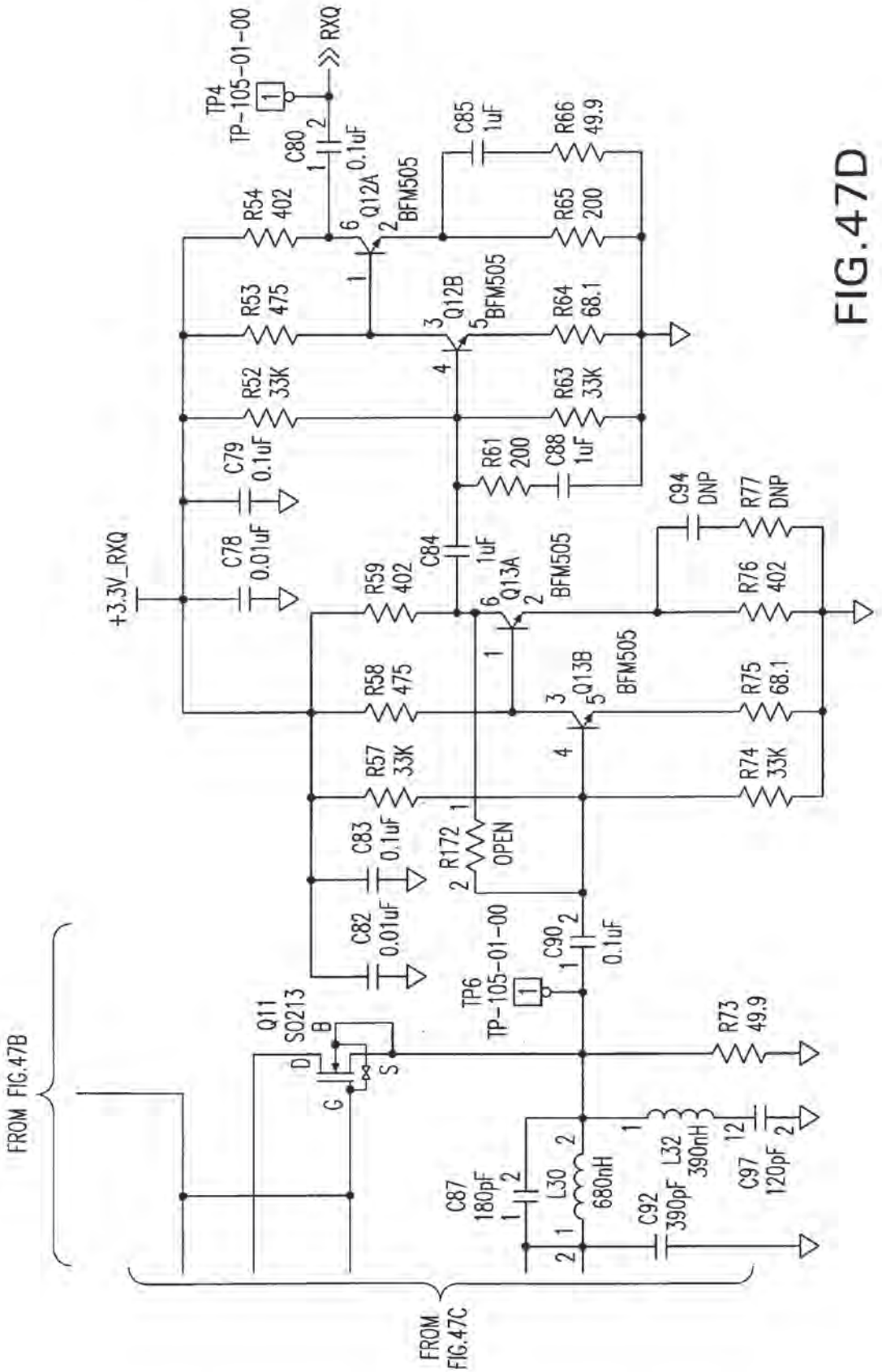

FROM FIG.47B
FROM FIG.47C
+3.3V_RXQ
TP4
TP-105-01-00
>> RXQ
C80 0.1uF
C85 1uF
R66 49.9
R54 402
Q12A BFM505
R65 200
R53 475
Q12B BFM505
R64 68.1
R52 33K
R63 33K
C79 0.1uF
C78 0.01uF
R61 200
C88 1uF
C94 DNP
R77 DNP
C84 1uF
R59 402
Q13A BFM505
R76 402
R58 475
Q13B BFM505
R75 68.1
R57 33K
R74 33K
R172 OPEN
C83 0.1uF
C82 0.01uF
TP6
TP-105-01-00
C90 0.1uF
Q11 SO213
R73 49.9
C87 180pF
L30 680nH
C92 390pF
L32 390nH
C97 120pF

FIG.47D

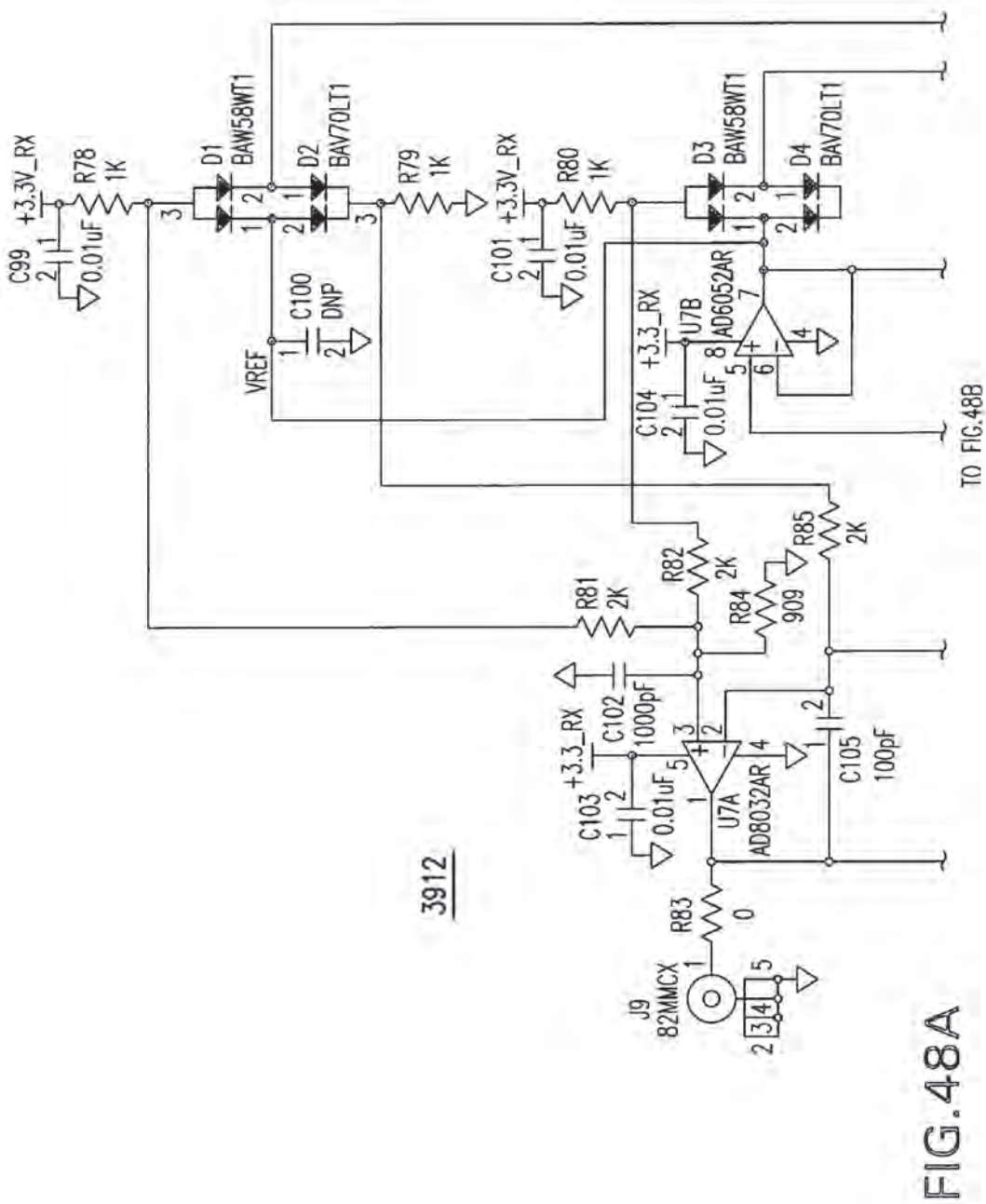

3912
C99
+3.3V_RX
R78
1K
0.01uF
D1
BAW58WT1
D2
BAV70LT1
R79
1K
C100
DNP
VREF
C101
+3.3V_RX
R80
1K
0.01uF
D3
BAW58WT1
D4
BAV70LT1
U7B
AD8052AR
C104
+3.3_RX
0.01uF
TO FIG.48B
R81
2K
R82
2K
R84
909
R85
2K
C102
1000pF
C103
+3.3_RX
0.01uF
U7A
AD8032AR
C105
100pF
R83
0
J9
82MMCX

FIG.48A

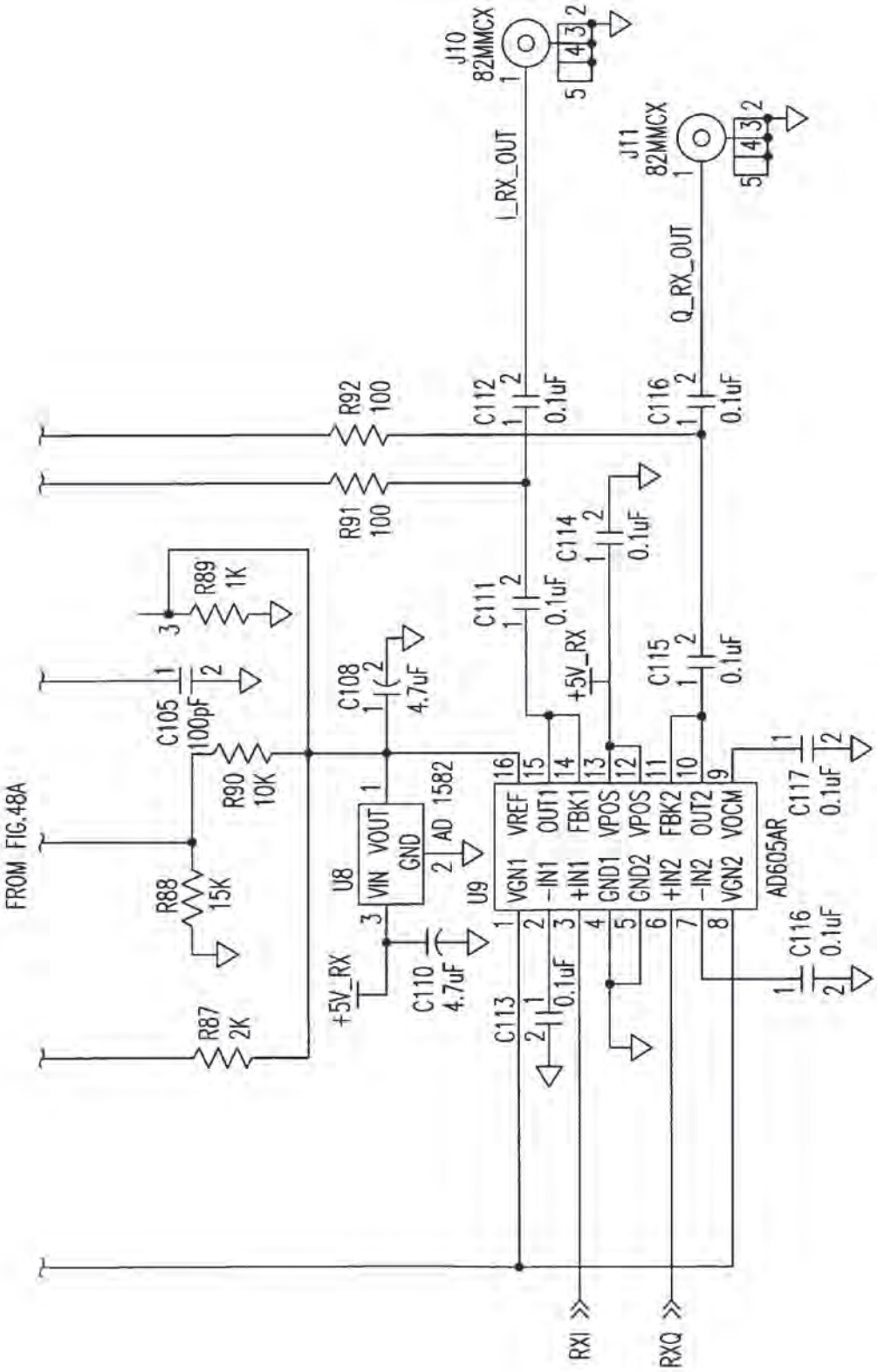

FROM FIG.48A
R88 15K
R87 2K
R90 10K
C105 100pF
R89 1K
C108 4.7uF
C110 4.7uF
+5V_RX
U8
VIN VOUT GND
AD 1582
U9
R92 100
R91 100
C112 0.1uF
C111 0.1uF
C114 0.1uF
C115 0.1uF
C116 0.1uF
C117 0.1uF
C113 0.1uF
+5V_RX
VGN1 -IN1 +IN1 GND1 GND2 +IN2 -IN2 VGN2
VREF OUT1 FBK1 VPOS VPOS FBK2 OUT2 VOCM
AD605AR
I_RX_OUT
Q_RX_OUT
J10 82MMCX
J11 82MMCX
RXI
RXQ

FIG.48B

ITEM	QUANT.	REFERENCE	PART	PART NUMBER	MANUFACTURER
1	4	C3,C52,C108,C110	4.7uF	T491A475K006AS	KEMET
2	26	C51,C54,C57,C58,C60,C61,	0.1uF	GRM39Y5V104Z016	MURATA
		C67,C68,C69,C77,C79,C80,			
		C81,C83,C89,C90,C91,C111,			
		C112,C113,C114,C115,C116,			
		C117,C118,C119			
3	1	C55	DNP	T491A475K006AS	KEMET
4	8	C56,C59,C78,C82,C99,C101,	0.01uF	GRM39X7R103K050	MURATA
		C103,C104			
5	8	C62,C63,C66,C73,C84,C85,	1uF	GRM40Y5V105Z016	MURATA
		C88,C95			
6	4	C64,C75,C86,C97	120pF	GRM39C0G121J050	MURATA
7	2	C65,C87	180pF	GRM39C0G181J050	MURATA
8	2	C70,C92	390pF	GRM39C0G391J050	MURATA
9	2	C71,C93	470pF	GRM39C0G471J050	MURATA
10	2	C72,C94	DNP	GRM40Y5V105Z016	MURATA
11	2	C74,C96	82pF	GRM39C0G820J050	MURATA
12	2	C100,C106	DNP	DNP	MURATA
13	2	C105,C102	1000pF	GRM39C0G102K050	MURATA
14	2	D3,D1	BAW56WT1	BAW56WT1	MOTOROLA
15	2	D4,D2	BAV70LT1	BAV70LT1	MOTOROLA
16	1	JP1	HEADER 7X2	FTSH-107-02-L-D	SAMTEC
17	9	J1,J3,J5,J7,J9,J10,J11,	82MMCX	82MMCX-50-0-1	SUHNER
		J12,J13			
18	1	L1	BLM11A121S	BLM11A121S	MURATA
19	2	L23,L28	2.2uH	LQG21N2R2K10	MURATA
20	2	L29,L24	1uH	LQG21N1R0K10	MURATA
21	2	L30,L25	680nH	LQG21NR68K10	MURATA

FIG.49A

22	2	L26,L31	1.8uH	LQG21N1R8K10	MURATA
23	2	L32,L27	390nH	LQG21NR39K10	MURATA
24	4	Q1,Q5,Q10,Q14	SD404CY	SD404CY	CALOGIC
25	4	Q2,Q4,Q12,Q13	BFM505	BFM505	PHILIPS
26	4	Q3,Q7,Q11,Q16	SD213	SD213	CALOGIC
27	2	Q17,Q8	BFR520	BFR520	PHILIPS
28	4	R19,R20,R21,R83	0	ERJ3GSY0R00	PANASONIC
29	8	R23,R26,R34,R45,R52,R57, R63,R74	33K	ERJ3GSYJ333	PANASONIC
30	4	R24,R27,R53,R58	475	ERJ3EKF4750	PANASONIC
31	6	R25,R28,R47,R54,R59,R76	402	ERJ3EKF4020	PANASONIC
32	4	R29,R30,R55,R56	221	ERJ3EKF2210	PANASONIC
33	2	R32,R61	200	ERJ3GSYJ201	PANASONIC
34	2	R33,R62	33.2K	ERJ3GSYJ333	PANASONIC
35	4	R35,R46,R64,R75	68.1	ERJ3EKF68R1	PANASONIC
36	2	R36,R65	200	ERJ3EKF2000	PANASONIC
37	6	R37,R44,R66,R73,R171, R173	49.9	ERJ3EKF49R9	PANASONIC
38	6	R40,R68,R78,R79,R80,R89	1K	ERJ3EKF1001	PANASONIC
39	2	R42,R71	62	ERJEGSYJ620	PANASONIC
40	2	R43,R72	162	ERJ3EKF1620	PANASONIC
41	2	R77,R48	DNP	ERJ3GSYJ330	PANASONIC
42	4	R81,R82,R85,R87	2K	ERJ3EKF2001	PANASONIC
43	1	R84	909	ERJ3EKF9090	PANASONIC
44	1	R88	15K	ERJ3EJF1502	PANASONIC
45	1	R90	10K	ERJ3EKF1002	PANASONIC
46	2	R91,R92	100	ERJ3EKF1000	PANASONIC
47	6	R164,R165,R166,R167,R168, R169	TBD		PANASONIC
48	2	R170,R172	OPEN		PANASONIC

FIG.49B

49	6	TP1, TP2, TP3, TP4, TP5, TP6	TP-105-01-00		
50	2	U42, U6	NC7S04M5	NC7S04M5	NATIONAL SEMICONDUCTOR
51	1	U7	AD8052AR	AD8052AR	ANALOG DEVICES
52	1	U8	AD1582	AD1582	ANALOG DEVICES
53	1	U9	AD605AR	AD605AR	ANALOG DEVICES
54	1	U43	TK11235AMTL	TK11235BM	TOKO
55	1		BOARD	8500.541.003.V13.01	

FIG.49C

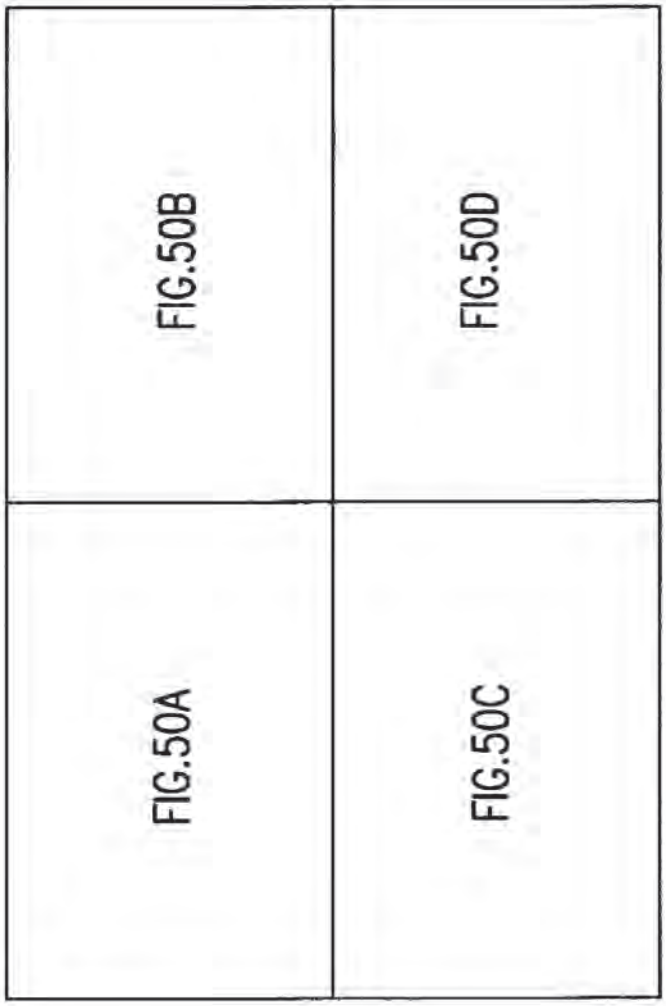


FIG.50

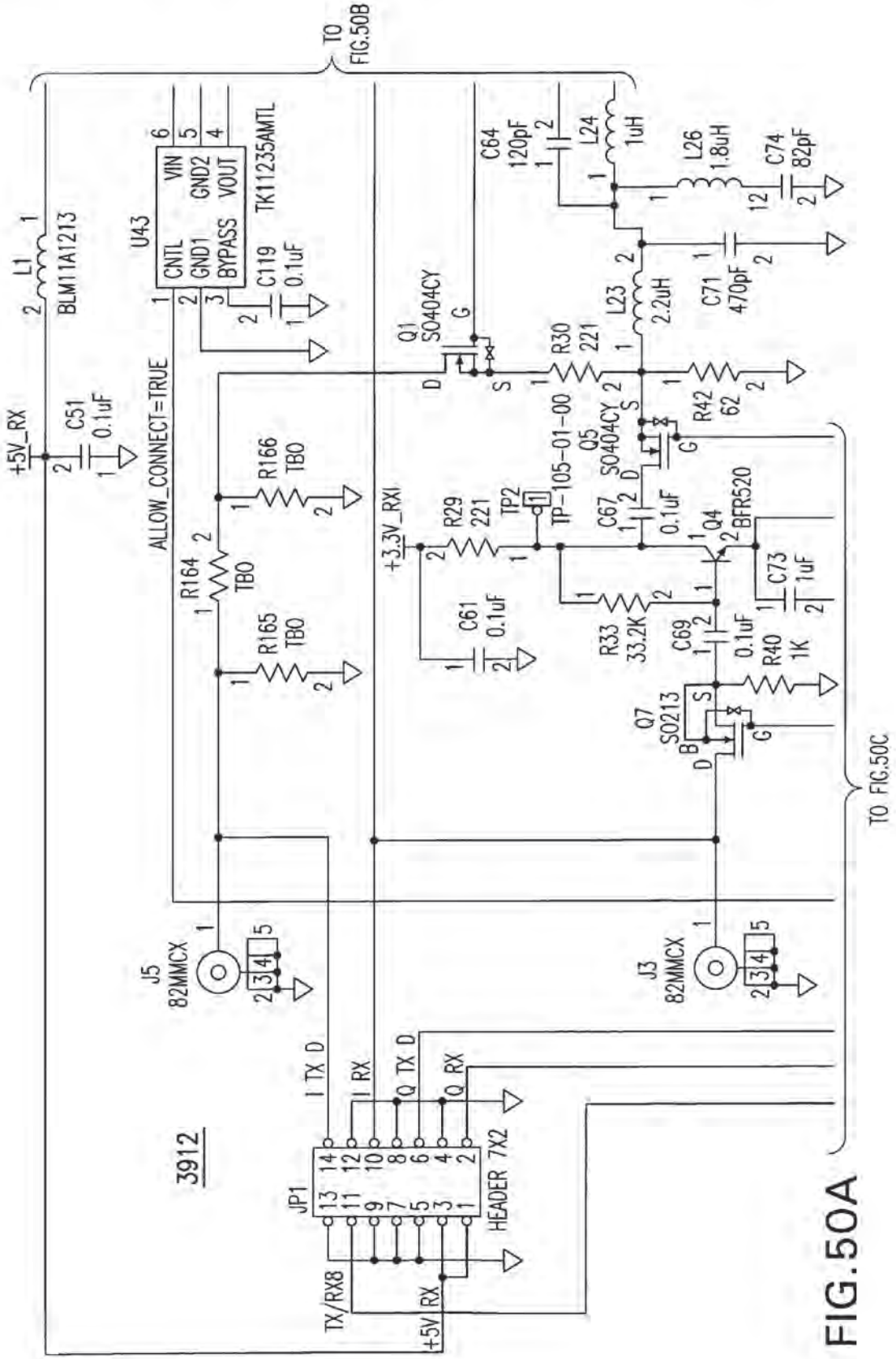

TO FIG.50B
+5V_RX
C51 0.1uF
L1 BLM11A1213
U43 TK11235AMTL
CNTL GND1 BYPASS VIN GND2 VOUT
C119 0.1uF
ALLOW_CONNECT=TRUE
R164 TBO
R165 TBO
R166 TBO
Q1 SO404CY
C64 120pF
L24 1uH
L26 1.8uH
C74 82pF
L23 2.2uH
C71 470pF
R30 221
R42 62
Q5 SO404CY
+3.3V_RXI
R29 221
TP2 TP-105-01-00
C67 0.1uF
Q4 BFR520
C73 1uF
C61 0.1uF
R33 33.2K
C69 0.1uF
R40 1K
Q7 SO213
J5 82MMCX
J3 82MMCX
I TX D
I RX
Q TX D
Q RX
JP1 HEADER 7X2
TX/RX8
RX
+5V
3912
TO FIG.50C

FIG.50A

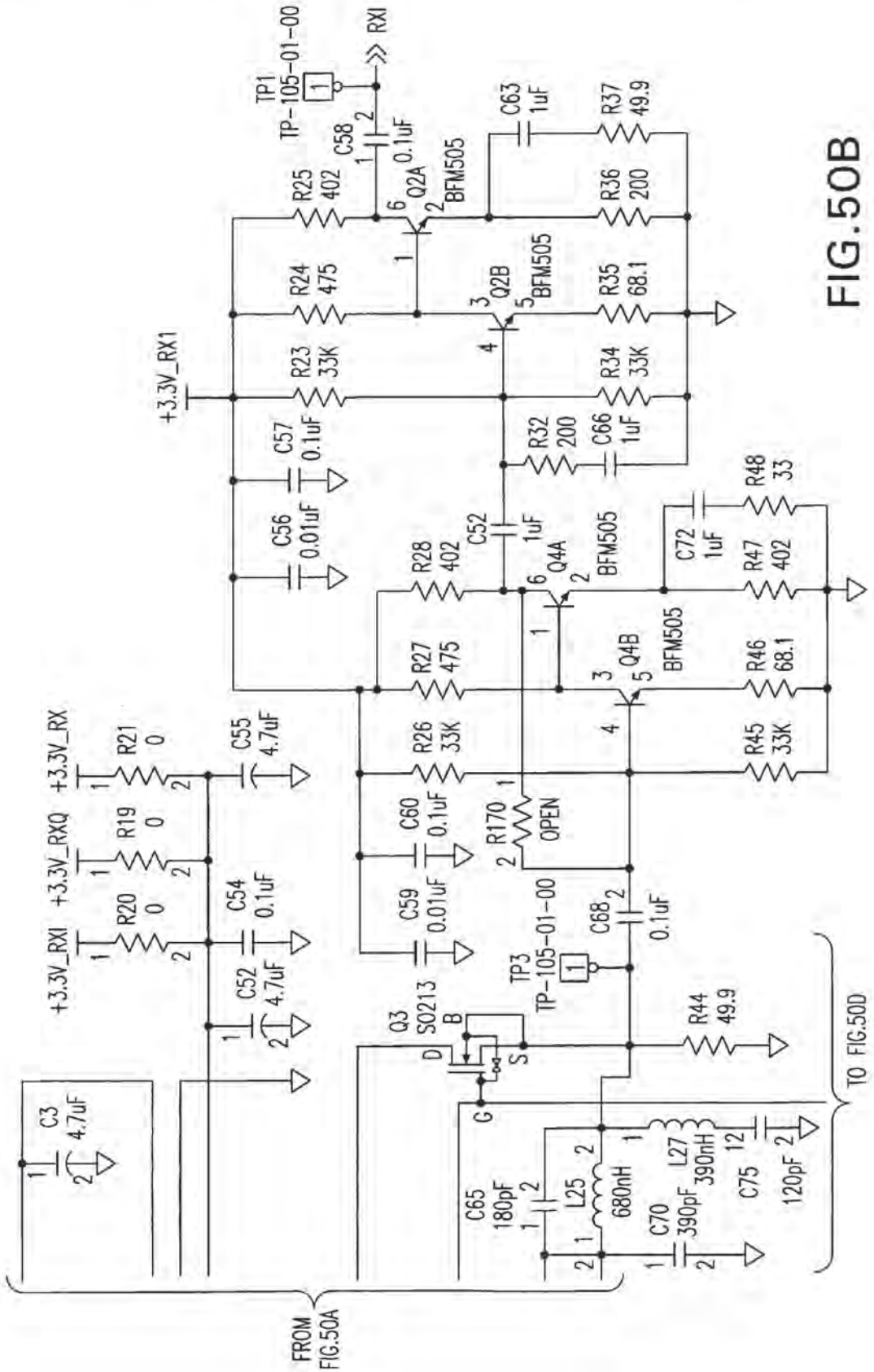

FROM FIG.50A
TO FIG.50D
TP1 TP-105-01-00
RXI
C58 0.1uF
C63 1uF
R37 49.9
R25 402
R36 200
Q2A BFM505
R24 475
R35 68.1
Q2B BFM505
+3.3V_RX1
R23 33K
R34 33K
C57 0.1uF
C56 0.01uF
R32 200
C66 1uF
C52 1uF
R48 33
R28 402
Q4A BFM505
C72 1uF
R47 402
R27 475
Q4B BFM505
R46 68.1
R26 33K
R45 33K
+3.3V_RX
R21 0
C55 4.7uF
+3.3V_RXQ
R19 0
C60 0.1uF
R170 OPEN
+3.3V_RXI
R20 0
C54 0.1uF
C59 0.01uF
C68 0.1uF
C52 4.7uF
TP3 TP-105-01-00
Q3 SO213
R44 49.9
C3 4.7uF
C65 180pF
L25 680nH
L27 390nH
C70 390pF
C75 120pF

FIG.50B

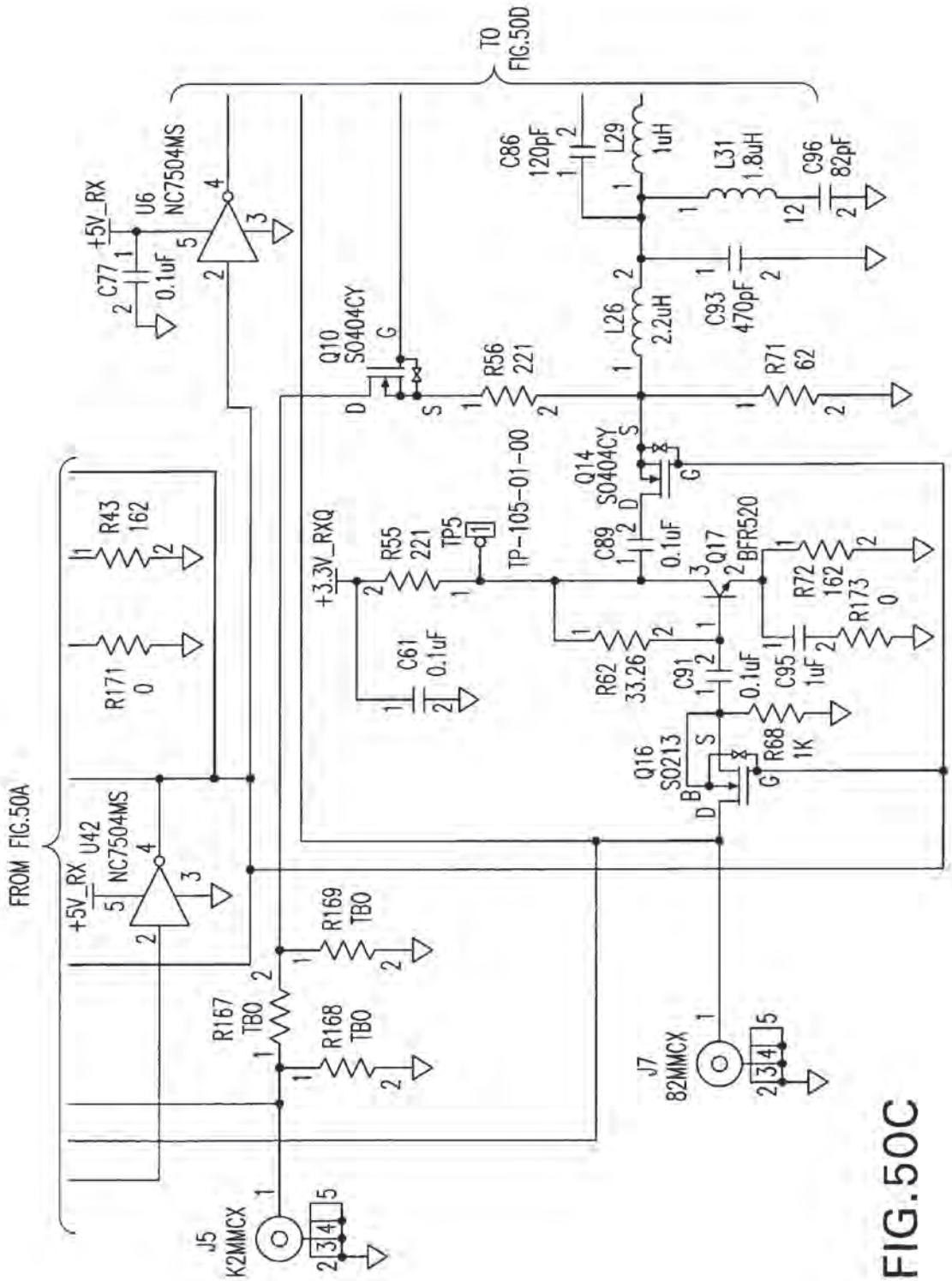

FROM FIG.50A
TO FIG.50D
+5V_RX
U6 NC7504MS
C77 0.1uF
U42 NC7504MS
R43 162
R171 0
R169 TBO
R167 TBO
R168 TBO
J5 K2MMCX
J7 82MMCX
Q10 SO404CY
R56 221
C86 120pF
L29 1uH
L31 1.8uH
C96 82pF
L26 2.2uH
C93 470pF
R71 62
Q14 SO404CY
+3.3V_RXQ
R55 221
TP5
TP-105-01-00
C89 0.1uF
Q17 BFR520
R72 162
R173 0
C61 0.1uF
R62 33.26
C91 0.1uF
C95 1uF
R68 1K
Q16 SO213

FIG.50C

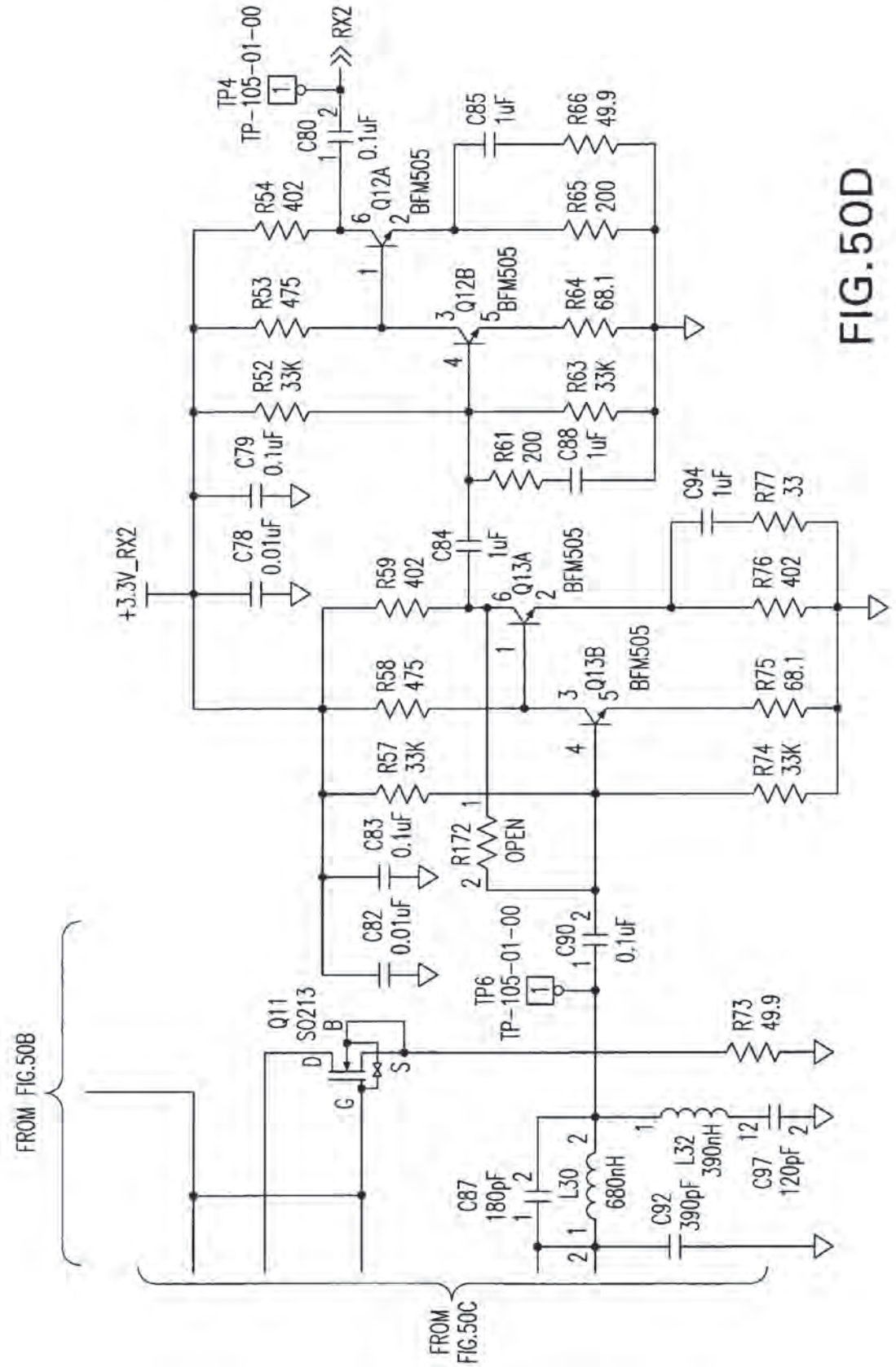

FROM FIG.50B
FROM FIG.50C
+3.3V_RX2
TP4 TP-105-01-00
>> RX2
C80 0.1uF
Q12A BFM505
Q12B BFM505
Q13A BFM505
Q13B BFM505
R54 402
R53 475
R52 33K
R59 402
R58 475
R57 33K
R172 OPEN
R73 49.9
R66 49.9
R65 200
R64 68.1
R63 33K
R61 200
R76 402
R75 68.1
R74 33K
R77 33
C85 1uF
C88 1uF
C94 1uF
C84 1uF
C79 0.1uF
C78 0.01uF
C83 0.1uF
C82 0.01uF
C90 0.1uF
TP6 TP-105-01-00
Q11 SO213
C87 180pF
L30 680nH
C92 390pF
L32 390nH
C97 120pF

FIG.50D

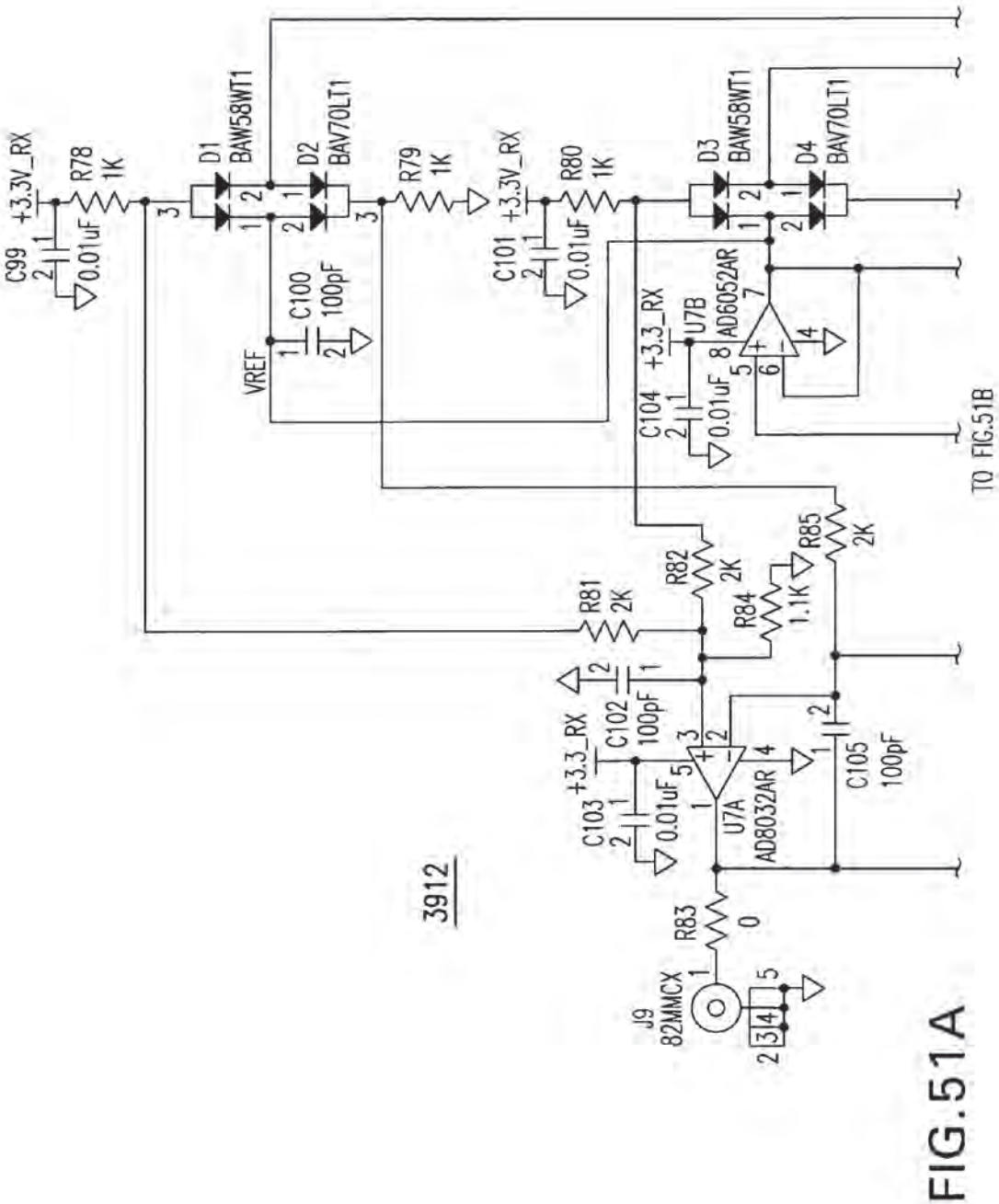

3912
C99
+3.3V_RX
R78
1K
0.01uF
D1
BAW56WT1
D2
BAV70LT1
R79
1K
C100
100pF
VREF
C101
+3.3V_RX
R80
1K
0.01uF
D3
BAW56WT1
D4
BAV70LT1
U7B
AD6052AR
C104
+3.3_RX
0.01uF
TO FIG.51B
R81
2K
R82
2K
R84
1.1K
R85
2K
C102
100pF
C103
+3.3_RX
0.01uF
U7A
AD8032AR
C105
100pF
R83
0
J9
82MMCX

FIG.51A

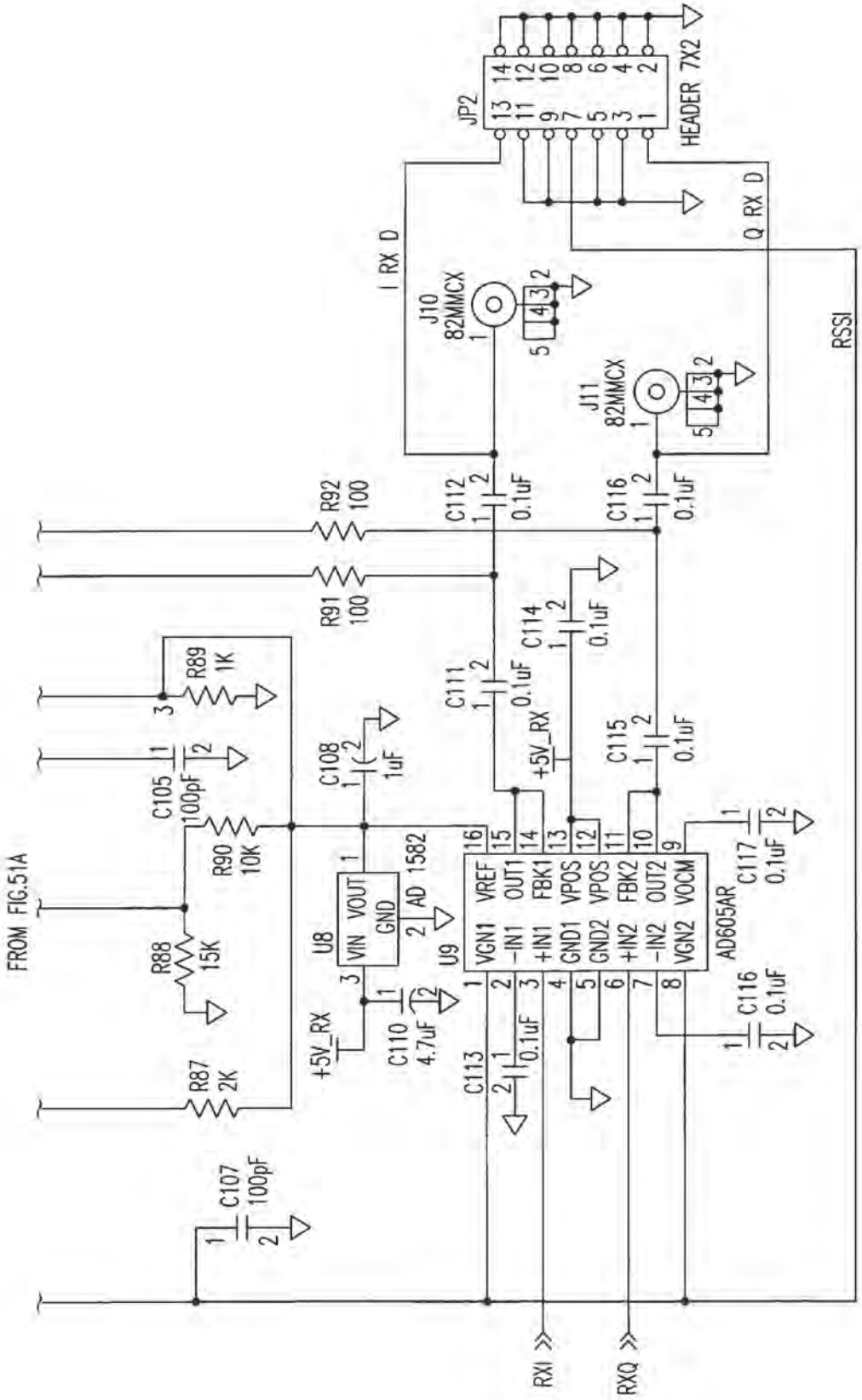

JP2
HEADER 7X2
I RX D
Q RX D
RSSI
J10
82MMCX
J11
82MMCX
R92
100
R91
100
C112
0.1uF
C116
0.1uF
C114
0.1uF
C111
0.1uF
C115
0.1uF
C117
0.1uF
C116
0.1uF
R89
1K
C105
100pF
R90
10K
C108
1uF
+5V_RX
FROM FIG.51A
R88
15K
R87
2K
C107
100pF
U8
VIN VOUT GND
AD 1582
U9
VGN1 VREF
-IN1 OUT1
+IN1 FBK1
GND1 VPOS
GND2 VPOS
+IN2 FBK2
-IN2 OUT2
VGN2 VOCM
AD605AR
C110
4.7uF
C113
0.1uF
RXI
RXQ

FIG.51B

ITEM	QTY	REFERENCE	PART	PART NUMBER	MANUFACTURER
1	3	C3,C52,C55	4.7uF	T491A475K006AS	KEMET
2	26	C51,C54,C57,C58,C60,C61,	0.1uF	GRM39Y5V104Z016	MURATA
		C67,C68,C69,C77,C79,C80,			
		C81,C83,C89,C90,C91,C111,			
		C112,C113,C114,C115,C116,			
		C117,C118,C119			
3	8	C56,C59,C78,C82,C99,C101,	0.01uF	GRM39X7R103K050	MURATA
		C103,C104			
4	10	C62,C63,C66,C72,C73,C84,	1uf	GRM40Y5V105Z016	MURATA
		C85,C88,C94,C95			
5	4	C64,C75,C86,C97	120pF	GRM39COG121J050	MURATA
6	2	C87,C65	180pF	GRM39COG181J050	MURATA
7	2	C70,C92	390pF	GRM39COG391J050	MURATA
8	2	C71,C93	470pF	GRM39COG471J050	MURATA
9	2	C96,C74	82pF	GRM39COG820J050	MURATA
10	5	C100,C102,C105,C106,C107	100pF	GRM39COG101K050	MURATA
11	1	C108	1uF		
12	1	C110	4.7uF		
13	2	D3,D1	BAW56WT1	BAW56WT1	MOTOROLA
14	2	D4,D2	BAV70LT1	BAV70LT1	MOTOROLA
15	2	JP2,JP1	HEADER 7X2		
16	6	J1,J3,J5,J7,J10,J11	82MMCX	142-0701-231	JOHNSON
17	1	J9	82MMCX	82MMCX-50-0-1	SUHNER
18	1	L1	BLM11A121S	BLM11A121S	MURATA
19	2	L28,L23	2.2uH	LQG21N2R2K10	MURATA
20	2	L24,L29	1uH	LQG21N1R0K10	MURATA
21	2	L30,L25	680nH	LQG21NR68K10	MURATA
22	2	L26,L31	1.8uH	LQG21N1R8K10	MURATA

FIG.52A

23	2	L27,L32	390nH	LQG21NR39K10	MURATA
24	4	Q1,Q5,Q10,Q14	SD404CY	SD404CY	CALOGIC
25	4	Q2,Q4,Q12,Q13	BFM505	BFM505	PHILIPS
26	4	Q3,Q7,Q11,Q16	SD213	SD213	CALOGIC
27	2	Q17,Q8	BFR520	BFR505	PHILIPS
28	5	R19,R20,R21,R171,R173	0		
29	8	R23,R26,R34,R45,R52,R57,	33K	ERJ3GSY333	PANASONIC
		R63,R74			
30	4	R24,R27,R53,R58	475	ERJ3EKF4750	PANASONIC
31	6	R25,R28,R47,R54,R59,R76	402	ERJ3EKF4020	PANASONIC
32	4	R29,R30,R55,R56	221	ERF3EKF2210	PANASONIC
33	2	R32,R61	200	ERJ3GSYJ201	PANASONIC
34	2	R33,R62	33.2K	ERJ3GSYJ333	PANASONIC
35	4	R35,R46,R64,R75	68.1	ERJ3EKF68R1	PANASONIC
36	2	R36,R65	200	ERJ3EKF2000	PANASONIC
37	2	R66,R37	49.9	ERJ3EKF49R9	PANASONIC
38	6	R40,R68,R78,R79,R80,R89	1K	ERJ3EKF1001	PANASONIC
39	2	R42,R71	62	ERJ3GSYJ620	PANASONIC
40	2	R43,R72	162	ERJ3EKF6810	PANASONIC
41	2	R44,R73	49.9	ERJ3EKF1001	PANASONIC
42	2	R77,R48	33	ERJ3GSYJ330	PANASONIC
43	4	R81,R82,R85,R87	2K	ERJ3EKF2001	PANASONIC
44	1	R83	0	ERJGSY0R00	PANASONIC
45	1	R84	1.1K	ERJ3EKF2001	PANASONIC
46	1	R88	15K	ERJ3EKF1502	PANASONIC
47	1	R90	10K	ERJ3EKF1002	PANASONIC
48	2	R91,R92	100	ERJ3EKF1000	PANASONIC
49	6	R164,R165,R166,R167,R168,	TBD		
		R169			
50	2	R170,R172	OPEN		
51	0	TP1,TP2,TP3,TP4,TP5,TP6	TP-105-01-00		
52	2	U42,U6	NC7S04M5		NATIONAL SEMICONDUCTOR
53	1	U7	AD8032AR	AD8032AR	ANALOG DEVICES
54	1	U8	AD1582	AD1582	ANALOG DEVICES
55	1	U9	AD605AR	AD605AR	ANALOG DEVICES
56	1	U43	TK11235AMTL	TK11235AMTL	TOKO

FIG.52B

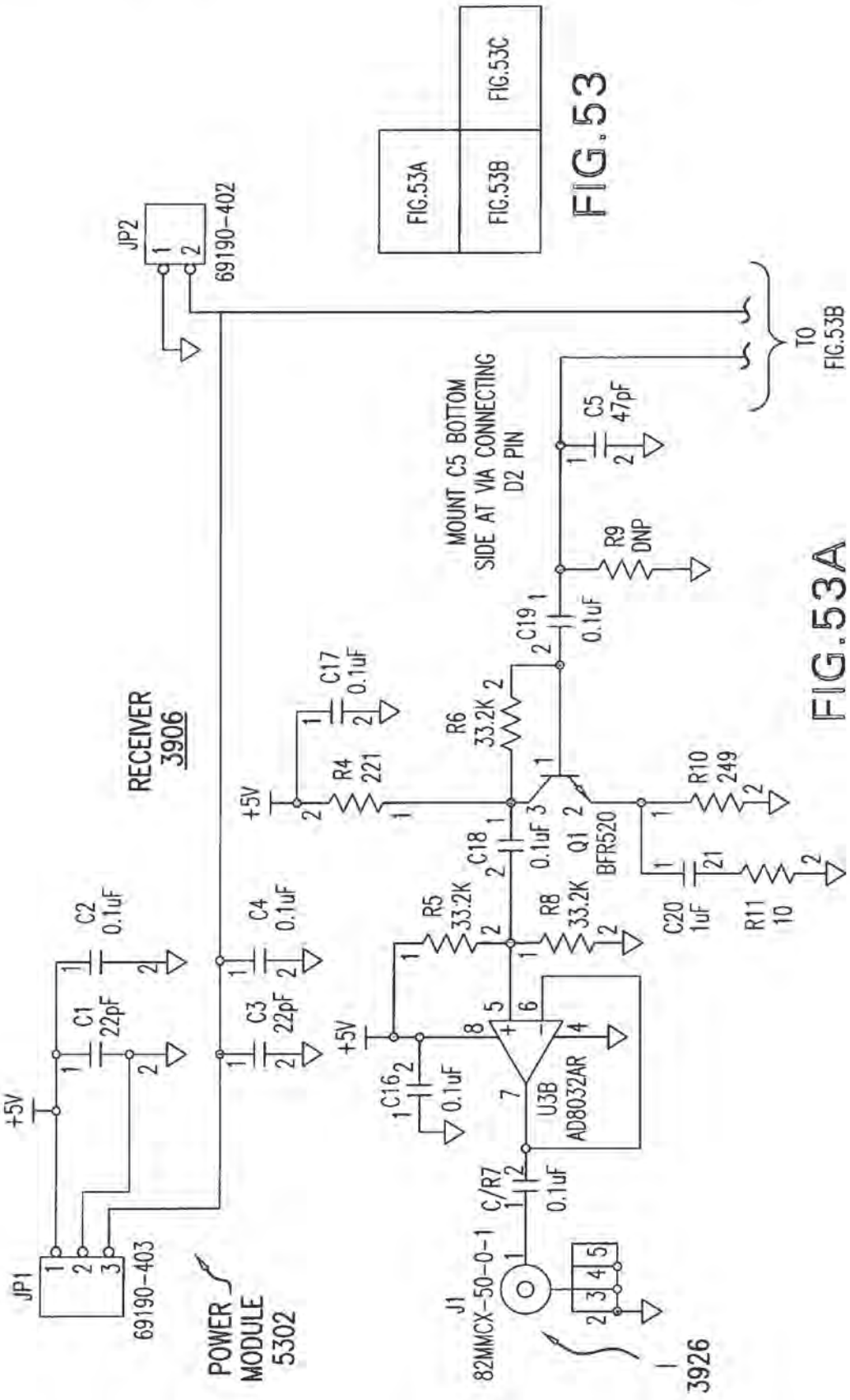


FIG.53

FIG.53A

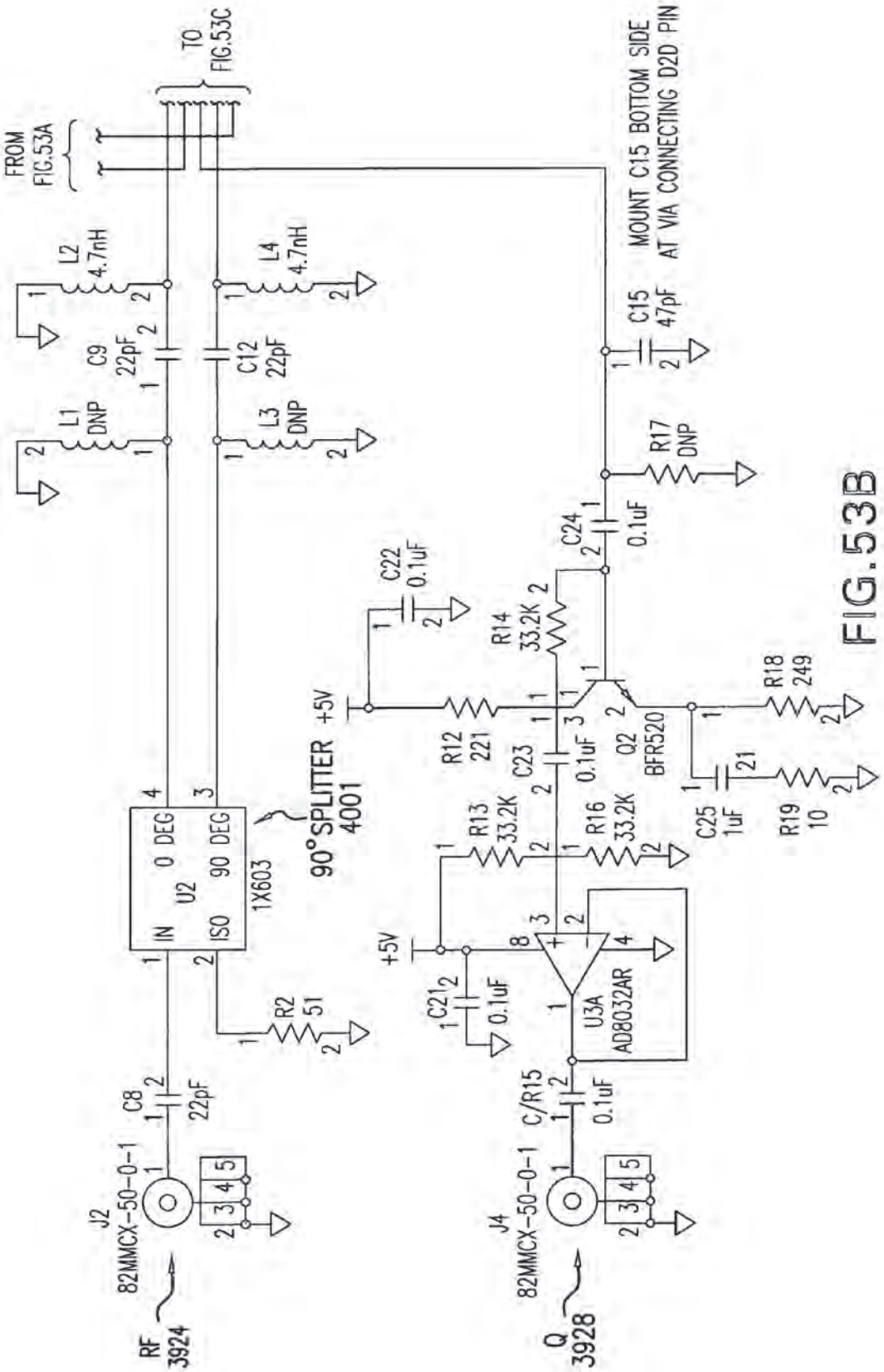

FROM FIG.53A
TO FIG.53C
L2 4.7nH
L4 4.7nH
C9 22pF
C12 22pF
L1 DNP
L3 DNP
C15 47pF
MOUNT C15 BOTTOM SIDE AT VIA CONNECTING D2D PIN
R17 DNP
C24 0.1uF
C22 0.1uF
R14 33.2K
R18 249
R12 221
C23 0.1uF
Q2 BFR520
C25 1uF
R19 10
90°SPLITTER 4001
U2 1X603
0 DEG
90 DEG
IN
ISO
+5V
R13 33.2K
R16 33.2K
C21 0.1uF
U3A AD8032AR
R2 51
C8 22pF
C/R15 0.1uF
J2 82MMCX-50-0-1
J4 82MMCX-50-0-1
RF 3924
Q 3928

FIG.53B

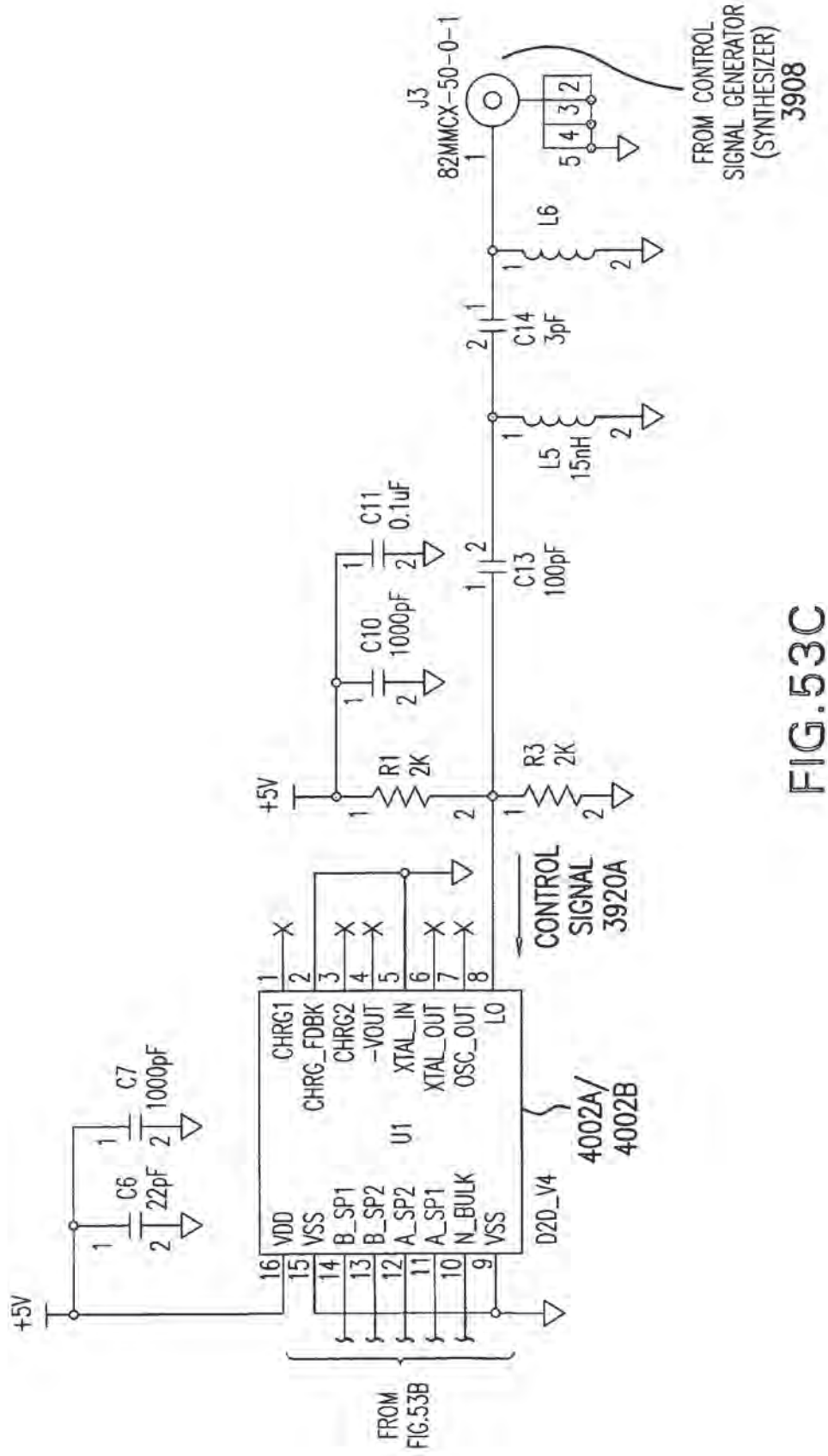

FROM FIG.53B
+5V
C6 22pF
C7 1000pF
U1
VDD
VSS
B_SP1
B_SP2
A_SP2
A_SP1
N_BULK
VSS
CHRG1
CHRG_FDBK
CHRG2
-VOUT
XTAL_IN
XTAL_OUT
OSC_OUT
LO
D2O_V4
4002A/ 4002B
CONTROL SIGNAL 3920A
+5V
R1 2K
R3 2K
C10 1000pF
C11 0.1uF
C13 100pF
C14 3pF
L5 15nH
L6
J3 82MMCX-50-0-1
FROM CONTROL SIGNAL GENERATOR (SYNTHESIZER) 3908

FIG. 53C

ITEM	QTY	REFERENCE	PART	PART NUMBER	MANUFACTURER
1	10	C/R7,C/R15,C16,C17,C18	0.1uF	GRM39Y5V104Z016	MURATA
		C19,C21,C22,C23,C24			
2	6	C1,C3,C6,C8,C9,C12	22pF	GRM39C0G220J050	MURATA
3	3	C2,C4,C11	0.1uF	GRM39X7R104K016	MURATA
4	2	C5,C15	47pF	GRM39C0G470J050	MURATA
5	2	C10,C7	1000pF	GRM39X7R102K050	MURATA
6	1	C13	100pF	GRM39X7R101J050	MURATA
7	1	C14	3pF	GRM40C0G030B50V	MURATA
8	2	C20,C25	1uF	GRM40Y5V105Z016	MURATA
9	1	JP1	69190-403	69190-403	BERG
10	1	JP2	69190-402	69190-402	BERG
11	4	J1,J2,J3,J4	82MMCX-50-0-1	82MMCX-50-0-1	SUHNER
12	2	L3,L1	DNP	L	TOKO
13	2	L4,L2	4.7nH	LL1608-F4N7K	TOKO
14	1	L5	15nH	LL2012FH15NJ	TOKO
15	1	L6	DNP	DNP	TOKO
16	2	Q1,Q2	BFR520	BFR520	PHILIPS
17	2	R1,R3	2K	ERJ3GSYJ202	PANASONIC
18	1	R2	51	ERJ3GSYJ510	PANASONIC
19	2	R4,R12	221	ERJ3EKF2210	PANASONIC
20	6	R5,R6,R8,R13,R14,R16	33.2K	ERJ3EKF3322	PANASONIC
21	2	R9,R17	DNP	ERJ3EKF1001	PANASONIC
22	2	R10,R18	249	ERJ3EKF2490	PANASONIC
23	2	R11,R19	10	ERJ3GSYJ100	PANASONIC
24	1	U1	D2D_V4	D2D_V4	PARKER VISION
25	1	U2	1X603	1X603	ANAREN
26	1	U3	AD8032AR	AD8032AR	ANALOG DEVICES
27	1		BOARD	STB500.641.001 V03.00	

FIG.54

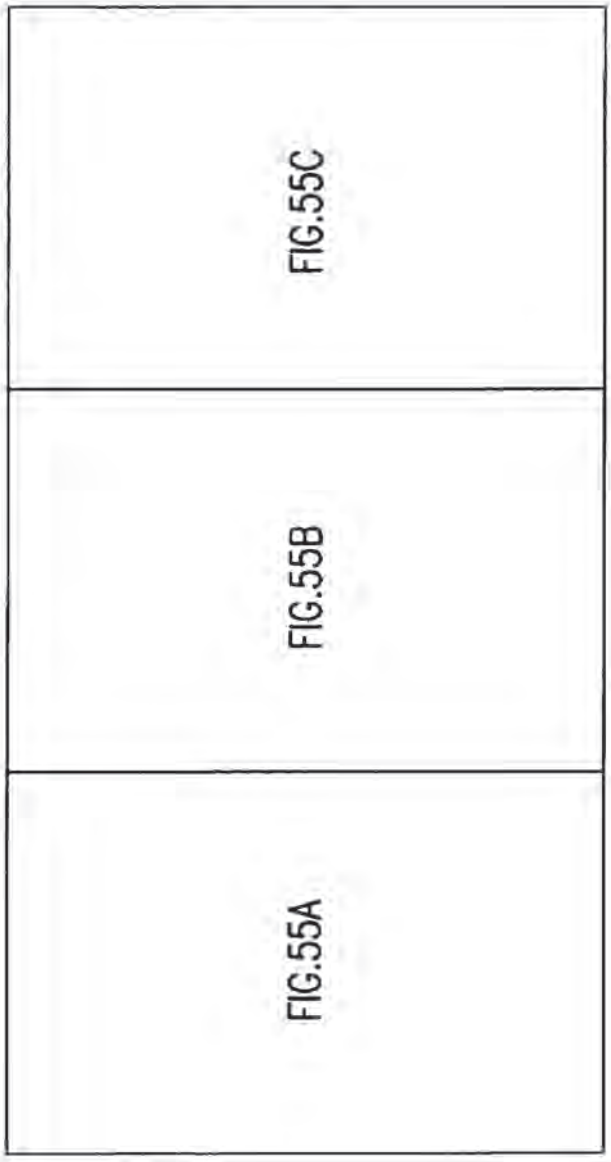


FIG.55

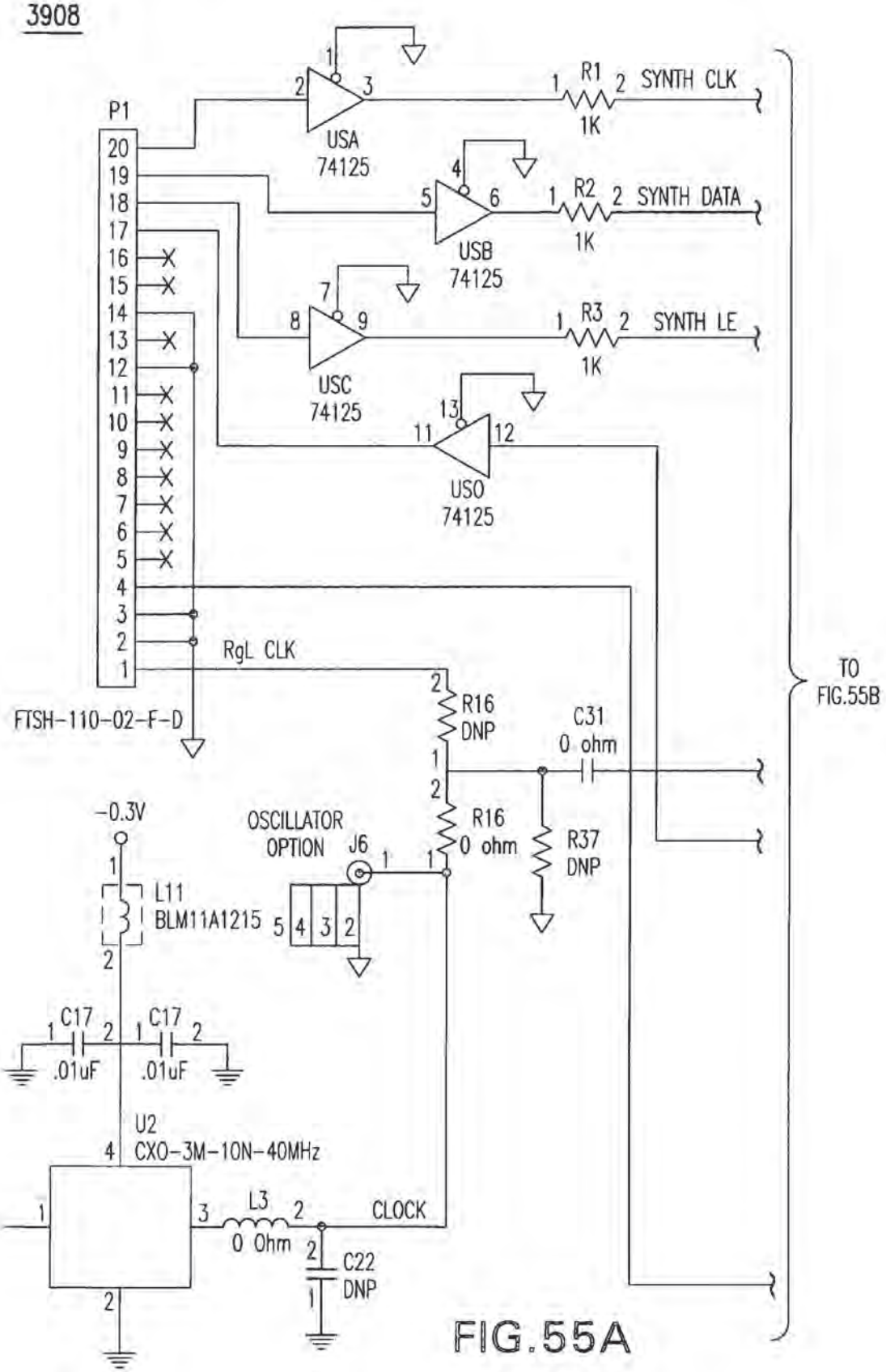

3908
P1
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
FTSH-110-02-F-D
USA
74125
USB
74125
USC
74125
USO
74125
R1
1K
SYNTH CLK
R2
1K
SYNTH DATA
R3
1K
SYNTH LE
RgL CLK
R16
DNP
C31
0 ohm
R16
0 ohm
R37
DNP
OSCILLATOR
OPTION
J6
-0.3V
L11
BLM11A1215
C17
.01uF
C17
.01uF
U2
CXO-3M-10N-40MHz
L3
0 Ohm
CLOCK
C22
DNP
TO
FIG.55B

FIG.55A

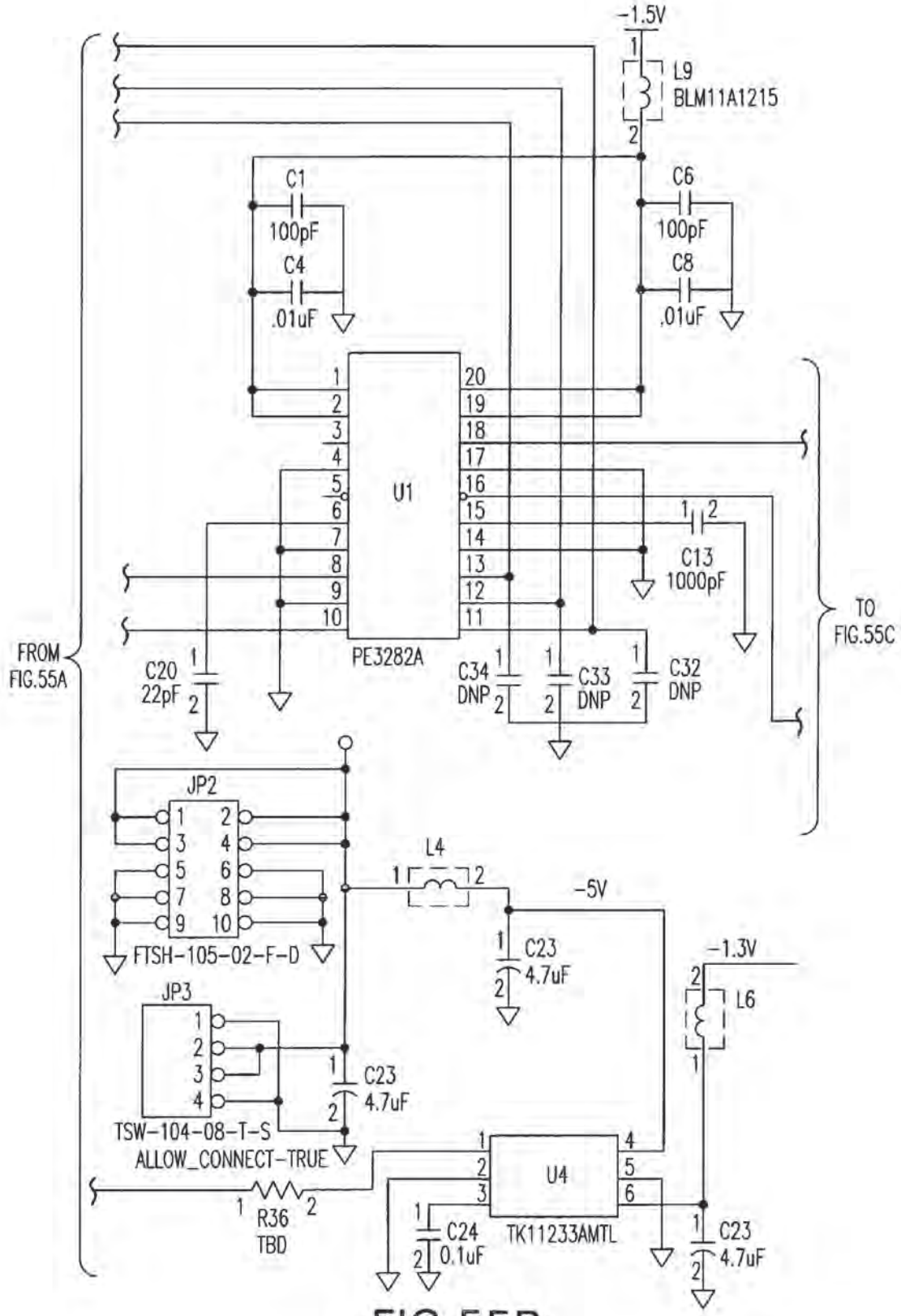

-1.5V
L9
BLM11A1215
C1
100pF
C4
.01uF
C6
100pF
C8
.01uF
U1
PE3282A
C13
1000pF
TO
FIG.55C
FROM
FIG.55A
C20
22pF
C34
DNP
C33
DNP
C32
DNP
JP2
FTSH-105-02-F-D
L4
-5V
C23
4.7uF
-1.3V
L6
JP3
TSW-104-08-T-S
ALLOW_CONNECT-TRUE
C23
4.7uF
U4
TK11233AMTL
R36
TBD
C24
0.1uF
C23
4.7uF

FIG.55B

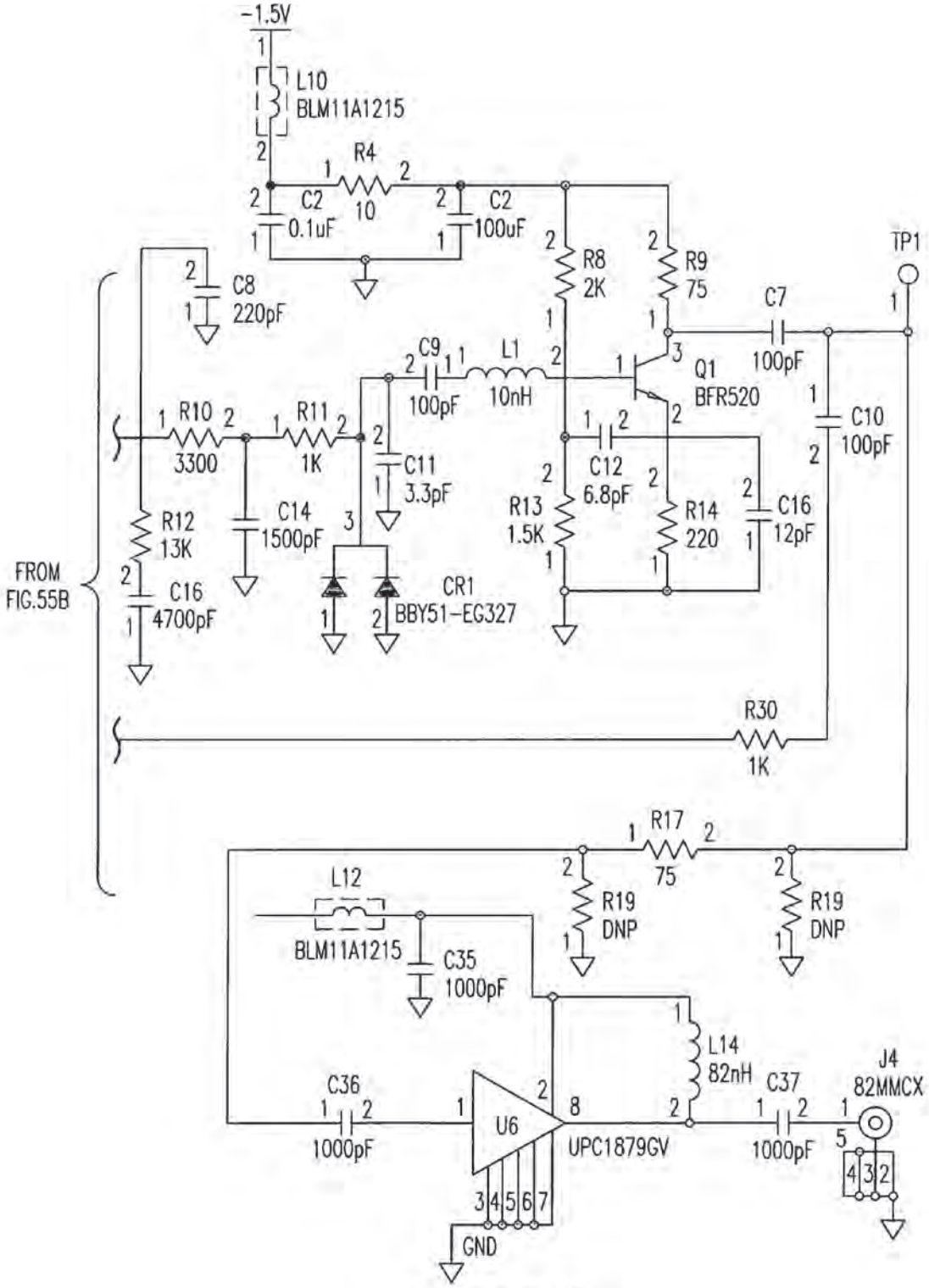

-1.5V
L10
BLM11A1215
R4
10
C2
0.1uF
C2
100uF
C8
220pF
R8
2K
R9
75
TP1
C7
100pF
C9
100pF
L1
10nH
Q1
BFR520
C10
100pF
R10
3300
R11
1K
C11
3.3pF
C12
6.8pF
R13
1.5K
R14
220
C16
12pF
R12
13K
C14
1500pF
C16
4700pF
CR1
BBY51-EG327
FROM
FIG.55B
R30
1K
R17
75
L12
BLM11A1215
C35
1000pF
R19
DNP
R19
DNP
L14
82nH
J4
82MMCX
C36
1000pF
U6
UPC1879GV
C37
1000pF
GND

FIG.55C

ITEM	QTY	REFERENCE	PART	DESCRIPTION	PART NUMBER	MANUFACT.
1	1	CR1	BBY51-E6327	DIODE,VARACTOR	BBY51-E6327	SIEMENS
2	6	C1,C3,C5,C7,C9,C10	100pF	CAPACITOR,CERAMIC,100pF,10%,COG,0603	GRM39COG101K050	MURATA
3	2	C29,C2	0.1uF	CAPACITOR,CERAMIC,.1uF,10%,X7R,0603	GRM39X7R104K016AD	MURATA
4	3	C4,C8,C17	.01uF	CAPACITOR,CERAMIC,.01uF,10%,X7R,0603	GRM39X7R103K050	MURATA
5	1	C6	220pF	CAPACITOR,CERAMIC,220pF,5%,COG,0603	GRM39COG221J025	MURATA
6	1	C11	3.3pF	CAPACITOR,CERAMIC,3.3pF,5%,COG,0603	GRM39COG3R3B100V	MURATA
7	1	C12	6.8pF	CAPACITOR,CERAMIC,6.8pF,+/-.25pF,COG,0603	GRM39COG6R8C100V	MURATA
8	4	C13,C35,C36,C37	1000pF	CAPACITOR,CERAMIC,1000pF,10%,X7R,0603	GRM39X7R102K016	MURATA
9	1	C14	1500pF	CAPACITOR,CERAMIC,1500Pf,10%,X7R,0603	GRM39X7R152K016	MURATA
10	1	C15	12pF	CAPACITOR,CERAMIC,12pF,5%,COG,0603	GRM39COG150J050	MURATA
11	1	C16	4700pF	CAPACITOR,CERAMIC,4700pF,10%,0603	GRM39X7R472K016	MURATA
12	2	C20,C18	22pF	CAPACITOR,CERAMIC,22pF,10%,COG,0603	GRM36COG220K050	MURATA
13	4	C22,C32,C33,C34	DNP	CAPACITOR,CERAMIC,,,,,0603		MURATA
14	3	C23,C24,C27	4.7uF	CAPACITOR,TANTALUM,4.7uF,10%,3216	T491A475K006AS	KEMET
15	3	R16,C31,R17	0 OHM	RESISTOR,ZERO OHM,0603	ERJ3GSY0R00	PANASONIC
16	1	JP1	FTSH-110-02-F-D	HEADER,DUAL ROW 10X2,.050X.050	FTSH-110-02-F-D	SAMTEC
17	1	JP2	FTSH-105-02-F-D	HEADER,DUAL ROW 5X2,.050X.050	FTSH-105-02-F-D	SAMTEC
18	1	JP3	TSW-104-08-T-S	HEADER, SINGLE ROW 4 PIN, .100"	TSW-104-08-T-S	BERG
19	2	J5,J6	82MMCX	RF CONNECTOR	82MMCX-50-0-1	SUHNER
20	1	L1	18nH	INDUCTOR,18nH,10%, 0805	0805CS-180XJBC	COILCRAFT
21	1	L3	0 OHM	ZERO OHM JUMPER	RM73Z1JT	KOA
22	6	L4,L6,L9,L10,L11,L12	BLM11A121S	FERRITE BEAD, 0603	BLM11A121S	MURATA
23	1	L14	82nH	INDUCTOR, 82nH,10%,0805	LL2012-F82NK	TOKO
24	1	Q1	BFR520	TRANSISTOR, NPN	BFR520	PHILIPS
25	5	R1,R2,R3,R11,R30	1K	RESISTOR, 1K,5%,0603	ERF3GSYJ102	PANASONIC
26	1	R4	10	RESISTOR, 10 OHM,5%,0603	ERJ3GSYJ1R0	PANASONIC

FIG.56A

27	1	R8	2K	RESISTOR, 2K, 5%, 0603	ERJ3GSYJ202	PANASONIC
28	1	R9	75	RESISTOR, 75 OHM, 5%, 0603	ERJ3GSYJ750	PANASONIC
29	1	R10	3300	RESISTOR, 3.3K, 5%, 0603	ERJ3GSYJ332	PANASONIC
30	1	R12	13K	RESISTOR, 13K, 5%, 0603	ERJ3GSYJ133	PANASONIC
31	1	R13	1.5K	RESISTOR, 1.5K, 5%, 0603	ERJ3GSYJ152	PANASONIC
32	1	R14	220	RESISTOR, 220 OHM, 5%, 0603	ERJ3GSYJ221	PANASONIC
33	1	R15	DNP	RESISTOR, ZERO OHM, 0603	ERJ3GSY0R00	PANASONIC
34	2	R18, R19	DNP	RESISTOR, 91 OHM, 5%, 0603	ERJ3GSYJ910	PANASONIC
35	1	R36	TBD	RESISTOR, ZERO OHM, 0603	ERJ3GSY0R00	PANASONIC
36	1	R37	DNP	RESISTOR, , , 0603		PANASONIC
37	1	TP1	TEST POINT			
38	1	U1	PE3282A	IC, SYNTHESIZER	PE3282A	PEREGRINE
39	1	U2	CXO-3M-10N-40MHz	XTAL OSC, 40MHz	CXO-3M-10N-40MHZ A/I	STATEK
40	1	U4	TK11233AMTL	VOLTAGE REGULATOR, 3.5V	TK11235BM	TOKO
41	1	U5	74125	IC, BUFFER	MC74LCX125DT	MOTOROLA
42	1	U6	UPC1678GV	IC, RF AMPLIFIER	UPC1678GV	NEC
43	1		STB500.641.008 V02.00	BOARD		

FIG.56B

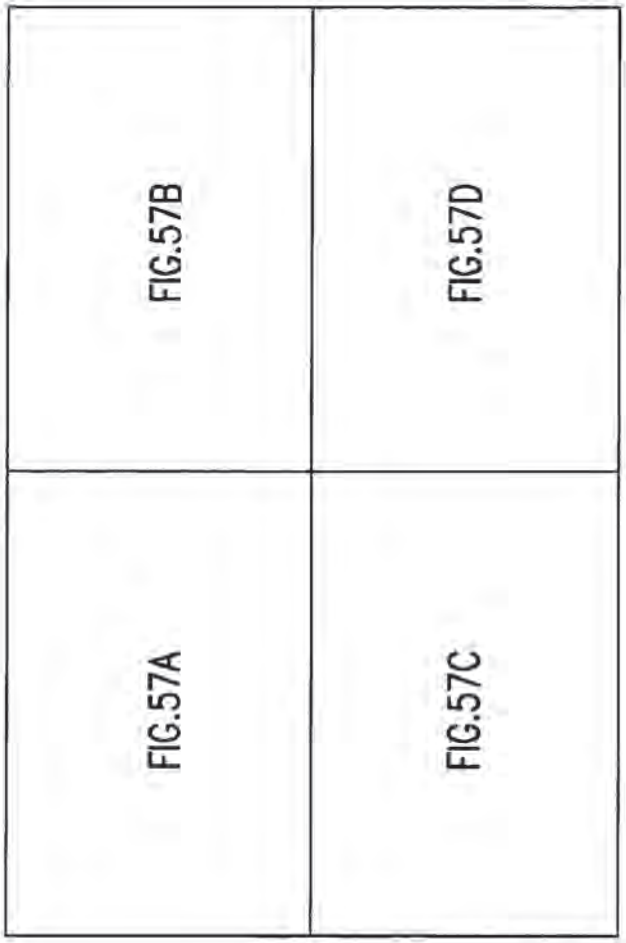


FIG.57

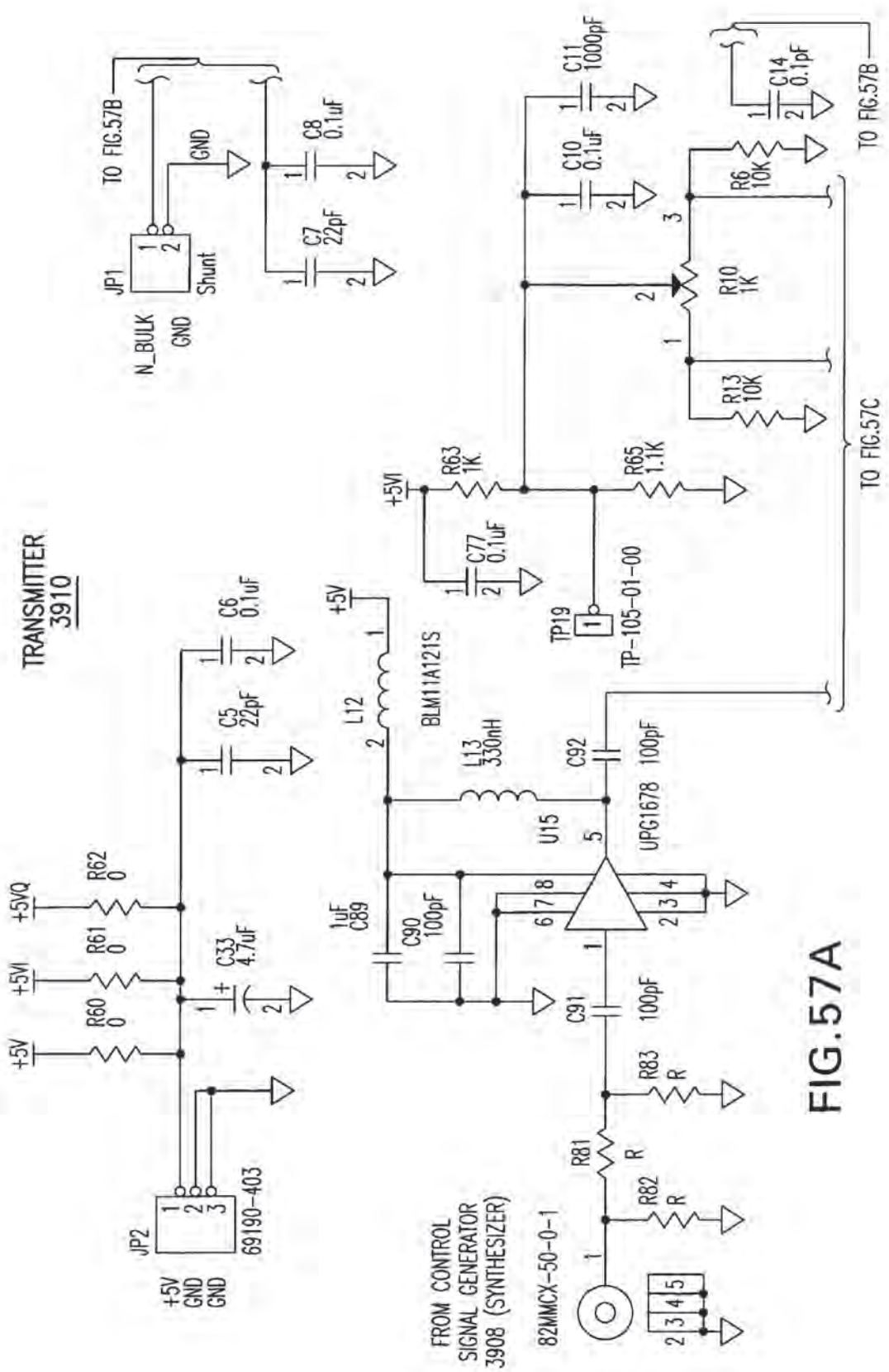

TRANSMITTER
3910
TO FIG.57B
GND
JP1
Shunt
N_BULK
GND
C8
0.1uF
C7
22pF
C11
1000pF
C10
0.1uF
C14
0.1pF
R6
10K
R10
1K
R13
10K
TO FIG.57B
TO FIG.57C
+5VI
R63
1K
R65
1.1K
C77
0.1uF
TP19
TP-105-01-00
+5V
L12
BLM11A121S
L13
330nH
C92
100pF
U15
UPG1678
C6
0.1uF
C5
22pF
+5VQ
R62
0
+5VI
R61
0
C33
4.7uF
+5V
R60
0
1uF
C89
C90
100pF
C91
100pF
R83
R
R81
R
R82
R
JP2
69190-403
+5V
GND
GND
FROM CONTROL
SIGNAL GENERATOR
3908 (SYNTHESIZER)
82MMCX-50-0-1

FIG.57A

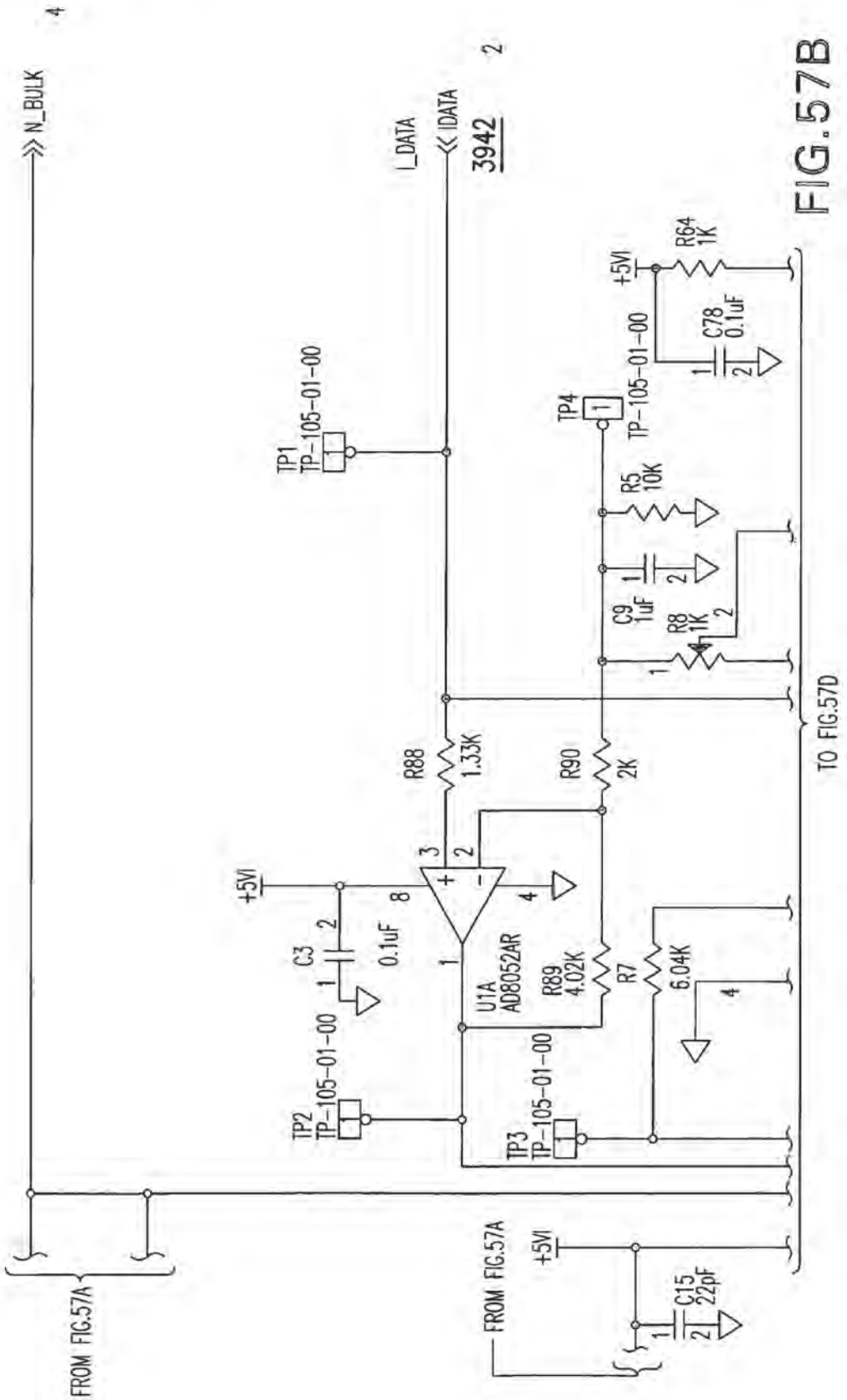

N_BULK
I_DATA
IDATA
3942
TP1 TP-105-01-00
TP2 TP-105-01-00
TP3 TP-105-01-00
TP4 TP-105-01-00
+5VI
C3 0.1uF
C78 0.1uF
C9 1uF
C15 22pF
R64 1K
R5 10K
R8 1K
R88 1.33K
R90 2K
R89 4.02K
R7 6.04K
U1A AD8052AR
FROM FIG.57A
FROM FIG.57A
TO FIG.57D

FIG.57B

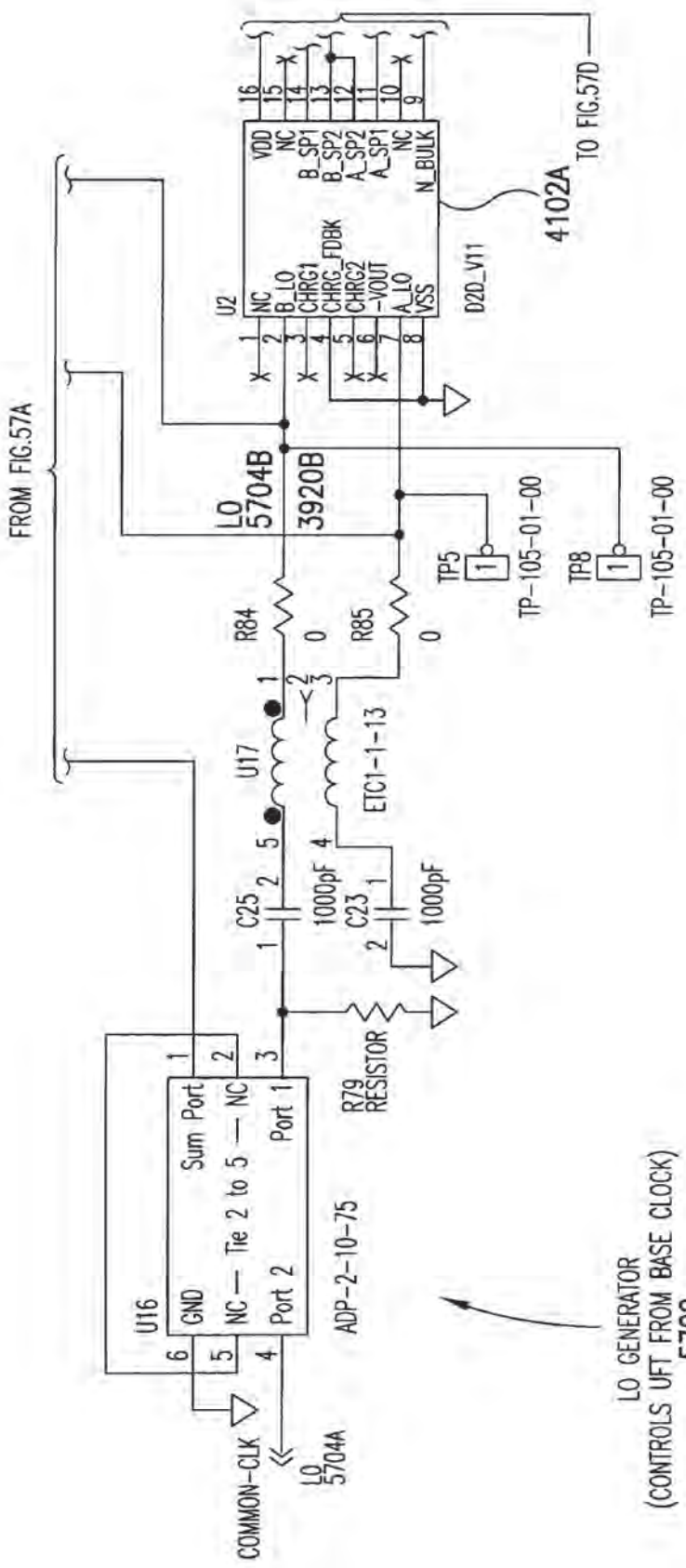

FROM FIG.57A
U2
NC
B_LO
CHRG1
CHRG_FDBK
CHRG2
-VOUT
A_LO
VSS
VDD
NC
B_SP1
B_SP2
A_SP1
NC
N_BULK
D2D_V11
4102A
TO FIG.57D
LO
5704B
3920B
TP5
TP-105-01-00
TP8
TP-105-01-00
R84
R85
0
0
U17
ETC1-1-13
C25
1000pF
C23
1000pF
R79
RESISTOR
U16
GND
NC — Tie 2 to 5 — NC
Port 2
Sum Port
Port 1
ADP-2-10-75
COMMON-CLK
LO
5704A
LO GENERATOR
(CONTROLS UFT FROM BASE CLOCK)
5702

FIG.57C

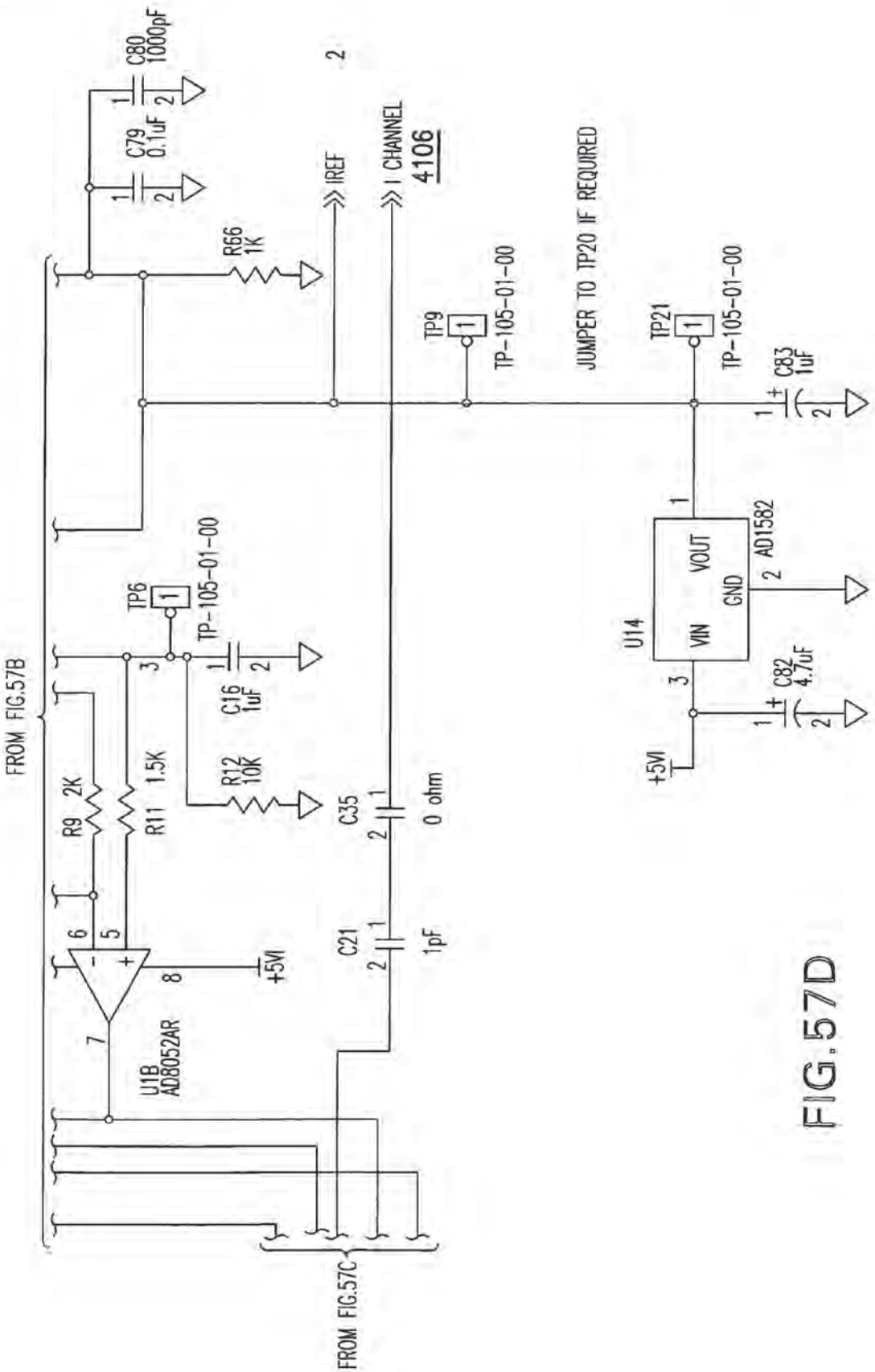

FROM FIG.57B
C80 1000pF
C79 0.1uF
R66 1K
IREF
I CHANNEL
4106
TP9
TP-105-01-00
JUMPER TO TP20 IF REQUIRED
TP21
TP-105-01-00
C83 1uF
U14
VIN
VOUT
GND
AD1582
C82 4.7uF
+5VI
TP6
TP-105-01-00
C16 1uF
R12 10K
R9 2K
R11 1.5K
C35
0 ohm
C21
1pF
+5VI
U1B AD8052AR
FROM FIG.57C

FIG. 57D

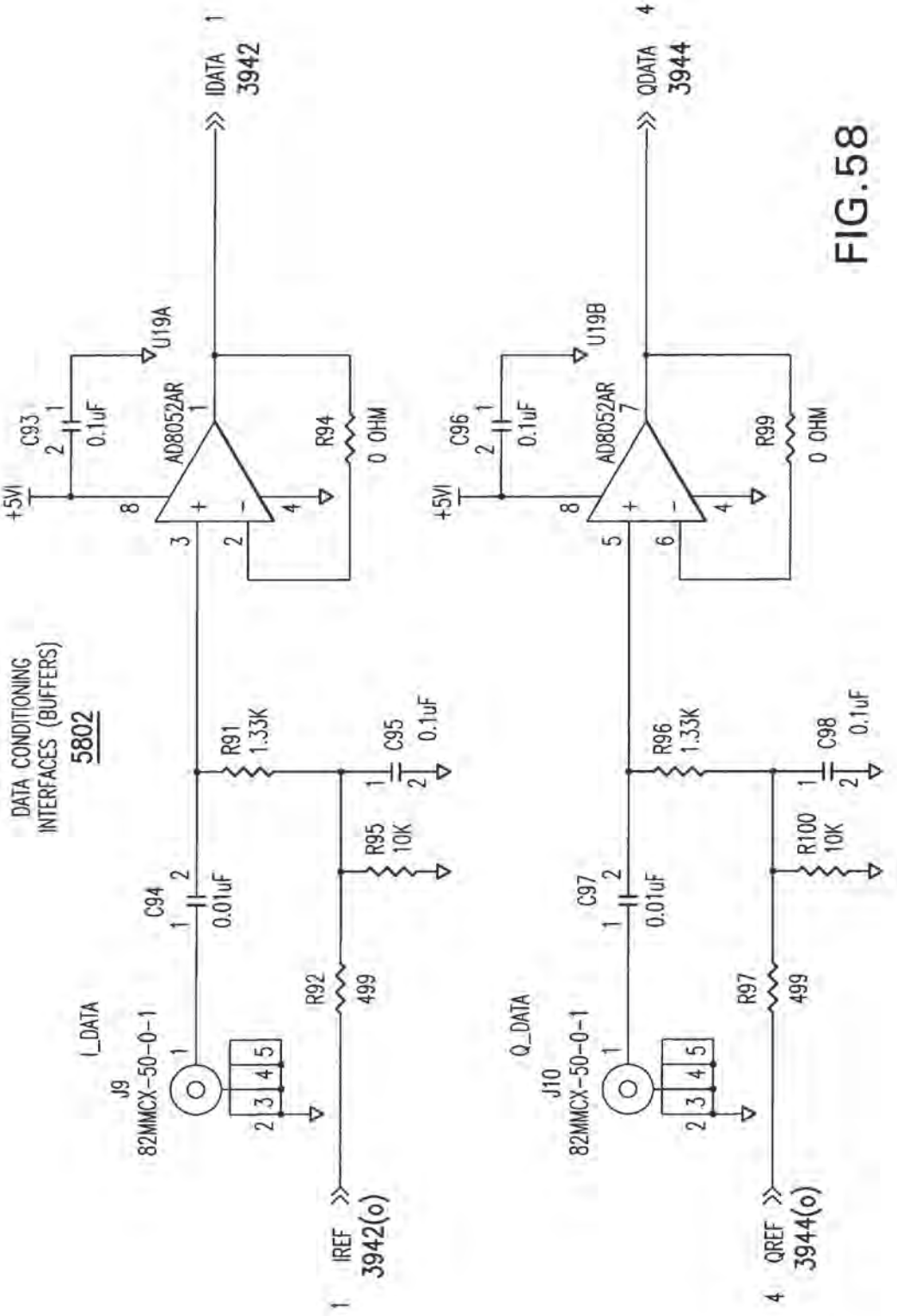

DATA CONDITIONING
INTERFACES (BUFFERS)
5802
+5VI
C93
0.1uF
U19A
AD8052AR
R94
0 OHM
IDATA
3942
R91
1.33K
C95
0.1uF
R95
10K
C94
0.01uF
R92
499
I_DATA
J9
82MMCX-50-0-1
IREF
3942(o)
C96
0.1uF
U19B
AD8052AR
R99
0 OHM
QDATA
3944
R96
1.33K
C98
0.1uF
R100
10K
C97
0.01uF
R97
499
Q_DATA
J10
82MMCX-50-0-1
QREF
3944(o)

FIG.58

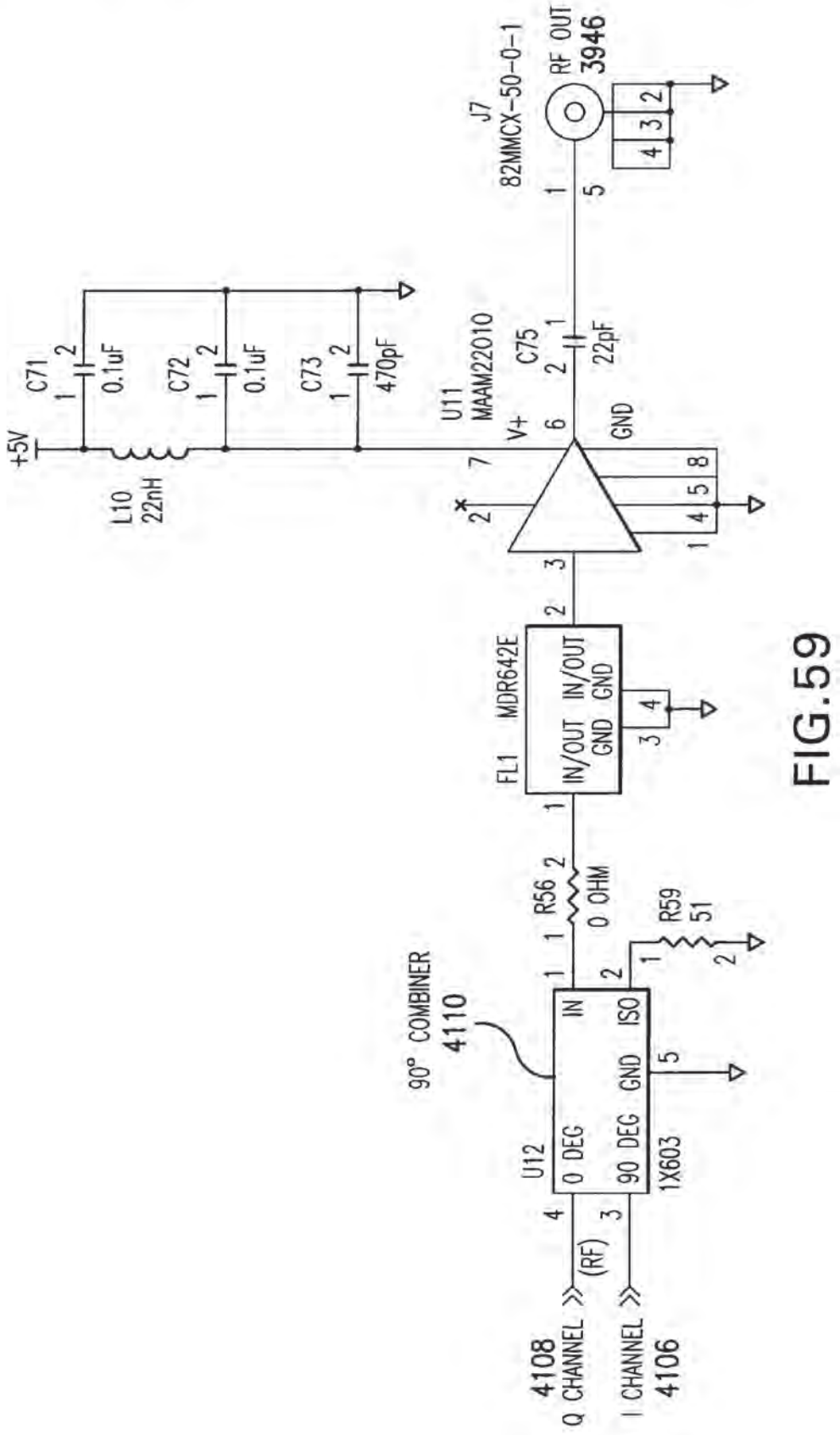

J7
82MMCX-50-0-1
RF OUT
3946
C71
0.1uF
C72
0.1uF
C73
470pF
+5V
L10
22nH
U11
MAAM22010
V+
GND
C75
22pF
FL1
MDR642E
IN/OUT
GND
R56
0 OHM
R59
51
90° COMBINER
4110
U12
0 DEG
90 DEG
IN
ISO
GND
1X603
(RF)
4108
Q CHANNEL
I CHANNEL
4106

FIG.59

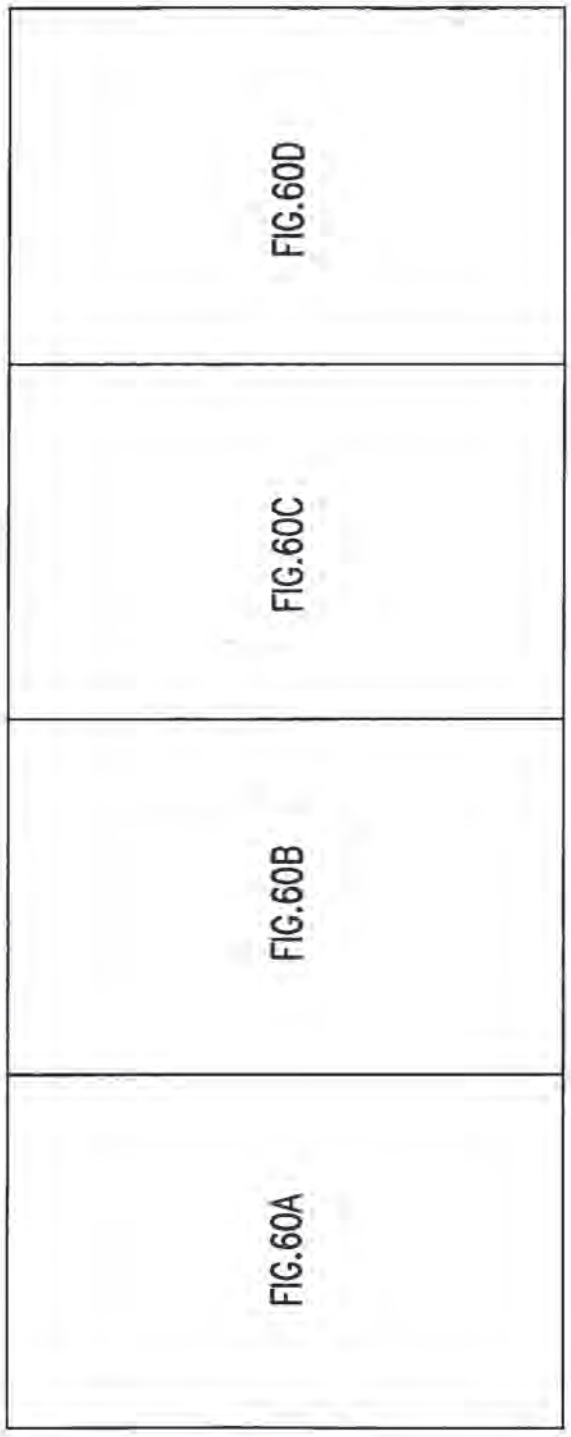


FIG. 60

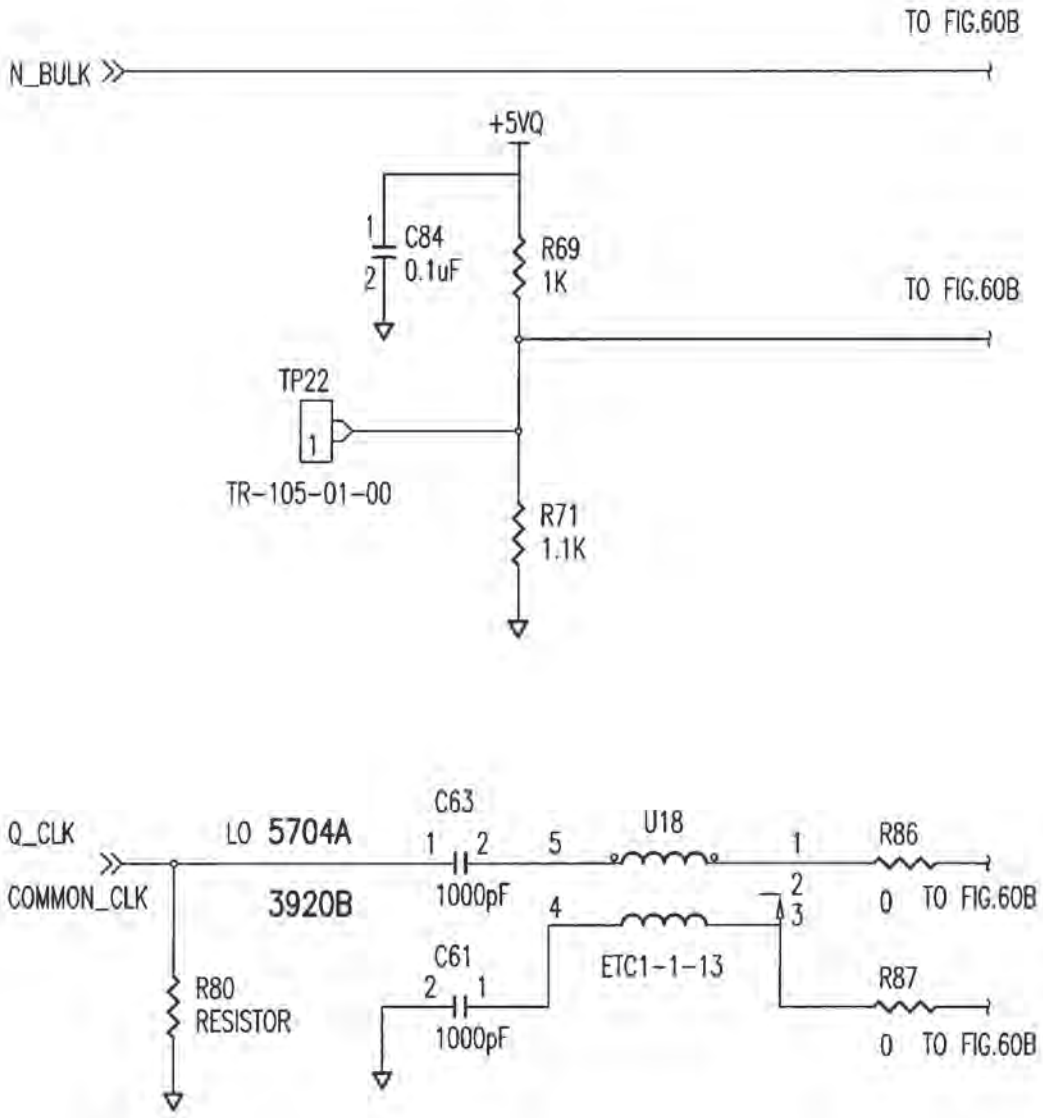

TO FIG.60B
N_BULK
+5VQ
C84
0.1uF
R69
1K
TO FIG.60B
TP22
TR-105-01-00
R71
1.1K
Q_CLK
COMMON_CLK
LO 5704A
3920B
C63
1000pF
U18
ETC1-1-13
R86
0 TO FIG.60B
C61
1000pF
R80
RESISTOR
R87
0 TO FIG.60B

FIG.60A

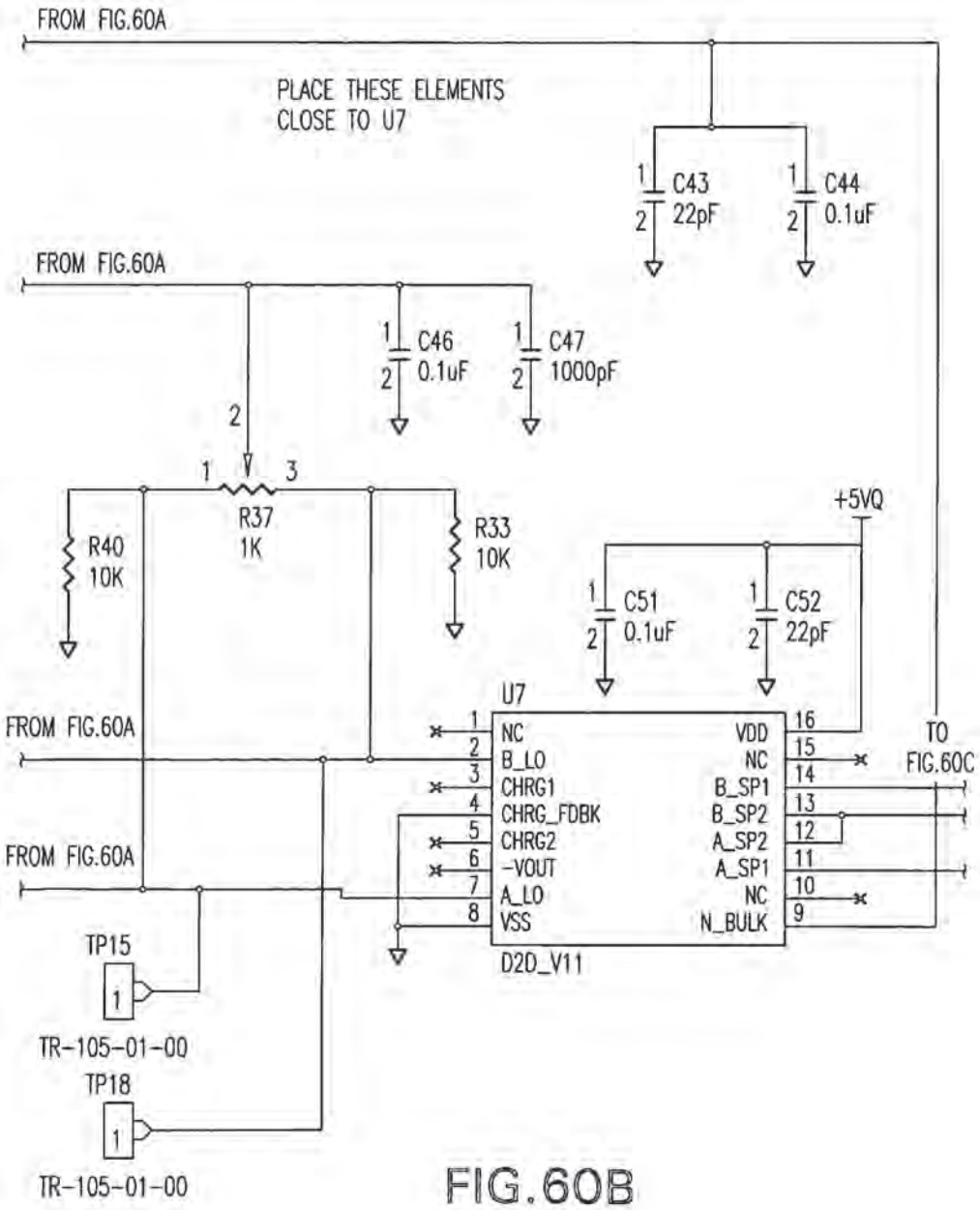

FROM FIG.60A
PLACE THESE ELEMENTS
CLOSE TO U7
C43
22pF
C44
0.1uF
FROM FIG.60A
C46
0.1uF
C47
1000pF
R37
1K
R40
10K
R33
10K
+5VQ
C51
0.1uF
C52
22pF
U7
NC
B_LO
CHRG1
CHRG_FDBK
CHRG2
-VOUT
A_LO
VSS
VDD
NC
B_SP1
B_SP2
A_SP2
A_SP1
NC
N_BULK
D2D_V11
TO
FIG.60C
FROM FIG.60A
FROM FIG.60A
TP15
TR-105-01-00
TP18
TR-105-01-00

FIG.60B

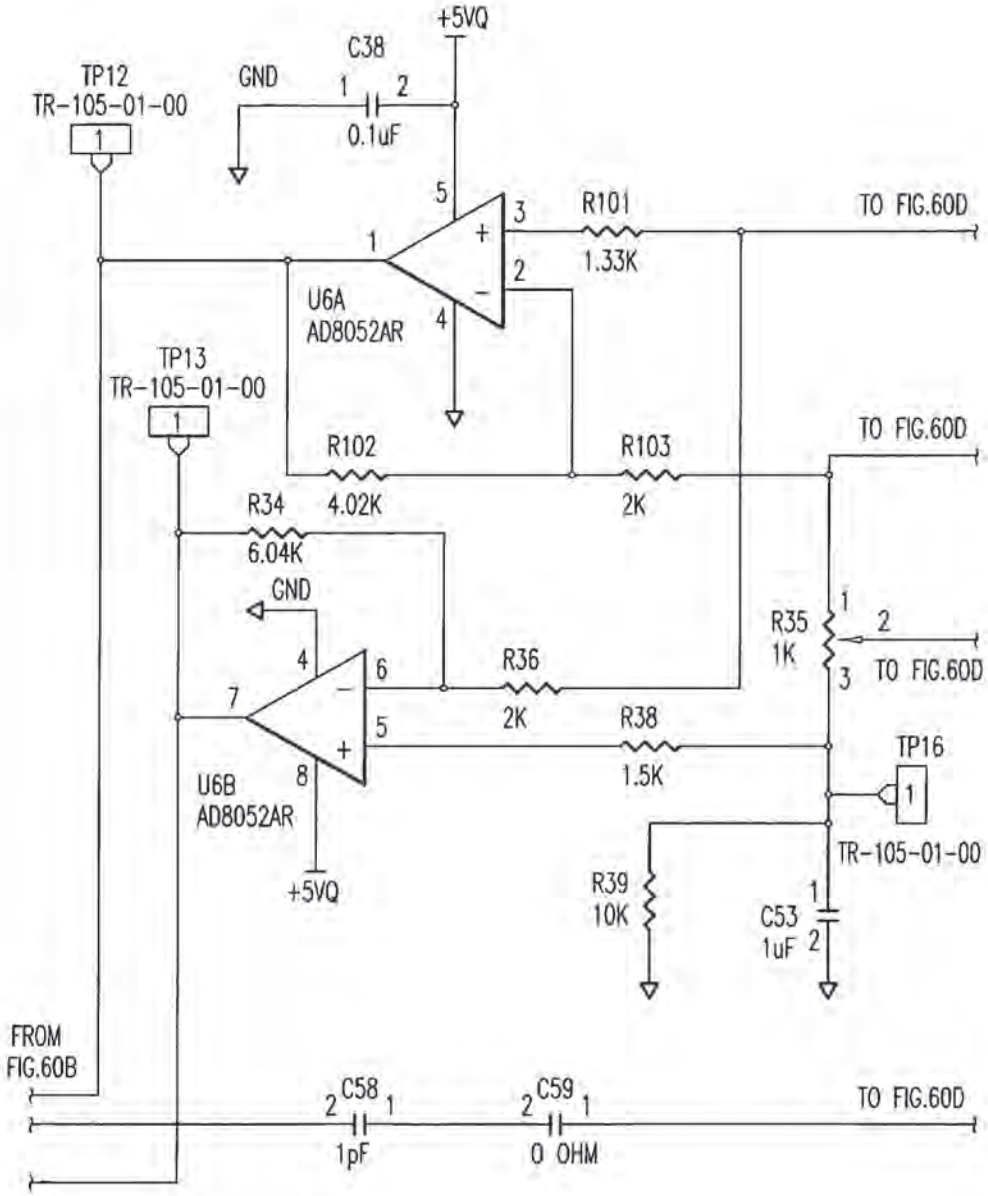

+5VQ
C38
TP12
TR-105-01-00
GND
0.1uF
R101
1.33K
TO FIG.60D
U6A
AD8052AR
TP13
TR-105-01-00
R102
4.02K
R103
2K
R34
6.04K
GND
R35
1K
R36
2K
R38
1.5K
U6B
AD8052AR
+5VQ
TP16
TR-105-01-00
R39
10K
C53
1uF
FROM
FIG.60B
C58
1pF
C59
0 OHM

FIG.60C

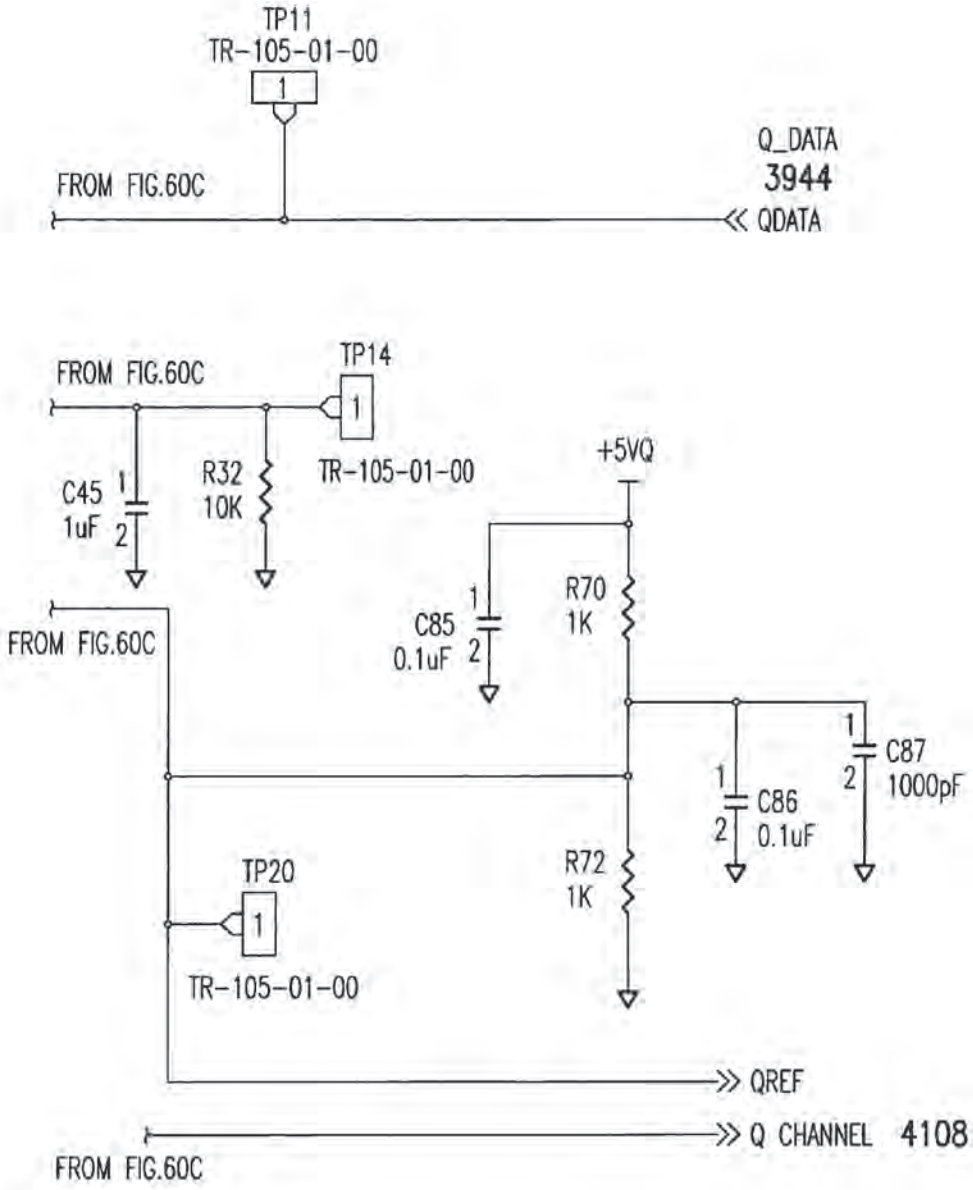

TP11
TR-105-01-00
1
Q_DATA
3944
FROM FIG.60C
QDATA
FROM FIG.60C
TP14
1
TR-105-01-00
+5VQ
C45
1uF
1
2
R32
10K
C85
0.1uF
R70
1K
FROM FIG.60C
C87
1000pF
C86
0.1uF
TP20
R72
1K
TR-105-01-00
QREF
Q CHANNEL
4108
FROM FIG.60C

FIG.60D

ITEM	QTY	REFERENCE	PART	PART NUMBER	MANUFACTURER
1	21	C3,C6,C8,C10,C14,C38,C44,	0.1uF	GRM39X7R104K016	MURATA
		C46,C51,C71,C72,C77,C78,			
		C79,C84,C85,C86,C93,C95,			
		C96,C98			
2	6	C5,C7,C15,C43,C52,C75	22pF	GRM39C0G220J050	MURATA
3	5	C9,C16,C45,C53,C89	1uF	GRM40Y5V105Z016	MURATA
4	8	C11,C23,C25,C47,C61,C63	1000pF	GRM39X7R102K050	MURATA
		C80,C87			
5	2	C58,C21	1pF	GRM39C0G010B50V	MURATA
6	2	C82,C33	4.7uF	T491A475K006AS	KEMET
7	2	C59,C35	0 ohm	GRM39C0Gxxxx50V	MURATA
8	1	C73	470pF	GRM39C0G471J050	MURATA
9	1	C83	1uF	T491A105M016AS	KEMET
10	3	C90,C91,C92	100pF	ECU-V1H101JCV	
11	2	C94,C97	0.01uF	GRM39X7R103K016	MURATA
12	1	FL1	MDR642E	MDR642E	SOSHIN
13	1	JP1	Shunt	69190-402	BERG
14	1	JP2	69190-403	69190-403	BERG
15	4	J7,J8,J9,J10	82MMCX-50-0-1	82MMCX-50-0-1	SUHNER
16	1	L10	22nH	LL1608-F22NK	COILCRAFT
17	1	L12	BLM11A121S	BLM11A121S	MURATA
18	1	L13	330nH	LL2012-FR33K	
19	10	R5,R6,R12,R13,R32,R33,	10K	ERJ3EKF1002	PANASONIC
		R39,R40,R95,R100			
20	2	R34,R7	6.04K	ERJ3EKF6041	PANASONIC
21	4	R8,R10,R35,R37	1K	3224W-1-102	BOURNS
22	4	R9,R36,R90,R103	2K	ERJ3EKF2001	PANASONIC
23	2	R38,R11	1.5K	ERJ3EKF1501	PANASONIC
24	3	R56,R94,R99	0 ohm	ERJ3GSY0R00	PANASONIC

FIG.61A

25	1	R59	51	ERJ3GSYJ510	PANASONIC
26	7	R60,R61,R62,R84,R85,R86,	0	ERJ3GSY0R00	PANASONIC
		R87			
27	6	R63,R64,R66,R69,R70,R72	1K	ERJ3EKF1001	PANASONIC
28	2	R71,R65	1.1K	ERJ3EKF1101	PANASONIC
29	2	R80,R79	RESISTOR		
30	3	R81,R82,R83	R		
31	4	R88,R91,R96,R101	1.33K	ERJ3EKF1331	PANASONIC
32	2	R102,R89	4.02K	ERJ3EKF4021	PANASONIC
33	2	R92,R97	499	ERJ3EKF4990	PANASONIC
34	19	TP1,TP2,TP3,TP4,TP5,TP6,	TP-105-01-00		
		TP8,TP9,TP11,TP12,TP13,			
		TP14,TP15,TP16,TP18,TP19,			
		TP20,TP21,TP22			
35	3	U1,U6,U19	AD8052AR	AD8052AR	ANALOG DEVICES
36	2	U7,U2	D2D_V11	D2D_V11	PARKER VISION
37	1	U11	MAAM22010	MAAM22010	MACOM
38	1	U12	1X603	1X603	ANAREN
39	1	U14	AD1582	AD1582	ANALOG DEVICES
40	1	U15	UPG1678	UPG1678GV	NEC
41	1	U16	ADP-2-10-75	ADP-2-10-75	MINI-CIRCUITS
42	1		BOARD	8500.641.021	V05.10

FIG.61B

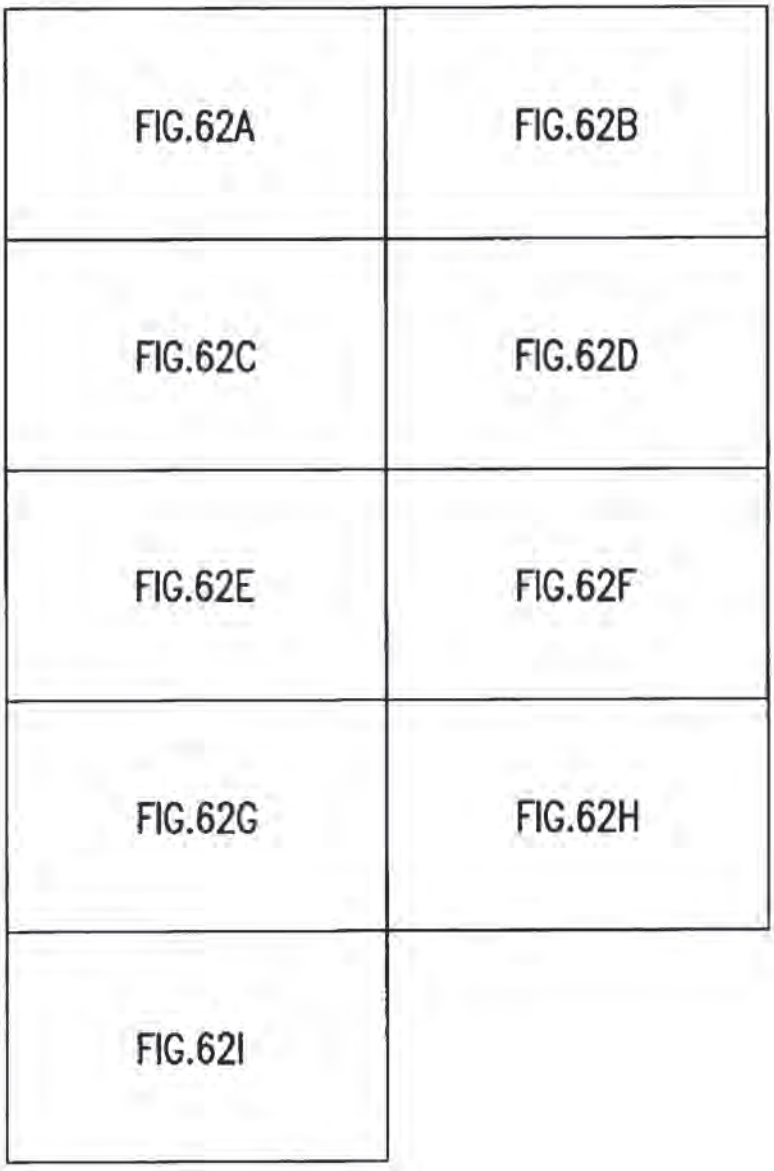

FIG.62A
FIG.62B
FIG.62C
FIG.62D
FIG.62E
FIG.62F
FIG.62G
FIG.62H
FIG.62I

FIG.62

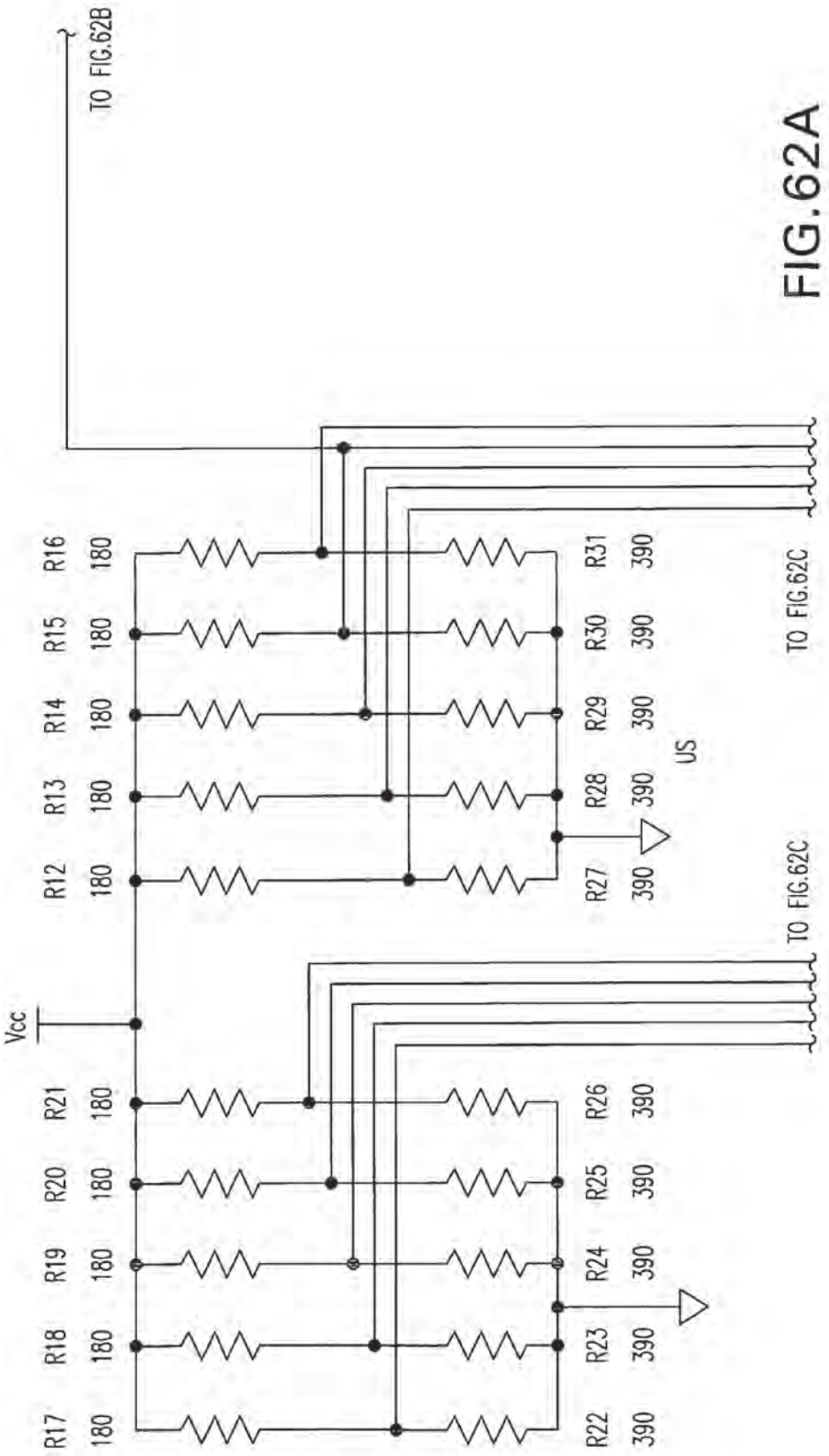
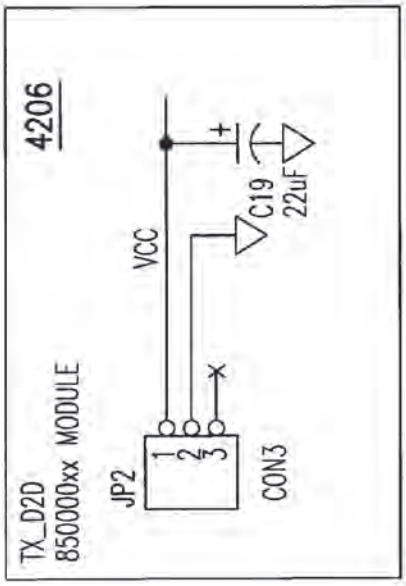
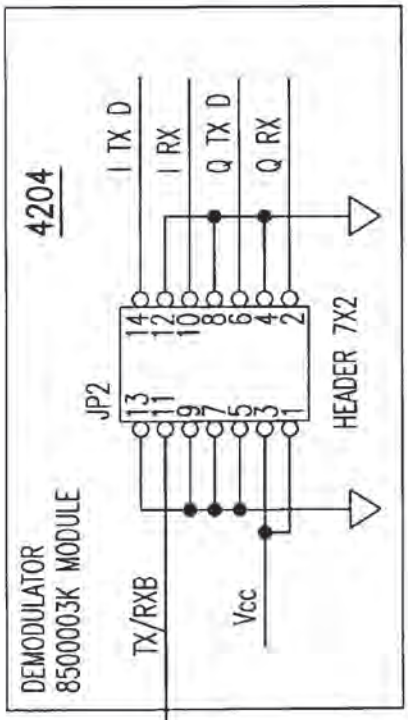

TO FIG.62B
Vcc
R16 180
R15 180
R14 180
R13 180
R12 180
R21 180
R20 180
R19 180
R18 180
R17 180
R31 390
R30 390
R29 390
R28 390
R27 390
R26 390
R25 390
R24 390
R23 390
R22 390
US
TO FIG.62C
TO FIG.62C

FIG.62A


4206
TX_D2D
8500000xx MODULE
JP2
CON3
VCC
C19
22uF


4204
DEMODULATOR
8500003K MODULE
JP2
HEADER 7X2
I TX D
I RX
Q TX D
Q RX
TX/RXB
Vcc
FROM FIG.62A

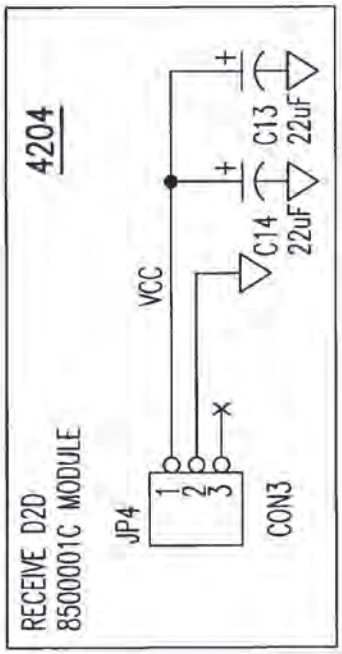

4204
RECEIVE D2D
8500001C MODULE
JP4
CON3
VCC
C14
22uF
C13
22uF

FIG.62B

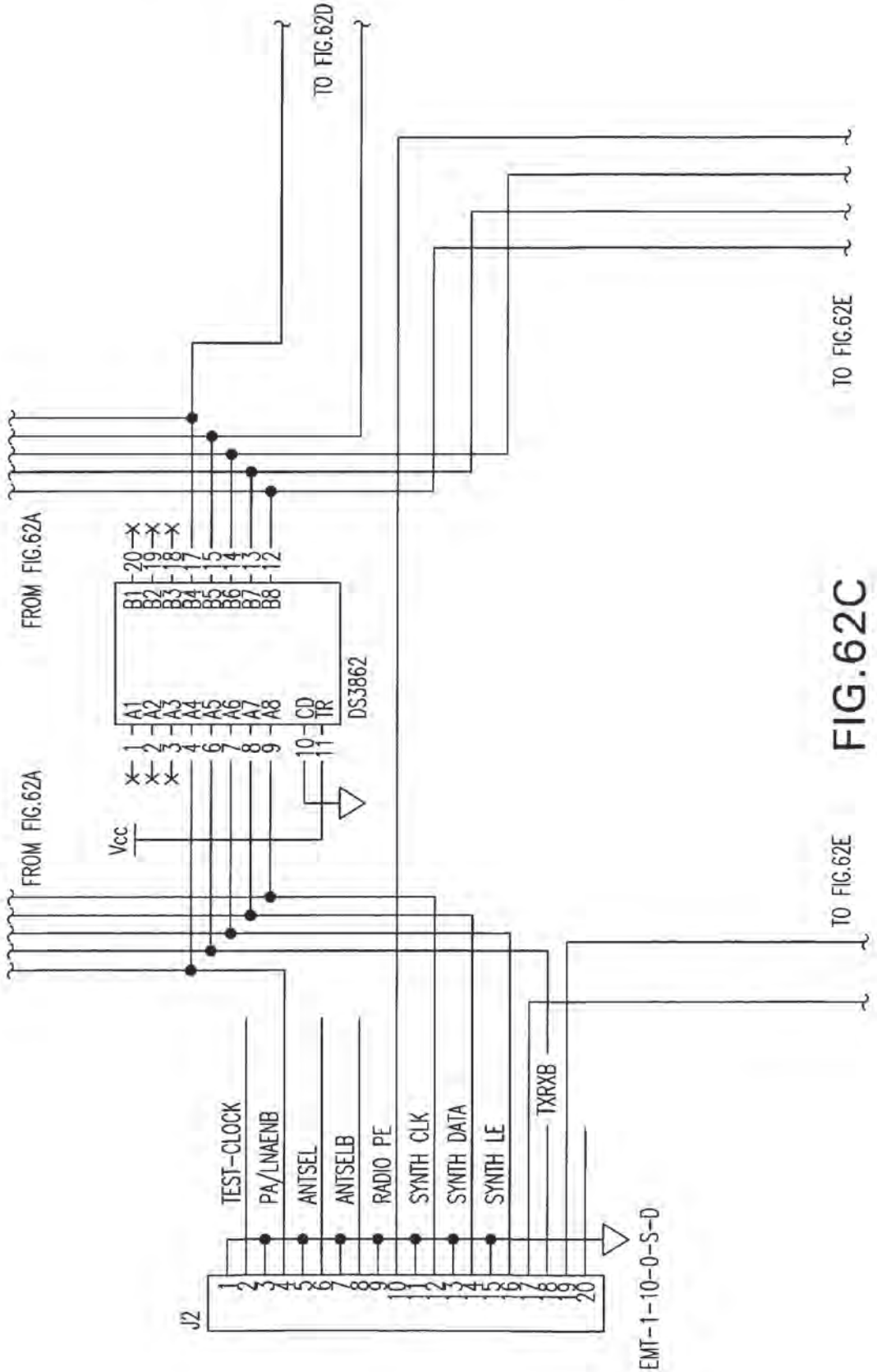

TO FIG.62D
TO FIG.62E
TO FIG.62E
FROM FIG.62A
FROM FIG.62A
DS3862
Vcc
J2
EMT-1-10-0-S-D
TEST-CLOCK
PA/LNAENB
ANTSEL
ANTSELB
RADIO PE
SYNTH CLK
SYNTH DATA
SYNTH LE
TXRXB

FIG.62C

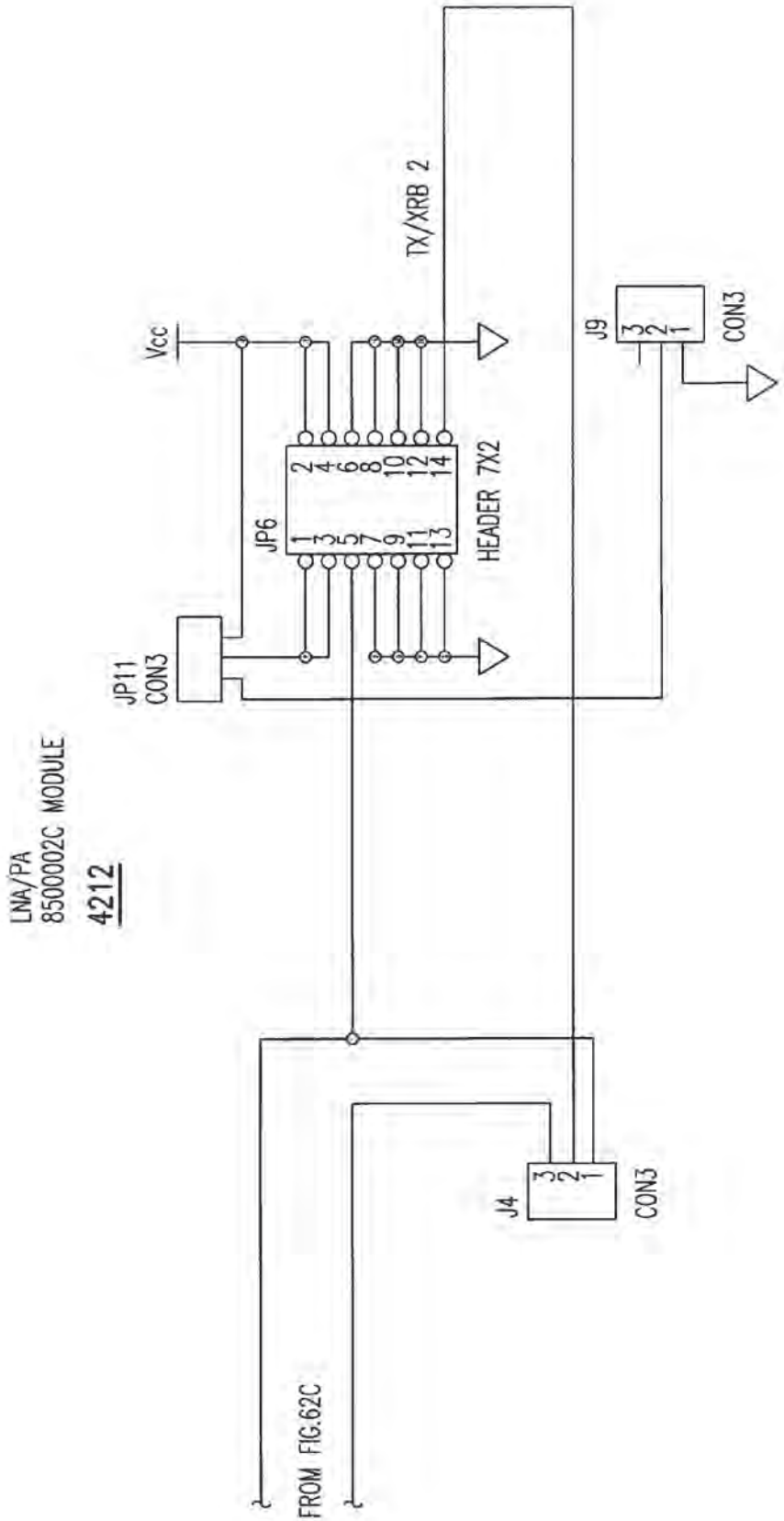

LNA/PA
8500002C MODULE
4212
JP11
CON3
JP6
HEADER 7X2
Vcc
TX/XRB 2
J9
CON3
J4
CON3
FROM FIG.62C

FIG.62D

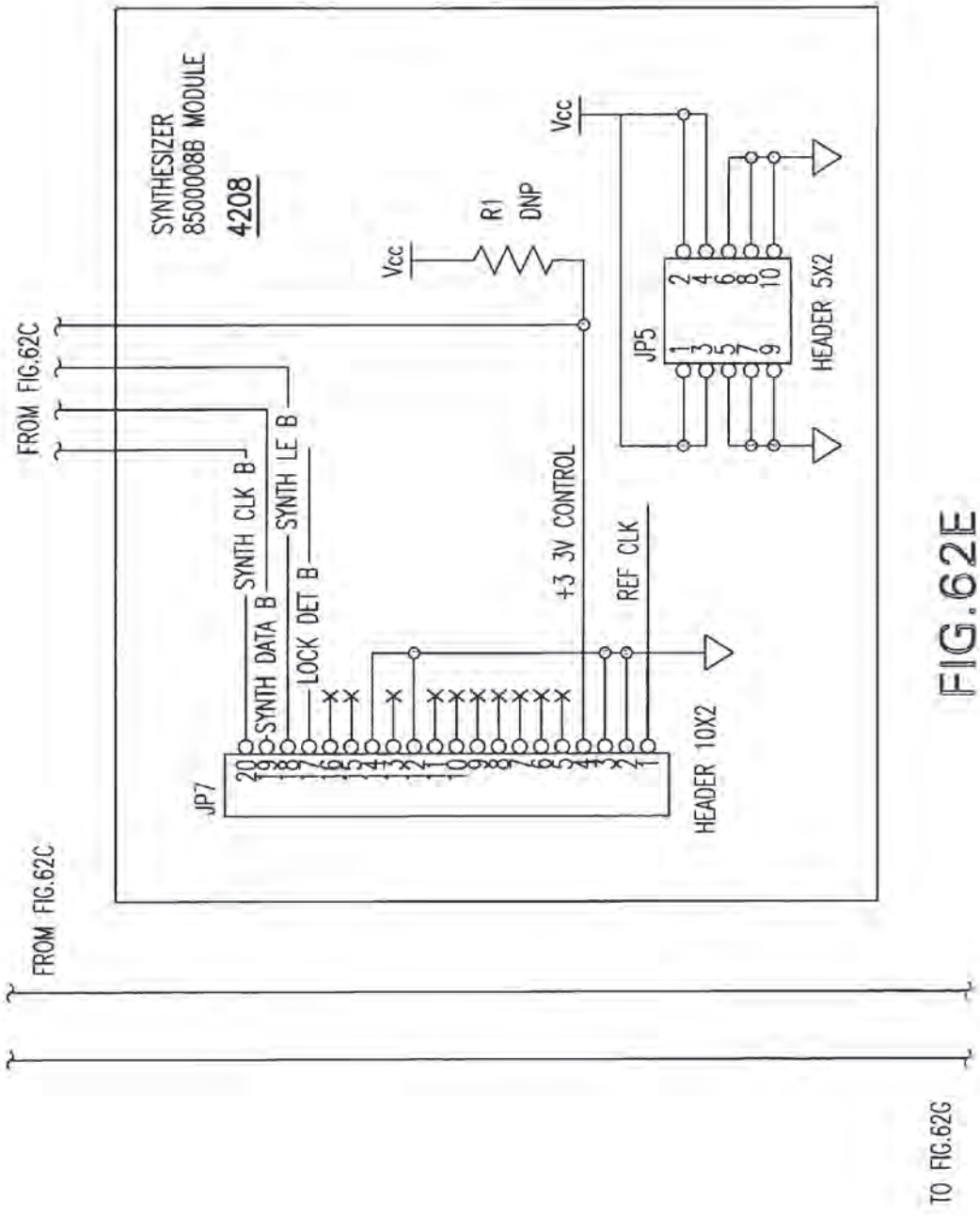

FROM FIG.62C
SYNTHESIZER
8500008B MODULE
4208
Vcc
R1
DNP
Vcc
JP5
HEADER 5X2
SYNTH CLK B
SYNTH LE B
SYNTH DATA B
LOCK DET B
+3 3V CONTROL
REF CLK
JP7
HEADER 10X2
FROM FIG.62C
TO FIG.62G

FIG.62E

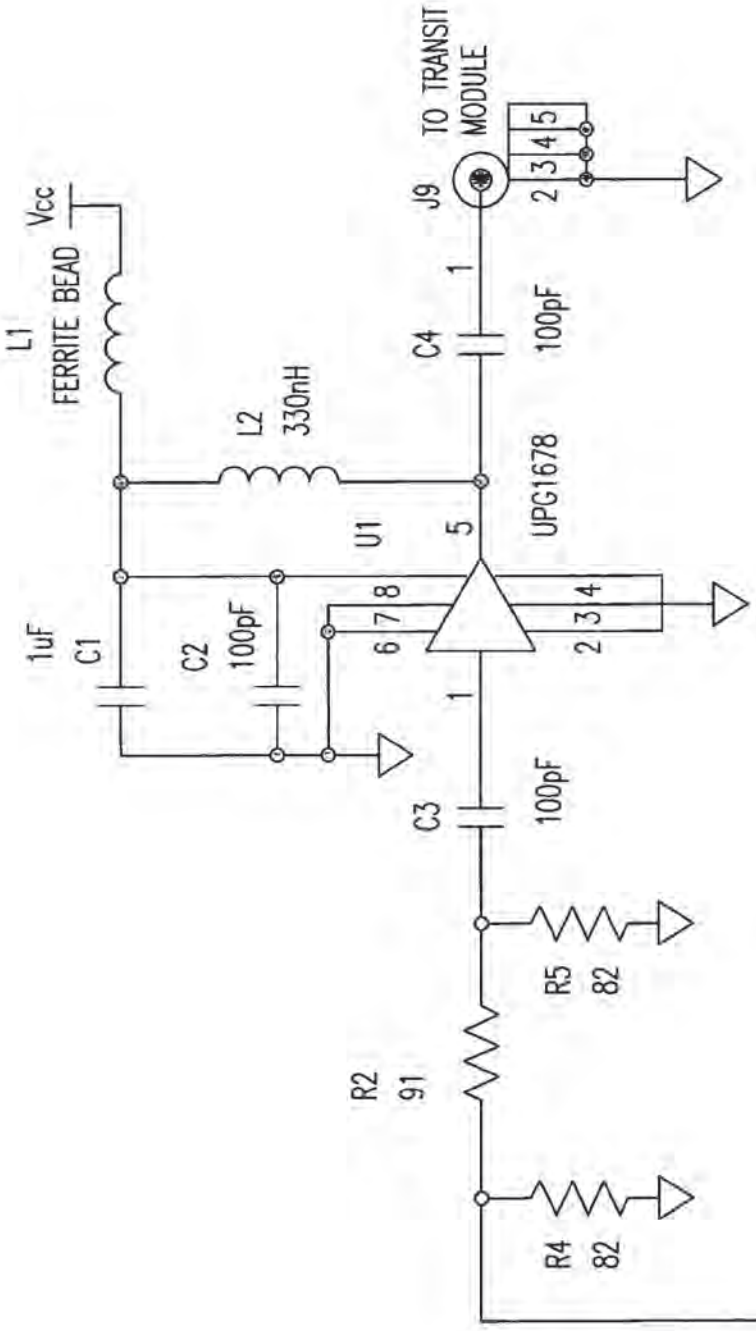

Vcc
L1
FERRITE BEAD
L2
330nH
1uF
C1
C2
100pF
U1
UPG1678
6 7 8
5
1
2 3 4
C3
100pF
C4
100pF
J9
TO TRANSIT MODULE
2 3 4 5
R5
82
R2
91
R4
82
TO FIG.62H

FIG.62F

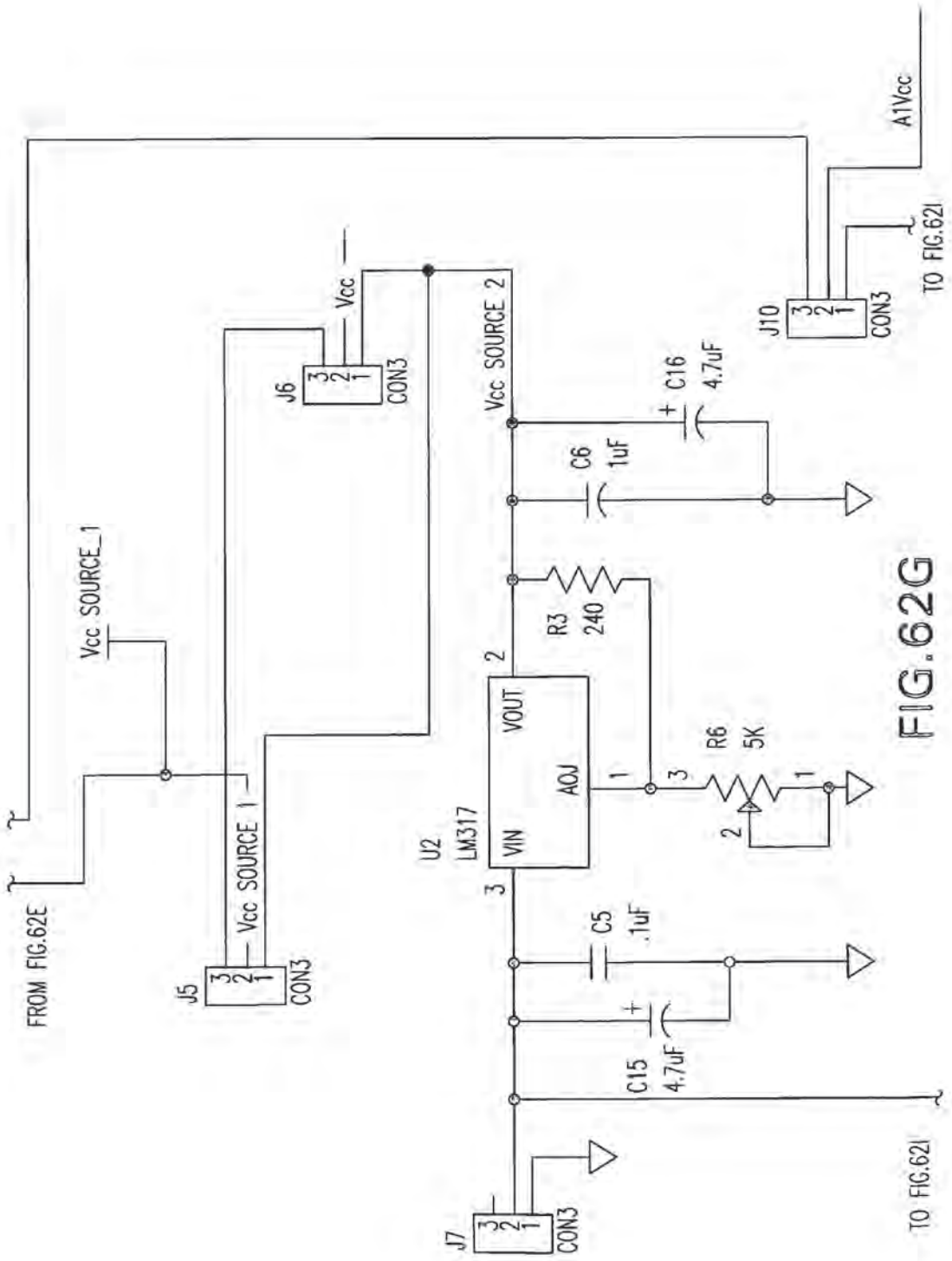

FROM FIG.62E
Vcc SOURCE_1
J5
CON3
Vcc SOURCE 1
J6
CON3
Vcc
Vcc SOURCE 2
U2
LM317
VIN
VOUT
ADJ
R3
240
R6
5K
C6
1uF
C16
4.7uF
C5
.1uF
C15
4.7uF
J7
CON3
J10
CON3
A1Vcc
TO FIG.62I
TO FIG.62I

FIG.62G

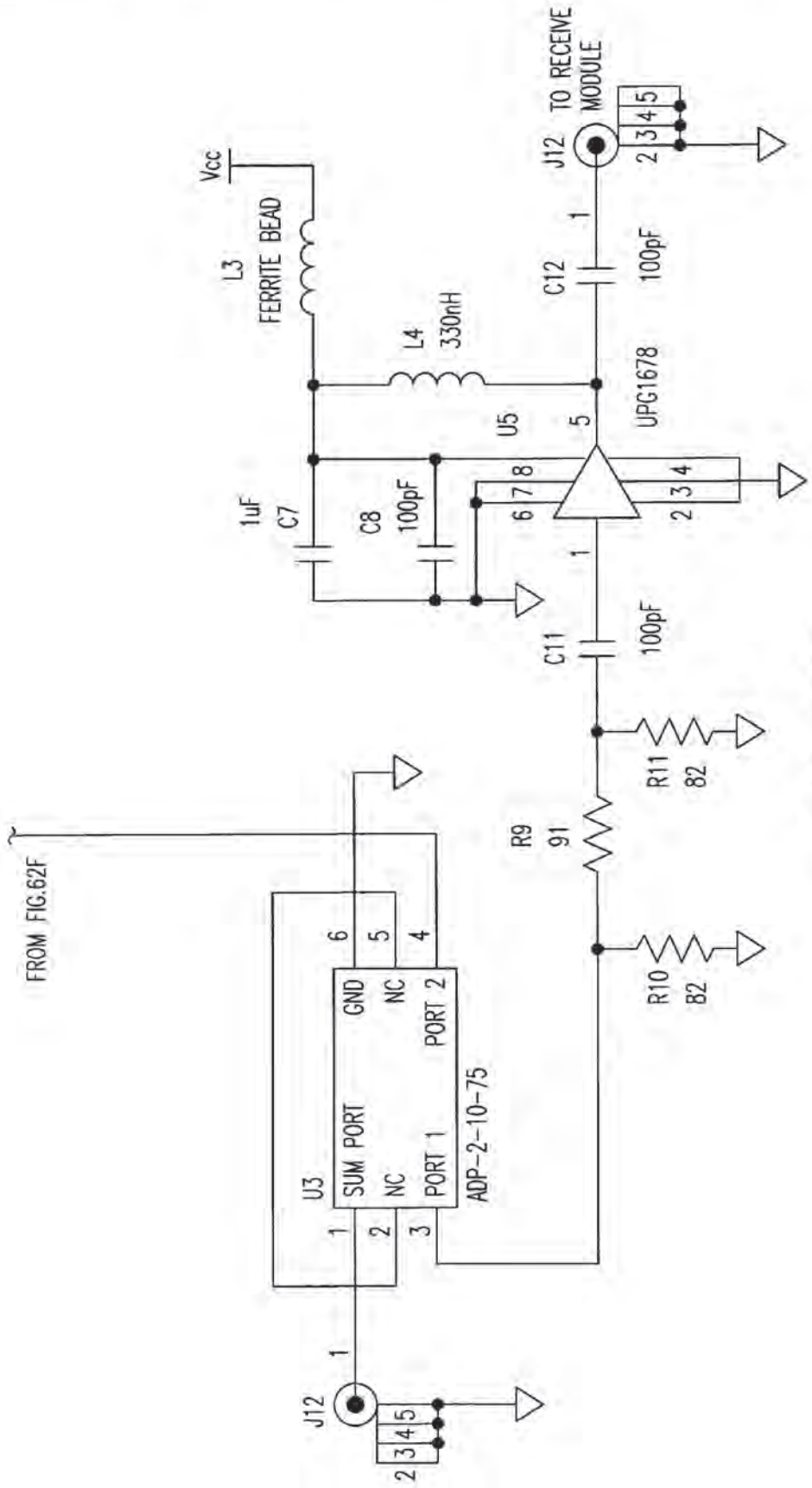

FROM FIG.62F
J12
1
2
3
4
5
U3
SUM PORT
NC
PORT 1
GND
NC
PORT 2
ADP-2-10-75
1
2
3
4
5
6
R10
82
R9
91
R11
82
C11
100pF
1uF
C7
C8
100pF
Vcc
L3
FERRITE BEAD
L4
330nH
U5
UPG1678
C12
100pF
J12
TO RECEIVE MODULE

FIG.62H

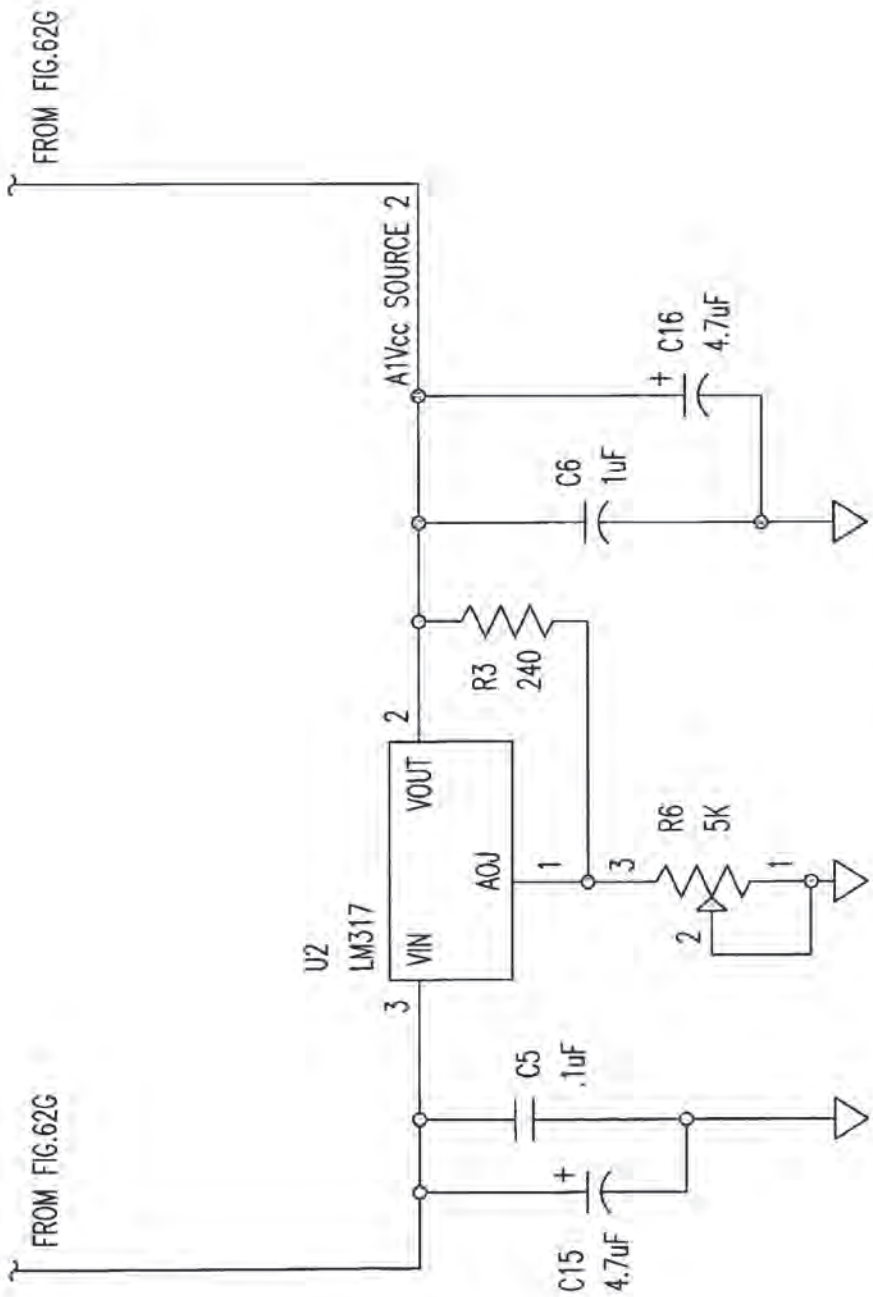

FROM FIG.62G
A1Vcc SOURCE 2
C16
4.7uF
C6
1uF
R3
240
2
VOUT
AOJ
1
3
R6
5K
U2
LM317
VIN
3
C5
.1uF
C15
4.7uF
FROM FIG.62G

FIG.62I

ITEM	QTY	REFERENCE	PART	DESCRIPTION	PART NUMBER	VENDOR
1	4	C1,C6,C7,C10	1uF	Cap, 1uF, +80-20%,0805	GRM40Y5V105Z016AD	MURATA
2	6	C2,C3,C4,C8,C11,C12	100pF	Cap, 100pF, 5%, COG, 0603	ECU-V1H101JCV	PANASONIC
3	2	C5,C9	.1uF	Cap, .1uF, +80-20%, Y5V, 0603		MURATA
4	3	C13,C14,C19	22uF	Cap, Tant, 22uF, 20%, 20V	T491D226M020AS	KEMET
5	4	C15,C16,C17,C18	4.7uF	Cap, Tant, 4.7uF, 20%, 20V	T491C475M020AS	KEMET
6	2	JP2,JP6	HEADER 7X2	Receptacle, 7x2pin, .050	SFMC-107-L1-S-D	SAMTEK
7	9	JP4, J4, J5, J6, J7, JP9, J9, J10, JP11	CON3	Header, 3pin, .100''	69190-403	BERG
8	1	JP7	HEADER 10X2	Receptacle, 10X2pin, .050	SFMC-110-L1-S-D	SAMTEK
9	1	JP8	HEADER 5X2	Receptacle, 5X2pin, .050	SFMC-105-L1-S-D	SAMTEK
10	1	J2	EHT-1-10-01-S-D	Header, ribbon, 10X2pin, 2mm	EHT-1-10-01-S-D	SAMTEK
11	3	J8,J11,J12	82MMCX-50-0-1	Connector,RF	82MMCX-50-0-1	SUHNER
12	2	L3,L1	Ferrite Bead	Ferrite Bead, 0805	BLM21A121S	MURATA
13	2	L4,L2	330nH	Ind, 330nH, 10%, 0805	LL2012-FR33K	TOKO
14	1	R1	DNP	Res, 0603		PANASONIC
15	2	R9,R2	91	Res, 91 Ohn, 5%, 0603	ERJ-3GSYJ910	PANASONIC
16	2	R7,R3	240	Res, 240 Ohm, 5%, 0603	ERJ-3GSYJ241	PANASONIC
17	4	R4,R5,R10,R11	82	Res, 82 Ohm, 5%, 0603	ERJ-3GSYJ820	PANASONIC
18	2	R8,R6	5K	Var Res, 5K, 10%	3296W001502	BOUMS
19	10	R12, R13, R14, R15, R16, R17, R18, R19, R20, R21	180	Res, 180 Ohm, 5%, 0603	ERJ-3GSYJ181	PANASONIC
20	10	R22, R23, R24, R25, R26, R27, R28, R29, R30, R31	390	Res, 390 Ohm, 5%, 0603	ERJ-3GSYJ391	PANASONIC
21	2	U5,U1	UPG1678	IC, RF Buffer	UPG1678GV	NEC
22	2	U4,U2	LM317	IC, Voltage Regulator	LM317T	NATIONAL
23	1	U3	ADP-2-10-75	RF Splitter	ADP-2-10-75	MINICIRCUITS
24	1	U6	DS3862	IC, Buffer	DS3862WM	NATIONAL
25	1			BOARD	ST8500.641.023VOL01	

FIG. 63

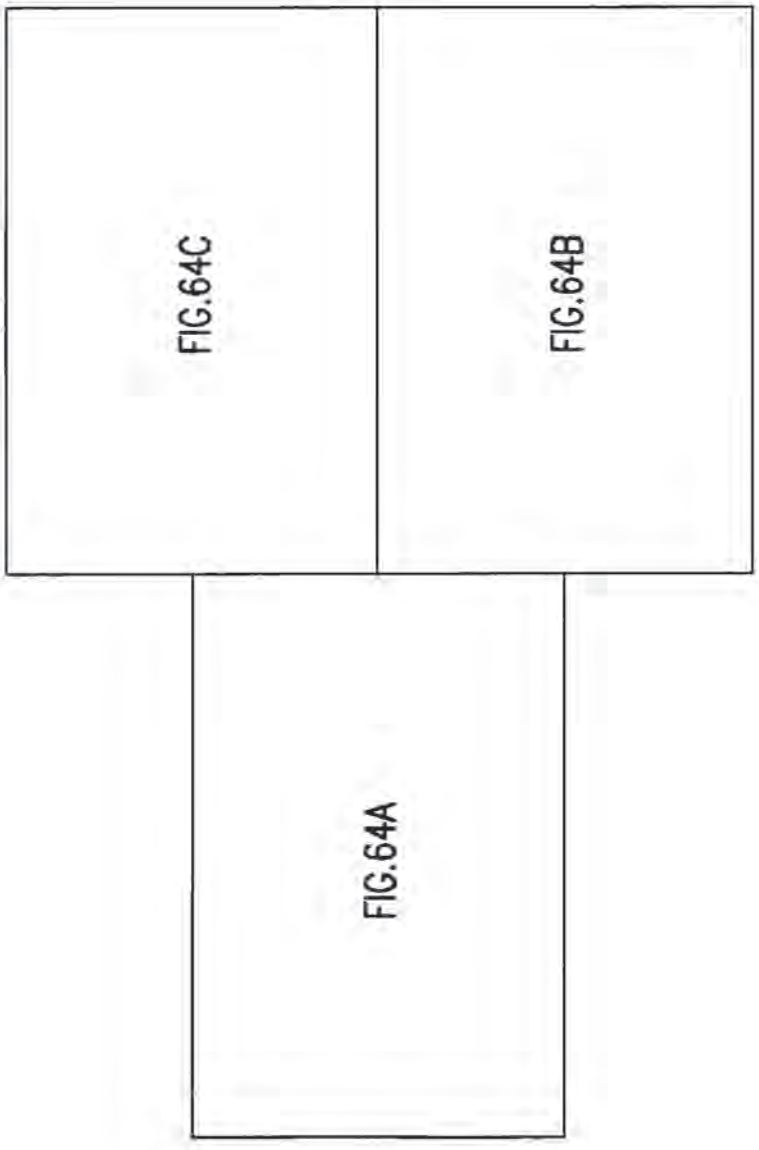


FIG.64

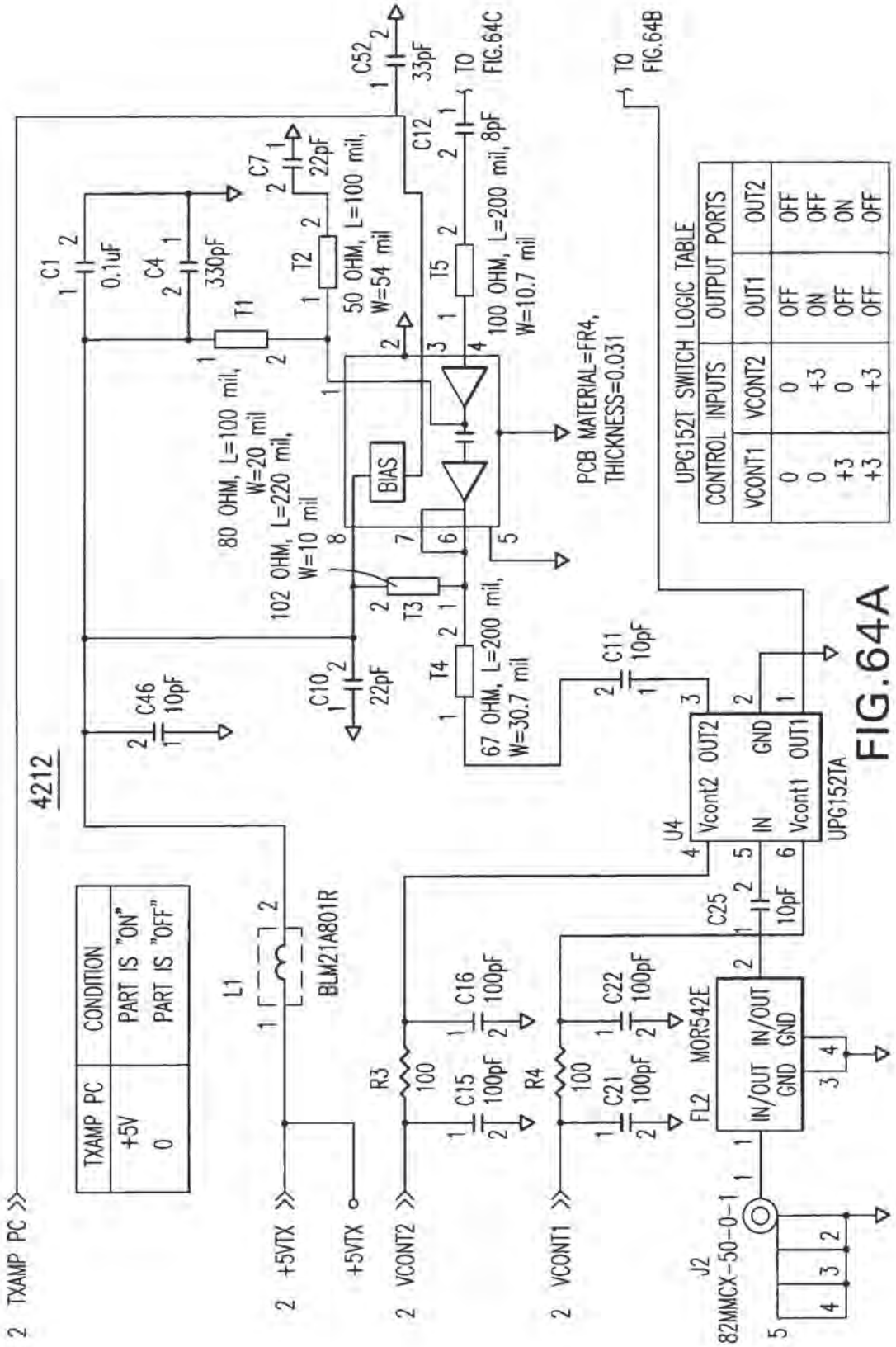

4212
2 TXAMP PC
TXAMP PC | CONDITION
+5V | PART IS "ON"
0 | PART IS "OFF"
C1 0.1uF
C4 330pF
C46 10pF
C7 22pF
C52 33pF
C12 8pF
C10 22pF
C11 10pF
C25 10pF
C16 100pF
C15 100pF
C22 100pF
C21 100pF
C17 100pF
R3 100
R4 100
L1 BLM21A801R
T1 80 OHM, L=100 mil, W=20 mil
T2 50 OHM, L=100 mil, W=54 mil
T3 102 OHM, L=220 mil, W=10 mil
T4 67 OHM, L=200 mil, W=30.7 mil
T5 100 OHM, L=200 mil, W=10.7 mil
BIAS
PCB MATERIAL=FR4, THICKNESS=0.031
TO FIG.64C
TO FIG.64B
U4 UPG152TA
Vcont2 OUT2 GND Vcont1 OUT1 IN
FL2 MOR542E
IN/OUT IN/OUT GND GND
J2 82MMCX-50-0-1
2 +5VTX
+5VTX
2 VCONT2
2 VCONT1
UPG152T SWITCH LOGIC TABLE
CONTROL INPUTS | OUTPUT PORTS
VCONT1 | VCONT2 | OUT1 | OUT2
0 | 0 | OFF | OFF
0 | +3 | ON | OFF
+3 | 0 | OFF | ON
+3 | +3 | OFF | OFF

FIG.64A

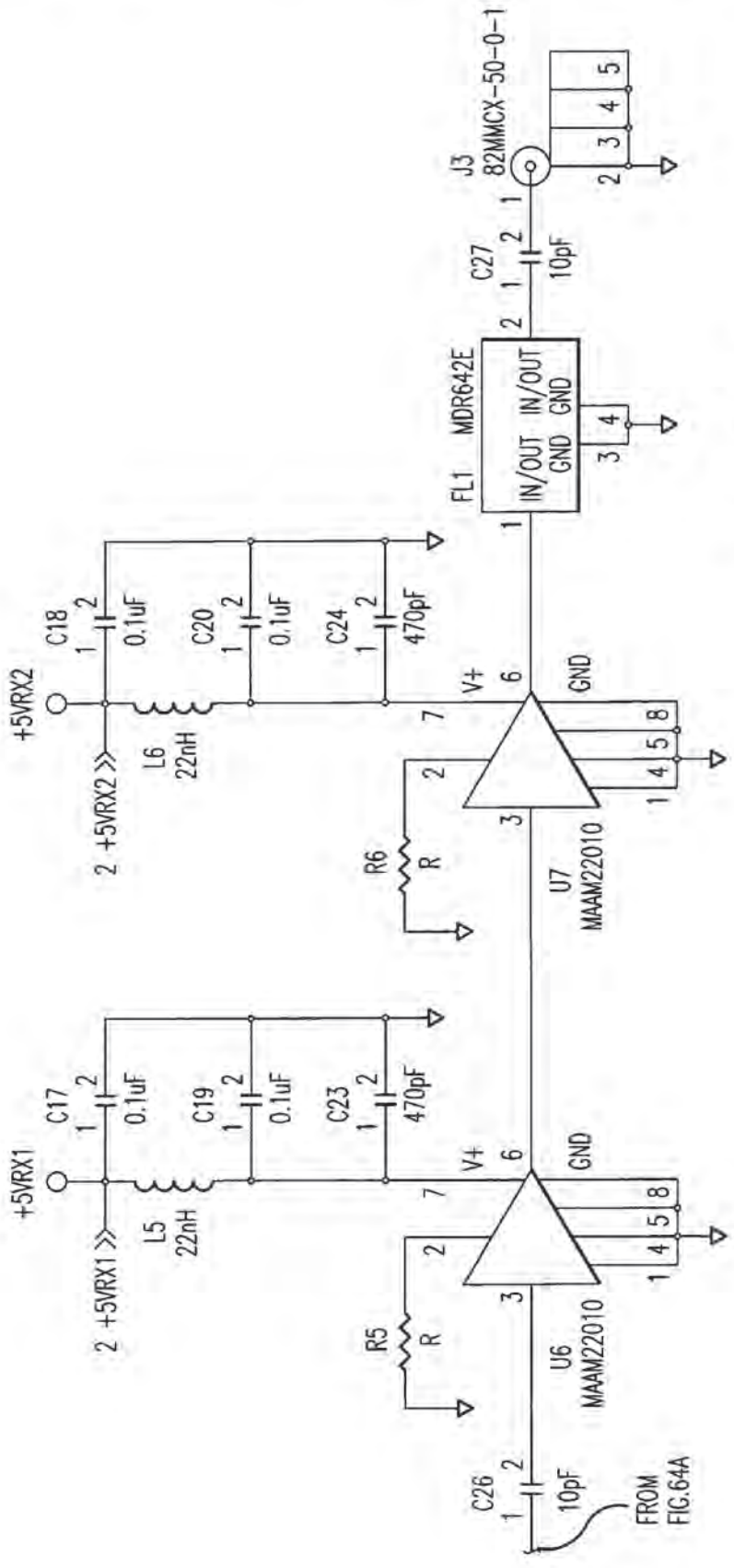

J3
82MMCX-50-0-1
C27
10pF
FL1
MDR642E
IN/OUT
GND
IN/OUT
GND
C18
0.1uF
C20
0.1uF
C24
470pF
+5VRX2
2 +5VRX2 >>
L6
22nH
V+
GND
R6
R
U7
MAAM22010
C17
0.1uF
C19
0.1uF
C23
470pF
+5VRX1
2 +5VRX1 >>
L5
22nH
R5
R
U6
MAAM22010
C26
10pF
FROM
FIG.64A

FIG.64B

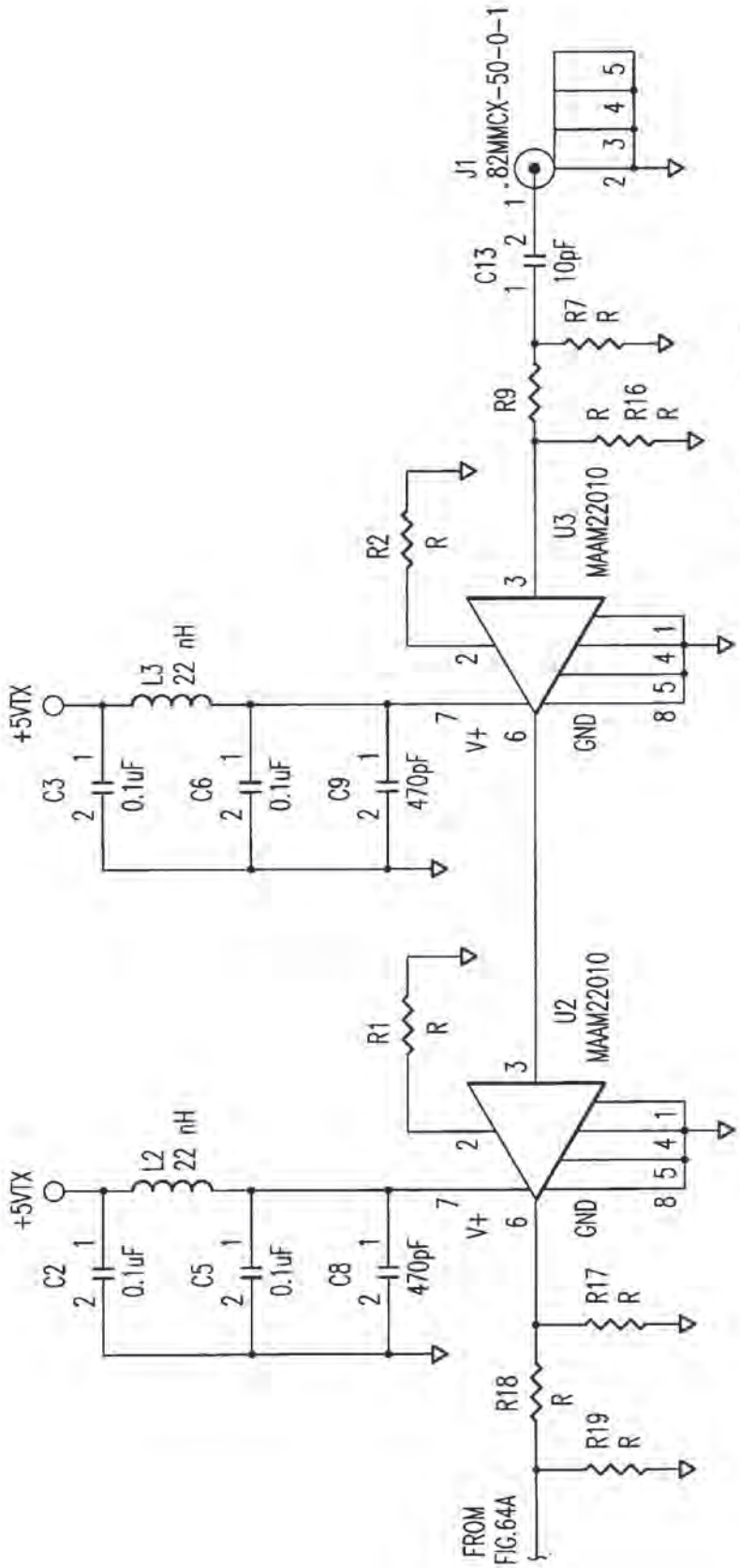

J1
.82MMCX-50-0-1
C13
10pF
R7
R
R9
R16
R
U3
MAAM22010
R2
R
L3
22 nH
+5VTX
C3
0.1uF
C6
0.1uF
C9
470pF
V+
GND
U2
MAAM22010
R1
R
L2
22 nH
+5VTX
C2
0.1uF
C5
0.1uF
C8
470pF
V+
GND
R17
R
R18
R
R19
R
FROM
FIG.64A

FIG.64C

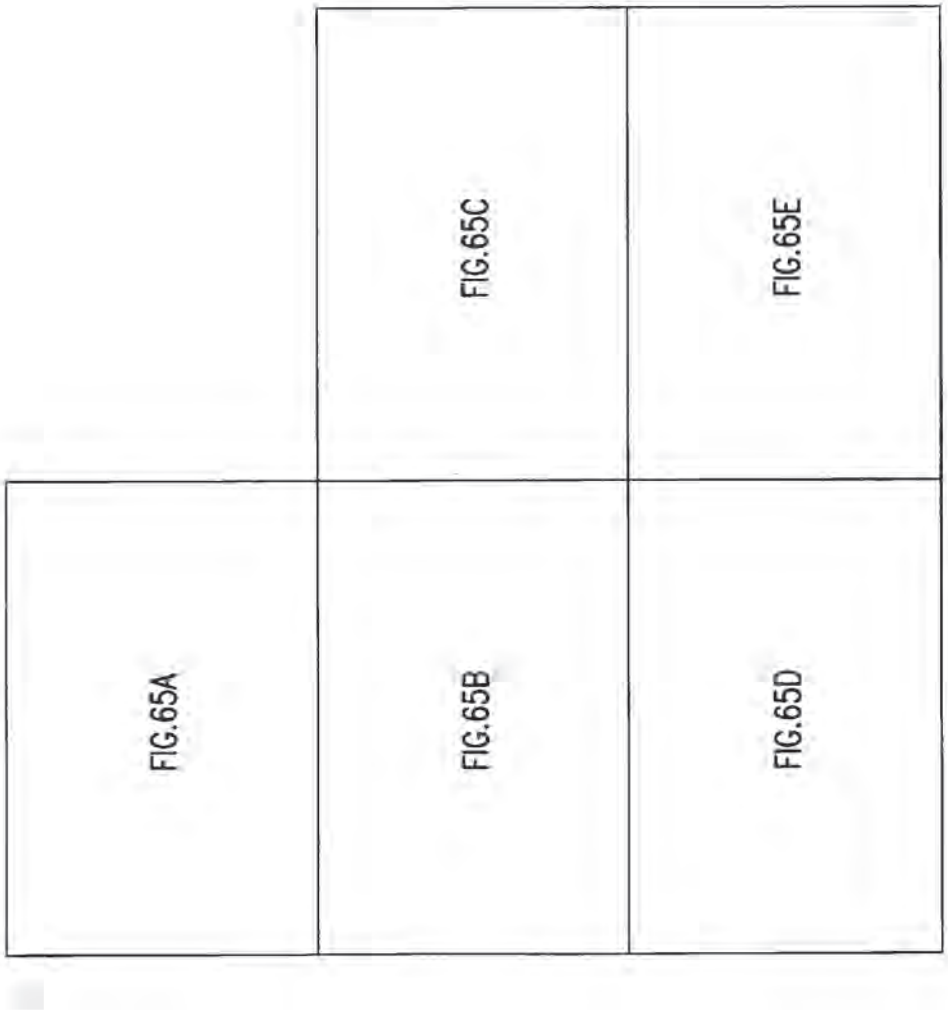


FIG.65

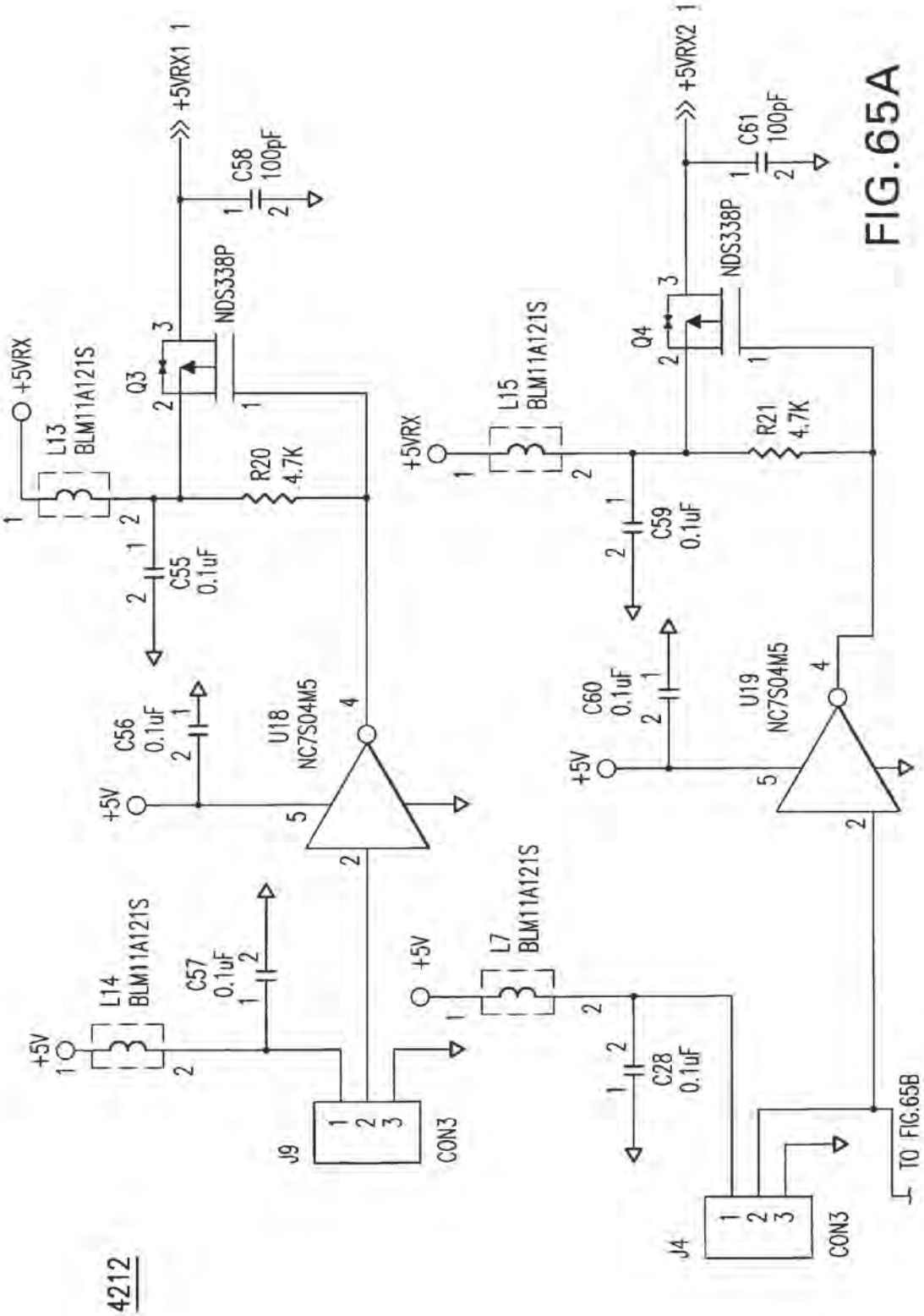

4212
+5VRX
L13 BLM11A121S
Q3
NDS338P
>> +5VRX1 1
C58 100pF
R20 4.7K
C55 0.1uF
C56 0.1uF
U18 NC7S04M5
+5V
L14 BLM11A121S
C57 0.1uF
J9 CON3
+5VRX
L15 BLM11A121S
Q4
NDS338P
>> +5VRX2 1
C61 100pF
R21 4.7K
C59 0.1uF
C60 0.1uF
U19 NC7S04M5
L7 BLM11A121S
C28 0.1uF
J4 CON3
TO FIG.65B

FIG.65A

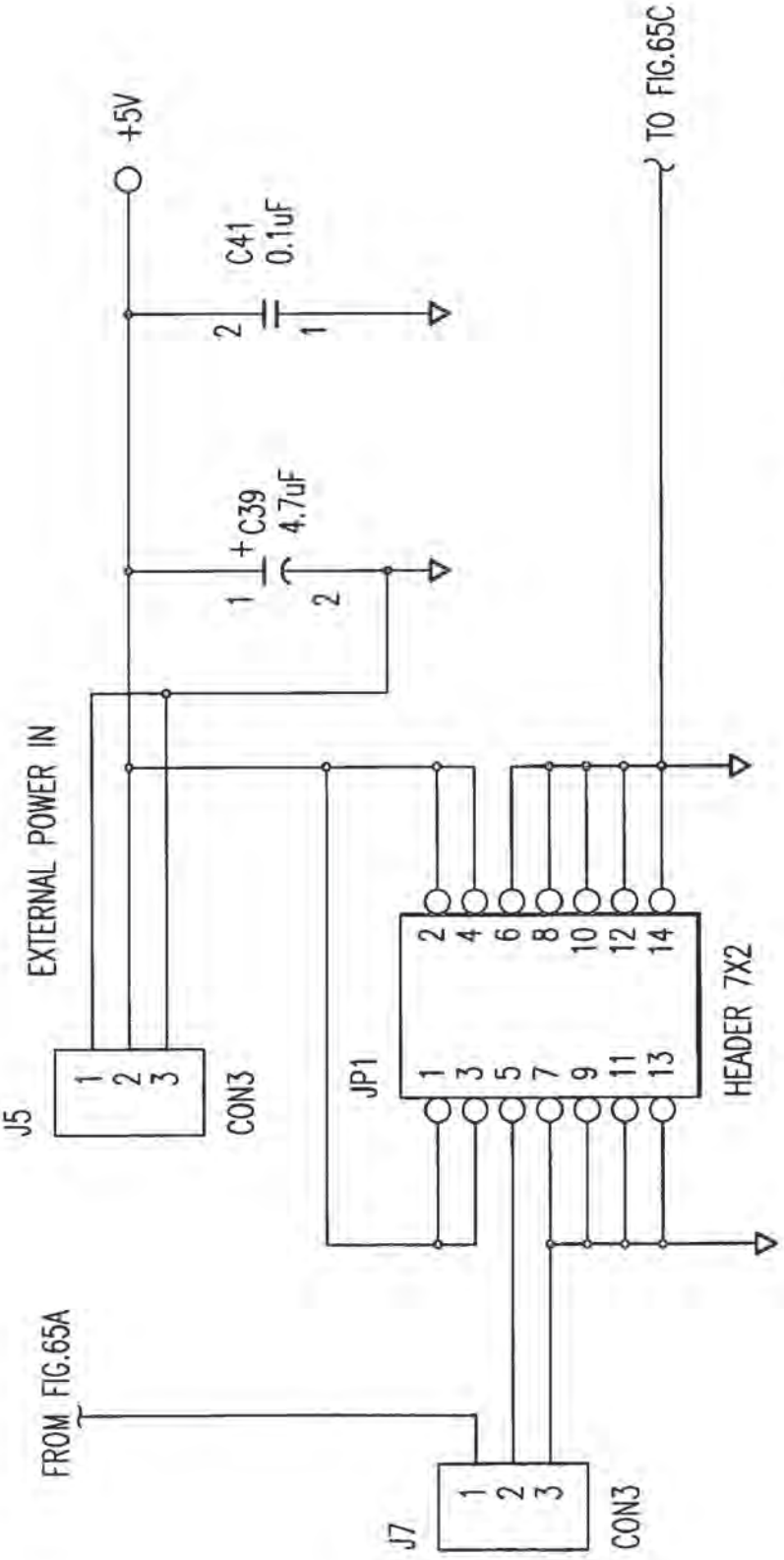

+5V
C41
0.1uF
+C39
4.7uF
TO FIG.65C
EXTERNAL POWER IN
J5
CON3
JP1
HEADER 7X2
FROM FIG.65A
J7
CON3

FIG.65B

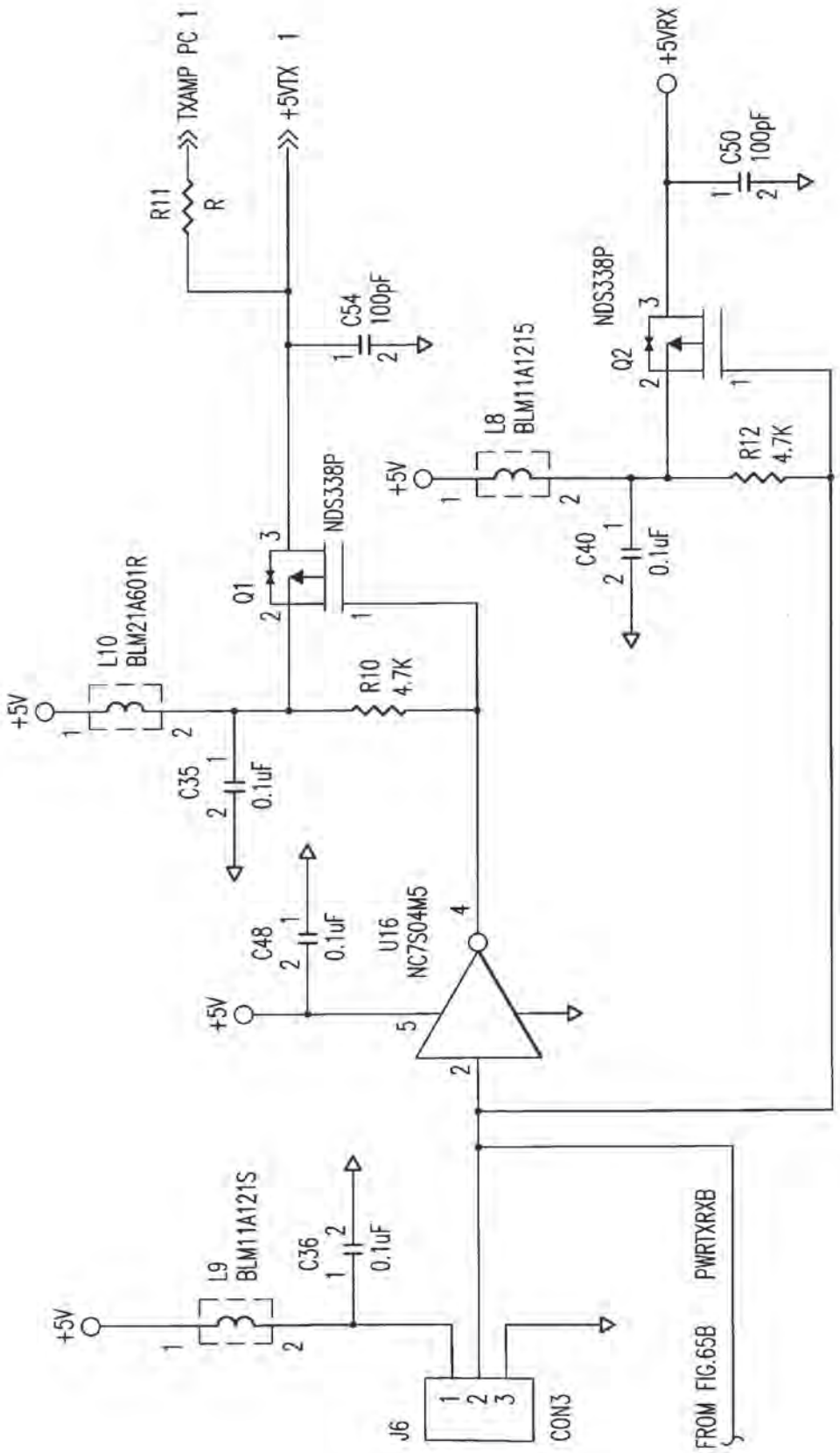

TXAMP PC 1
+5VTX 1
+5VRX
R11
R
C54
100pF
C50
100pF
NDS338P
Q2
L8
BLM11A1215
R12
4.7K
C40
0.1uF
+5V
NDS338P
Q1
L10
BLM21A601R
R10
4.7K
C35
0.1uF
C48
0.1uF
U16
NC7S04M5
L9
BLM11A121S
C36
0.1uF
J6
CON3
FROM FIG.65B
PWRTXRXB

FIG.65C

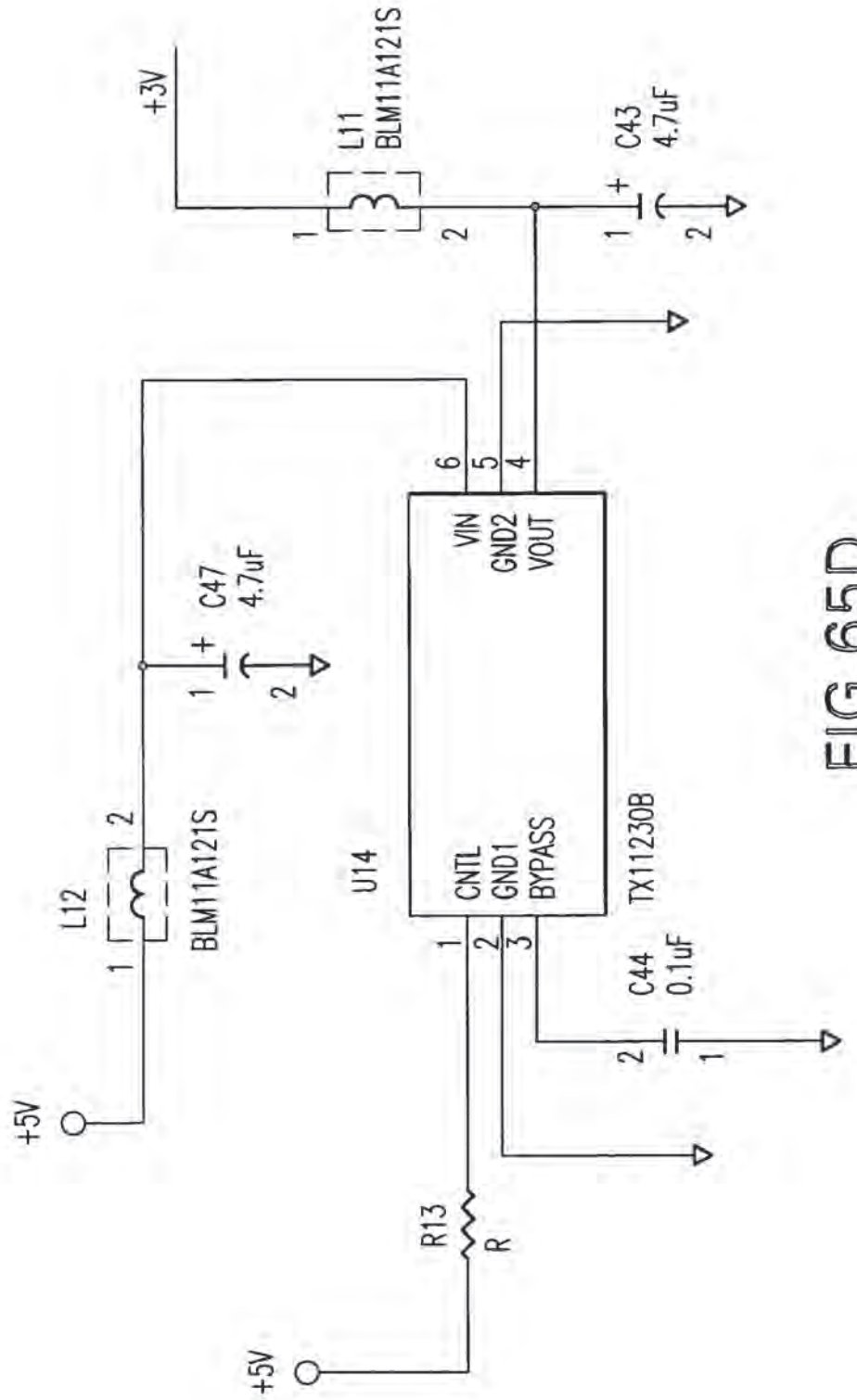

+3V
L11
BLM11A121S
C43
4.7uF
C47
4.7uF
L12
BLM11A121S
U14
VIN
GND2
VOUT
CNTL
GND1
BYPASS
TX11230B
C44
0.1uF
R13
R
+5V
+5V

FIG.65D

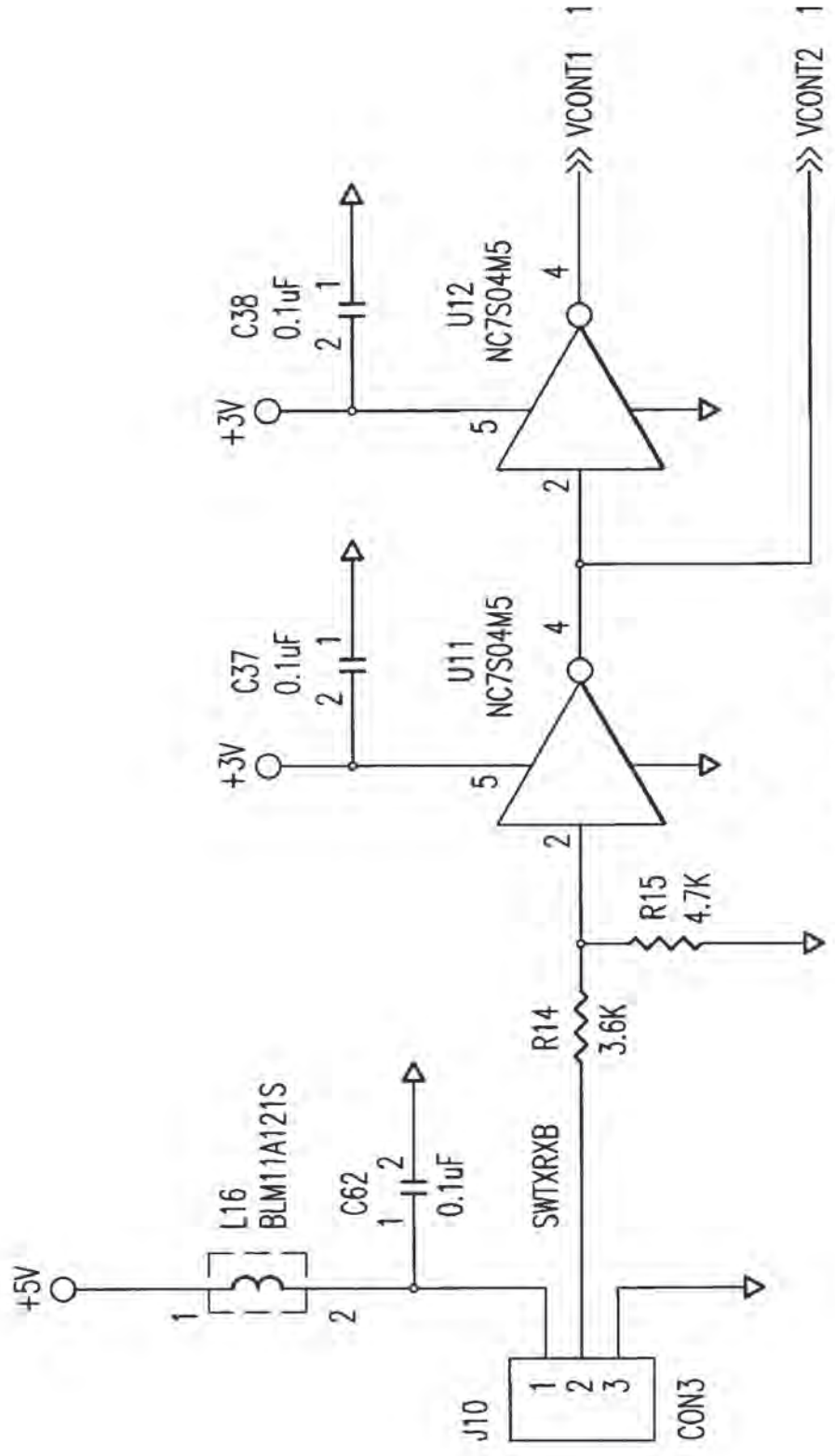

+5V
L16
BLM11A121S
C62
0.1uF
SWTXRXB
R14
3.6K
R15
4.7K
J10
CON3
+3V
C37
0.1uF
U11
NC7S04M5
+3V
C38
0.1uF
U12
NC7S04M5
>> VCONT1
>> VCONT2

FIG. 65E

ITEM	QTY	REFERENCE	PART	MANUFACT.	PART DESCRIPTION	PART NUMBER
1	24	C1,C2,C3,C5,C6,C17,C18, C19,C20,C28,C35,C36,C37, C38,C40,C41,C44,C48,C55, C56,C57,C59,C60,C62	0.1uF	MURATA	.1uF,0603,X7R,20%,16V	GRM39X7R104M016
2	1	C4	330pF	MURATA	330pF,0603,COG,10%,50	GRM39COG331K050
3	2	C10,C7	22pF	MURATA	22pF,0603,COG,10%,50	GRM30COG220K050
4	4	C8,C9,C23,C24	470pF	MURATA	470pF,0603,COG,10%,50	GRM39COG471K050
5	6	C11,C13,C25,C26,C27,C46	10pF	MURATA	10pF,0603,COG,10%,50	GRM39COG100K050
6	1	C12	8pF	MURATA	8pF,0603,COG,10%,50	GRM39COG080K050
7	8	C15,C16,C21,C22,C50,C54 C58,C61	100pF	MURATA	100pF,0603,COG,10%,50	GRM39COG101K050
8	3	C39,C43,C47	4.7uF	PANASONIC	4.7uF TANTALUM,16V	ECS-T1CY475R
9	1	C52	33pF	MURATA	330pF,0603,COG,10%,50	GRM3COG330K050
10	2	FL1,FL2	MDR642E	SOSHIN	2.4-2.5GHz BPF	MDR642E
11	1	JP1	HEADER 7X2	SAMTEC	DUAL ROW, 7 PINS PER ROW	FTSH-107-01-F-D
12	3	J1,J2,J3	82MMCX-50-0-1	SUHNER	RF CONNECTOR	82MMCX-50-0-1
13	6	J4,J5,J6,J7,J9,J10	CON3	BERG	3 PIN HEADER W RETENTIVE LEG	69190-403H
14	2	L10,L1	BLM21A601R	MURATA	600 OHMS@100MHz,500mA FERRITE BEAD	BLM21A601R
15	4	L2,L3,L5,L6	22nH	COILCRAFT	22nH,0805CS (2012),5%	0805CS-220X-BC
16	9	L7,L8,L9,L11,L12,L13,L14, L15,L16	BLM11A121S	MURATA	RF BEAD	BLM11A121S
17	4	Q1,Q2,Q3,Q4	NDS336P	NATIONAL	P-CHANNEL FET	NDS336P
18	12	R1,R2,R5,R6,R7,R9,R11, R13,R16,R17,R18,R19	R	PANASONIC		
19	2	R3,R4	100	PANASONIC	0603,100,5%,1/16W	ERJ-3GSY-J-101
20	5	R10,R12,R15,R20,R21	4.7K	PANASONIC	0603,4.7K,5%,1/16W	ERJ-3GSY-J-472

FIG.66A

21	1	R14	3.6K	PANASONIC	0603,3.6K,5%,1/16W	ERJ-3GSY-J-362
22	1	T1	80 OHM,L=100 MIL,W=20 MIL		80 OHM,L=100 MIL,W=20 MIL	
23	1	T2	50 OHM,L=100 MIL,W=54 MIL		50 OHM,L=100 MIL,W=54 MIL	
24	1	T3	102 OHM,L=220 MIL,W=10 MIL		102 OHM,L=220 MIL,W=10 MIL	
25	1	T4	67 OHM,L=200 MIL,W=30.7 MIL		67 OHM,L=200 MIL,W=30.7 MIL	
26	1	T5	100 OHM,L=200 MIL,W=10.7MIL		100 OHM,L=200 MIL,W=10.7 MIL	
27	4	U2,U3,U6,U7	MAAM22010	MACOM	2.4-2.5 GHz LNA	MAAM22010
28	1	U4	UPG152TA	NEC	RF SWITCH	UPG152TA
29	5	U11,U12,U16,U18,U19	NC7S04M5	NATIONAL	INVERTER	NC7S04M5
30	1	U14	TKN11230B	TOKO	VOLTAGE REGULATOR	TK11230B
31	1	U17	RF2128P	RFMD	MEDIUM POWER LINEAR AMPLIFIER	RF2128P
32	1				BOARD	B500.641.024 VOL.

FIG.66B

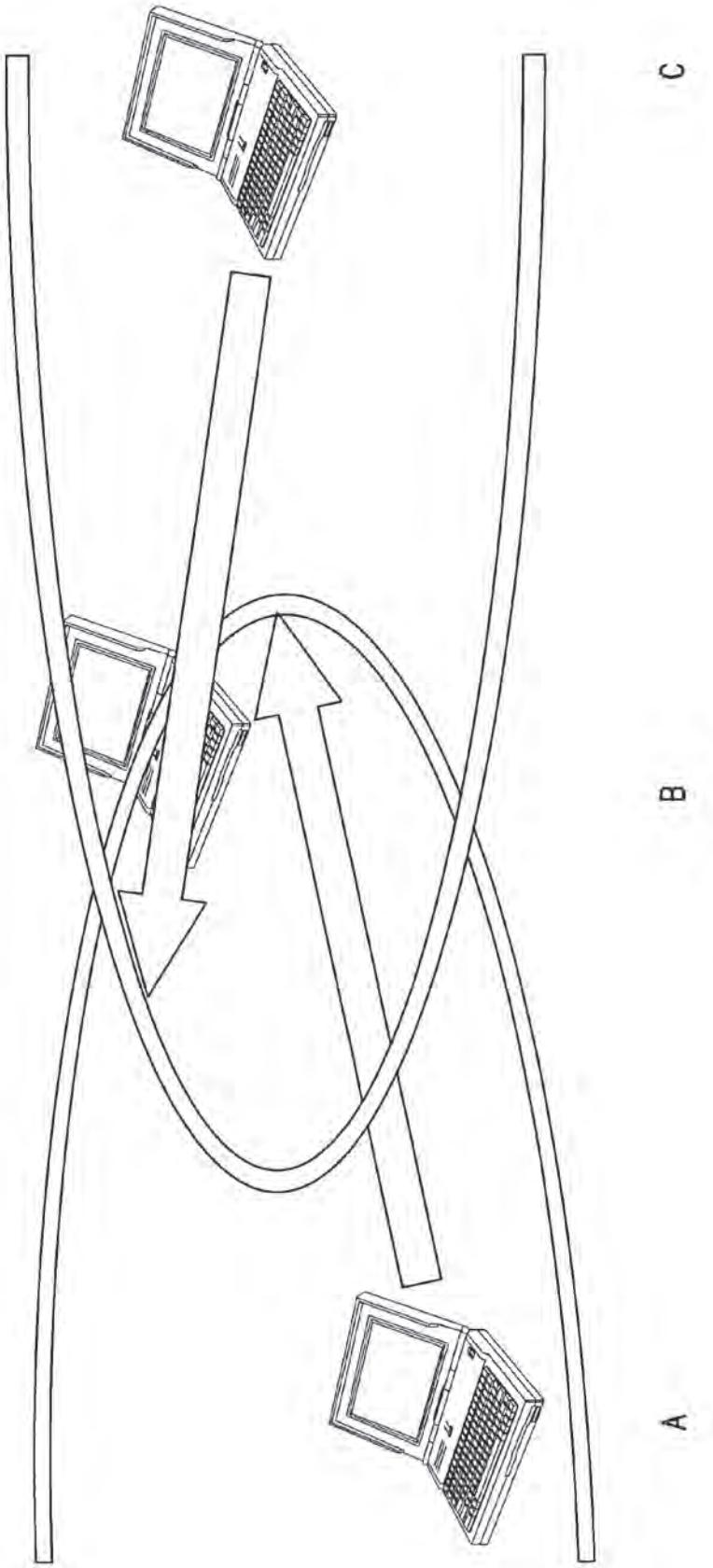


FIG.67

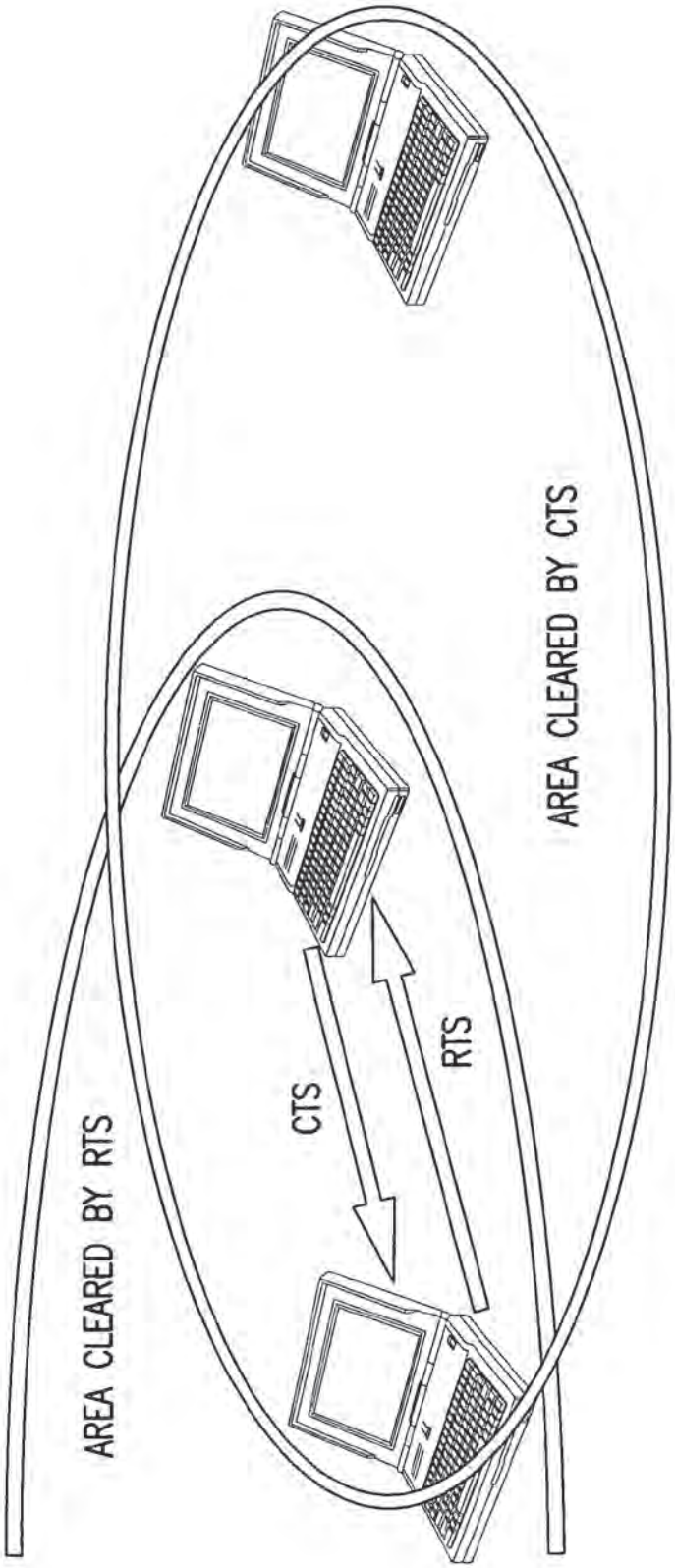


FIG.68

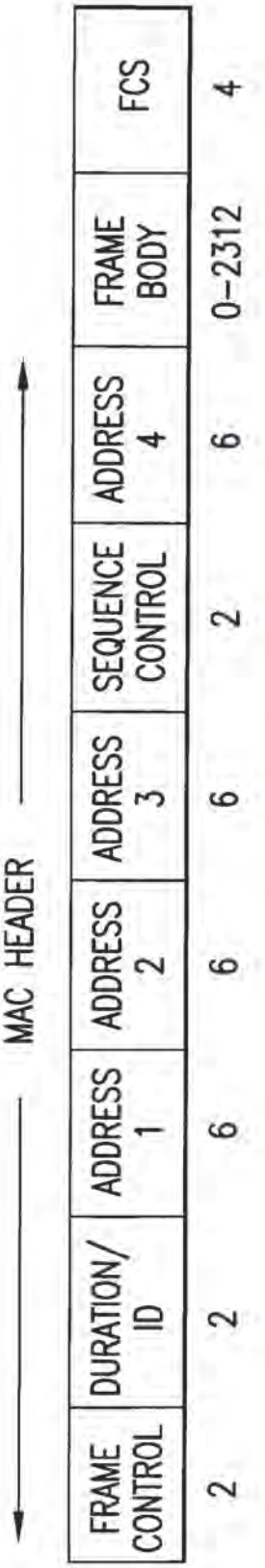

MAC HEADER
FRAME CONTROL
DURATION/ ID
ADDRESS 1
ADDRESS 2
ADDRESS 3
SEQUENCE CONTROL
ADDRESS 4
FRAME BODY
FCS
2
2
6
6
6
2
6
0–2312
4

FIG.69

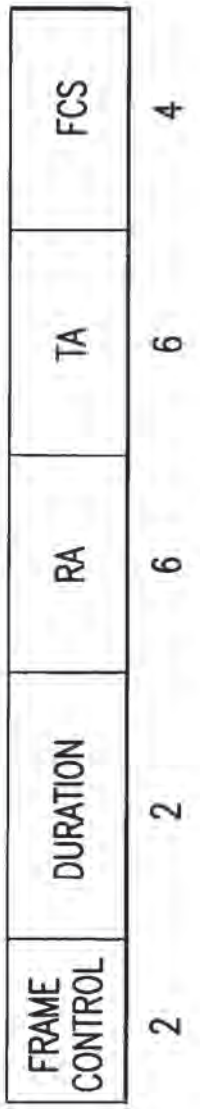

FRAME CONTROL
DURATION
RA
TA
FCS
2
2
6
6
4

FIG.70

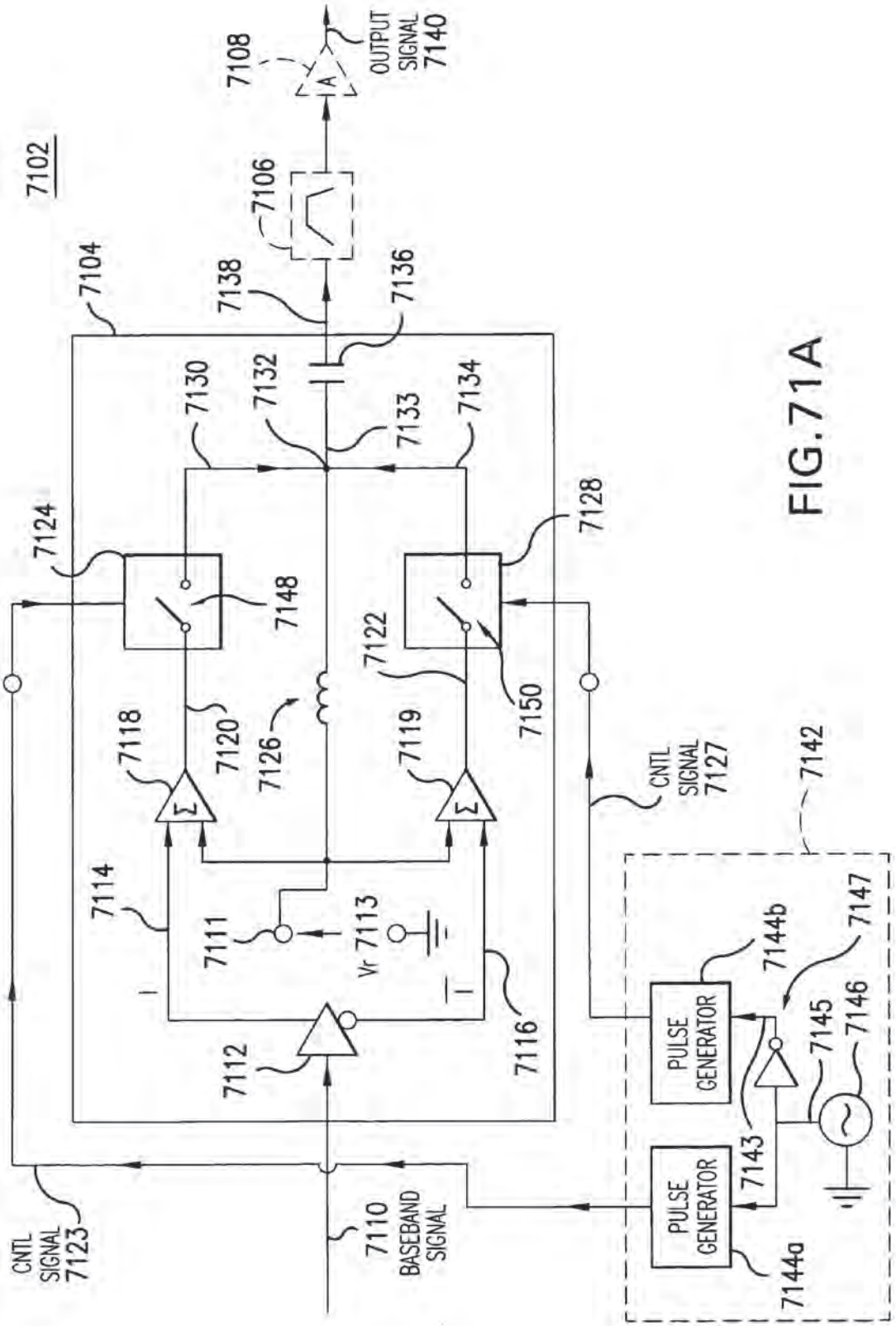

7102
7104
7106
7108
OUTPUT SIGNAL 7140
7110 BASEBAND SIGNAL
CNTL SIGNAL 7123
CNTL SIGNAL 7127
7111
7112
7113
Vr
7114
7116
7118
7119
7120
7122
7124
7126
7128
7130
7132
7133
7134
7136
7138
7142
7143
7144a
7144b
7145
7146
7147
7148
7150
PULSE GENERATOR
PULSE GENERATOR

FIG. 71A

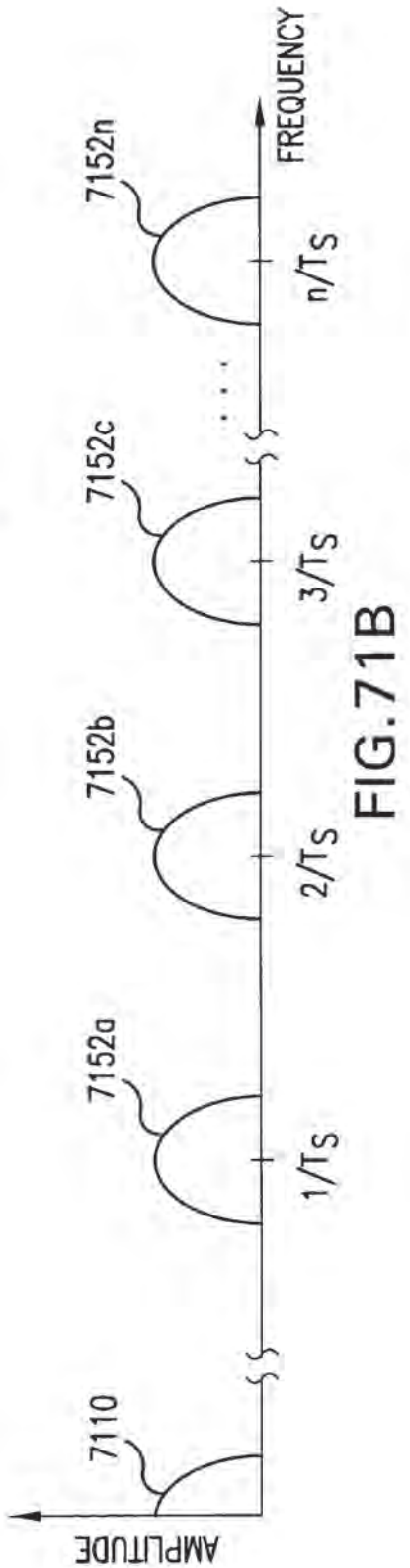


FIG.71B

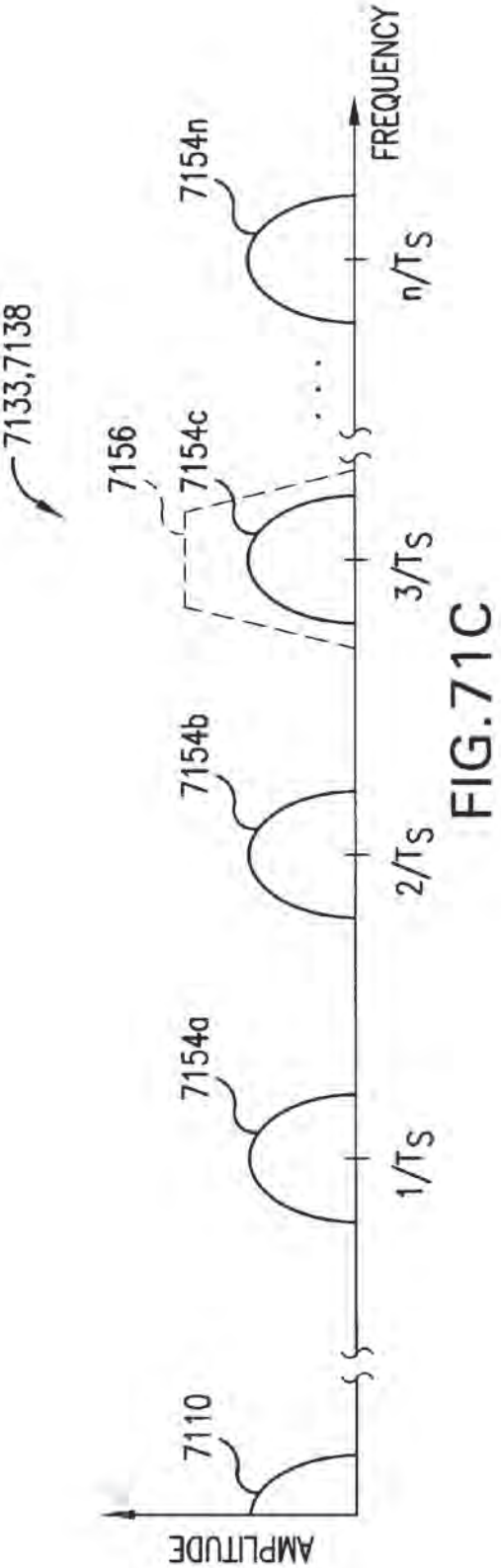


FIG.71C

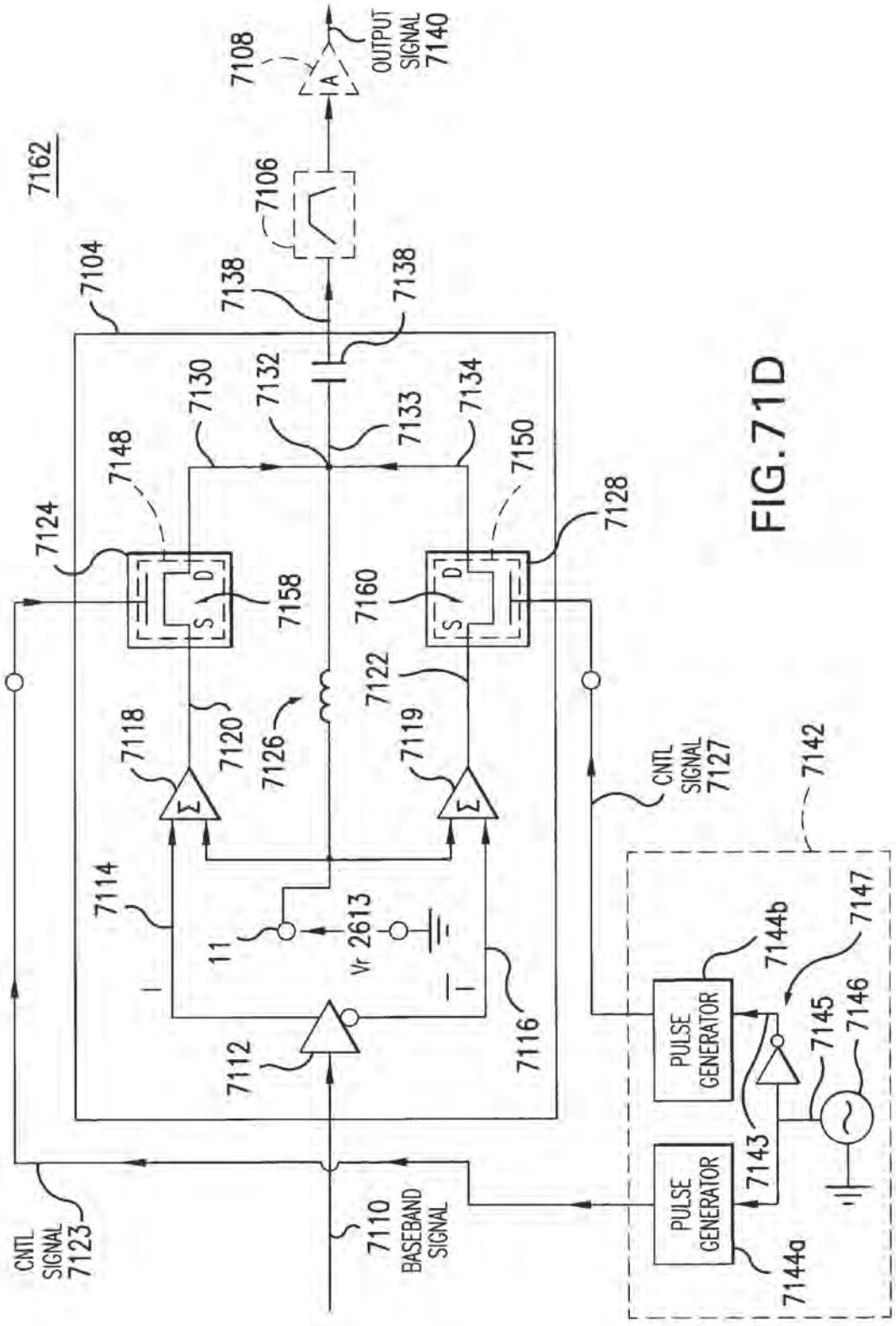

7162
7108
OUTPUT SIGNAL 7140
7106
7104
7138
7138
7130
7132
7133
7134
7148
7150
7124
7128
7158
7160
7122
7120
7126
7119
7118
7114
11
Vr 2613
7112
7116
CNTL SIGNAL 7127
7142
PULSE GENERATOR
7144b
7147
7145
7146
7143
PULSE GENERATOR
7144a
CNTL SIGNAL 7123
7110 BASEBAND SIGNAL

FIG. 71D

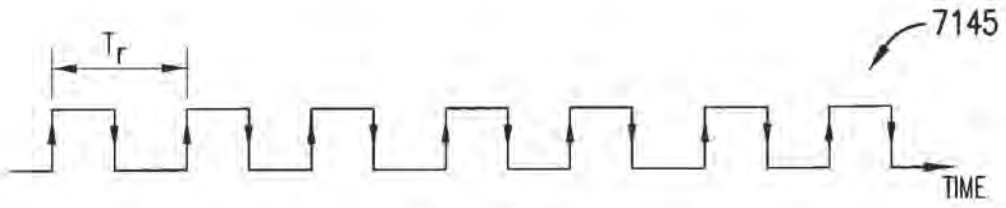


FIG. 72A



FIG. 72B

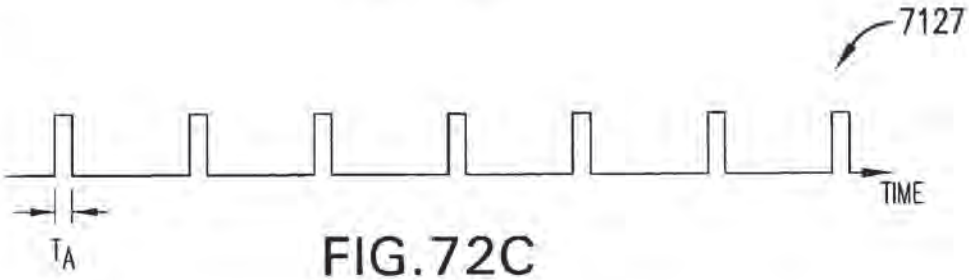


FIG. 72C

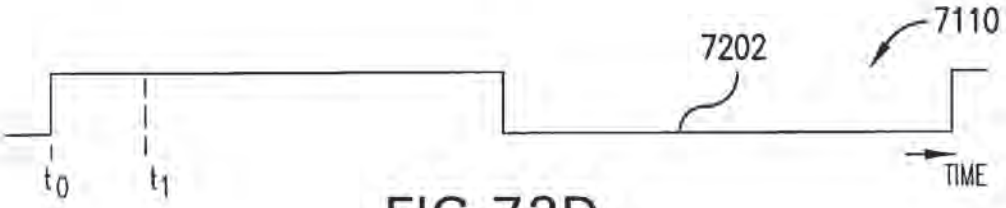


FIG. 72D

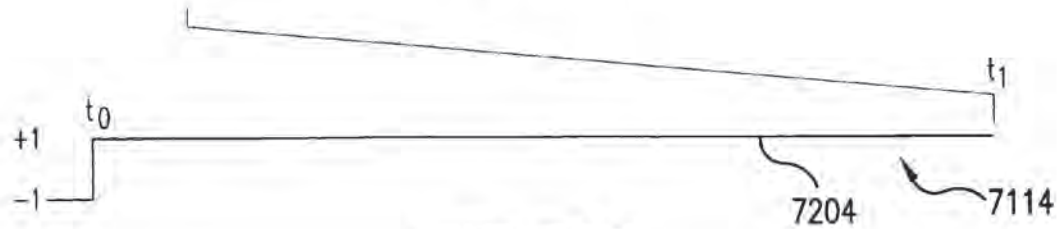


FIG. 72E

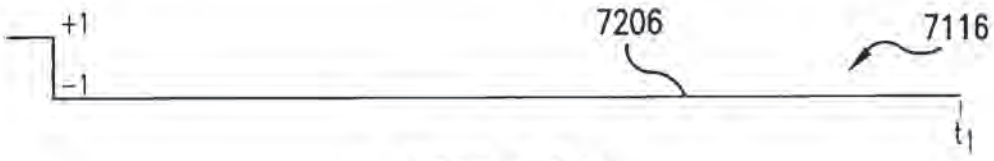


FIG.72F



FIG.72G

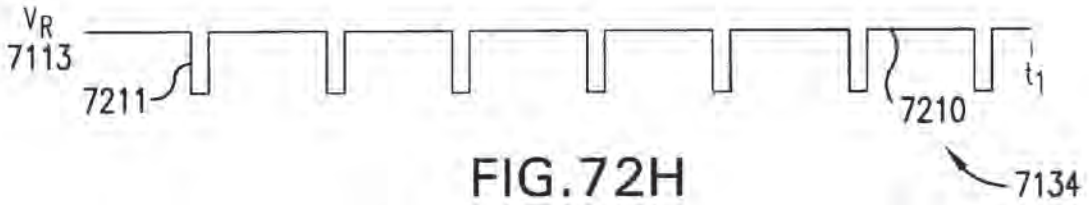


FIG.72H

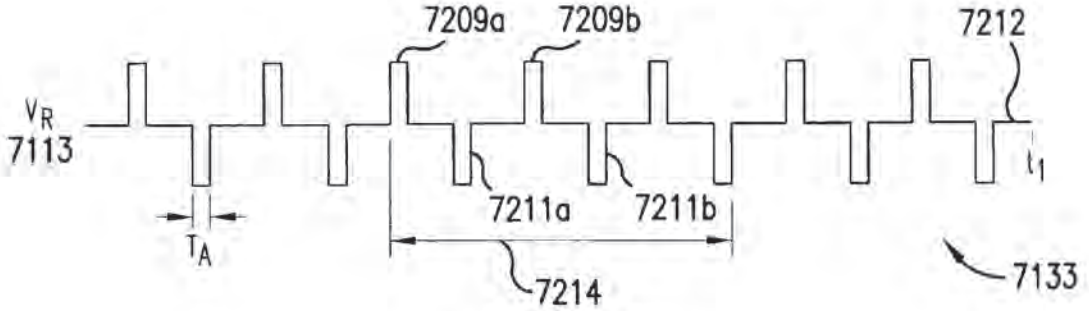


FIG.72I

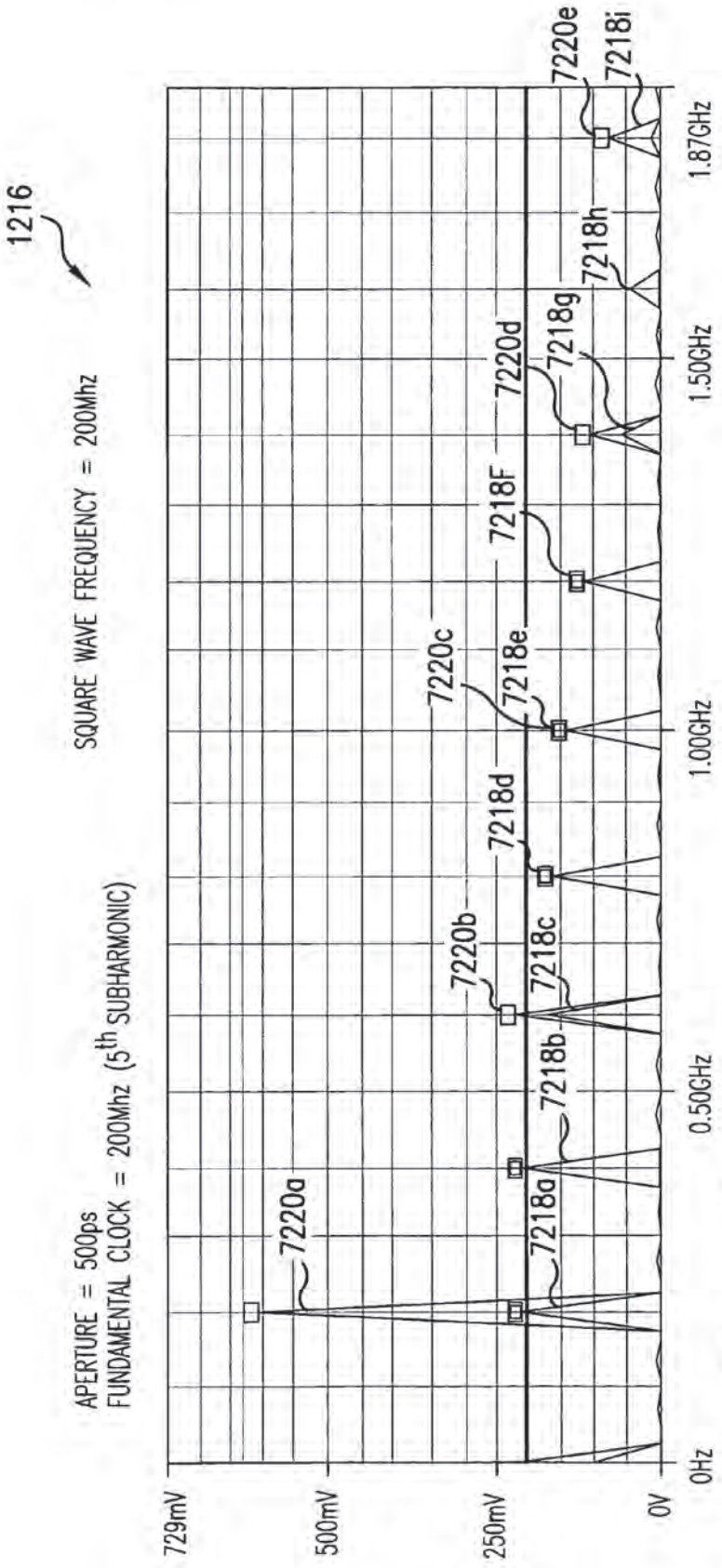

1216
SQUARE WAVE FREQUENCY = 200Mhz
APERTURE = 500ps
FUNDAMENTAL CLOCK = 200Mhz (5th SUBHARMONIC)
729mV
500mV
250mV
0V
0Hz
0.50GHz
1.00GHz
1.50GHz
1.87GHz
FREQUENCY
V
V (SQUARE_WAVE)
7220a
7220b
7220c
7220d
7220e
7218a
7218b
7218c
7218d
7218e
7218F
7218g
7218h
7218i

FIG. 72J

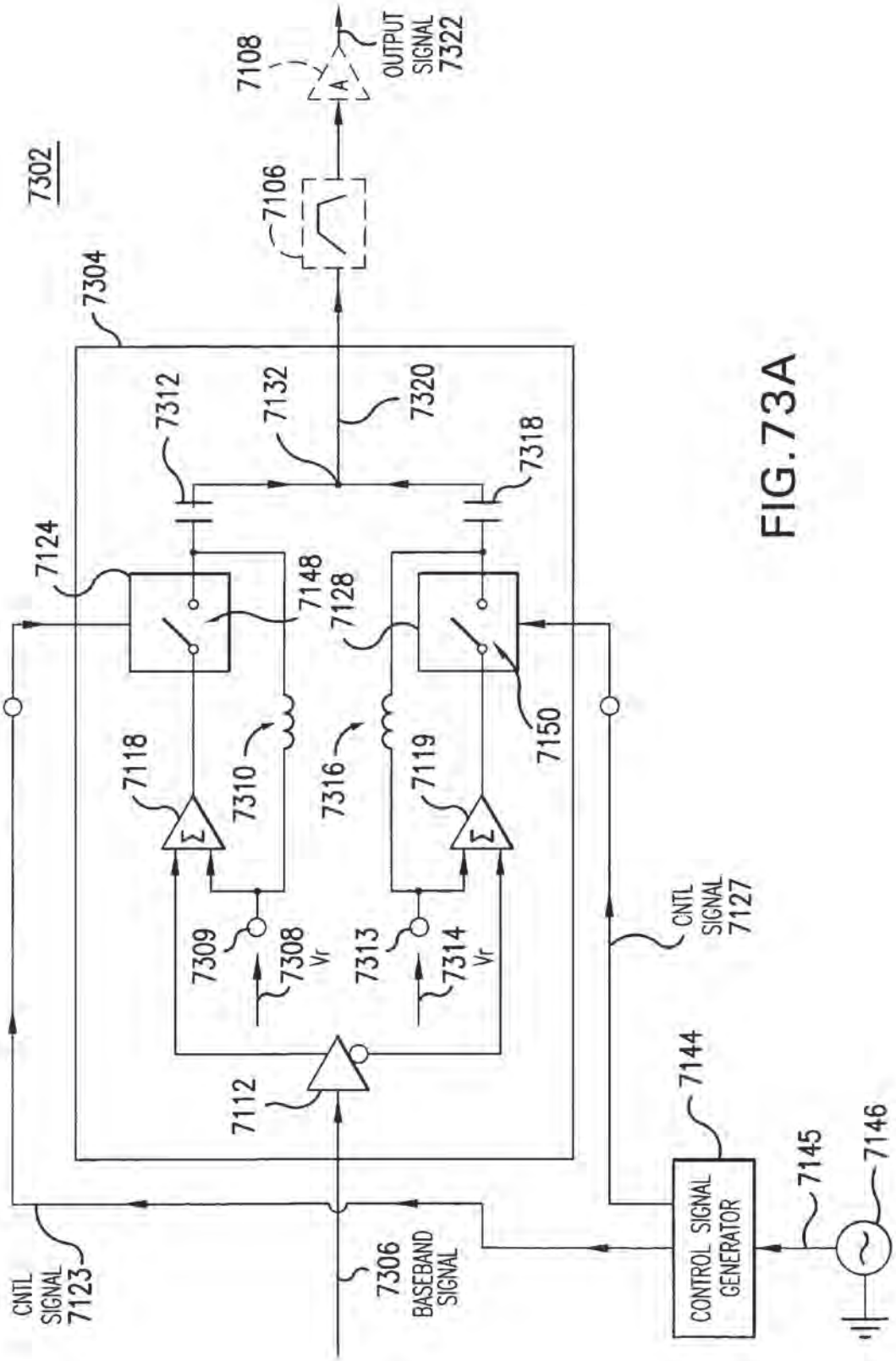

7302
7304
7108
7106
OUTPUT SIGNAL 7322
7312
7132
7320
7318
7124
7148
7128
7150
7118
7310
7316
7119
7309
7308 Vr
7313
7314 Vr
7112
CNTL SIGNAL 7127
7144
7145
7146
CONTROL SIGNAL GENERATOR
CNTL SIGNAL 7123
7306 BASEBAND SIGNAL

FIG. 73A

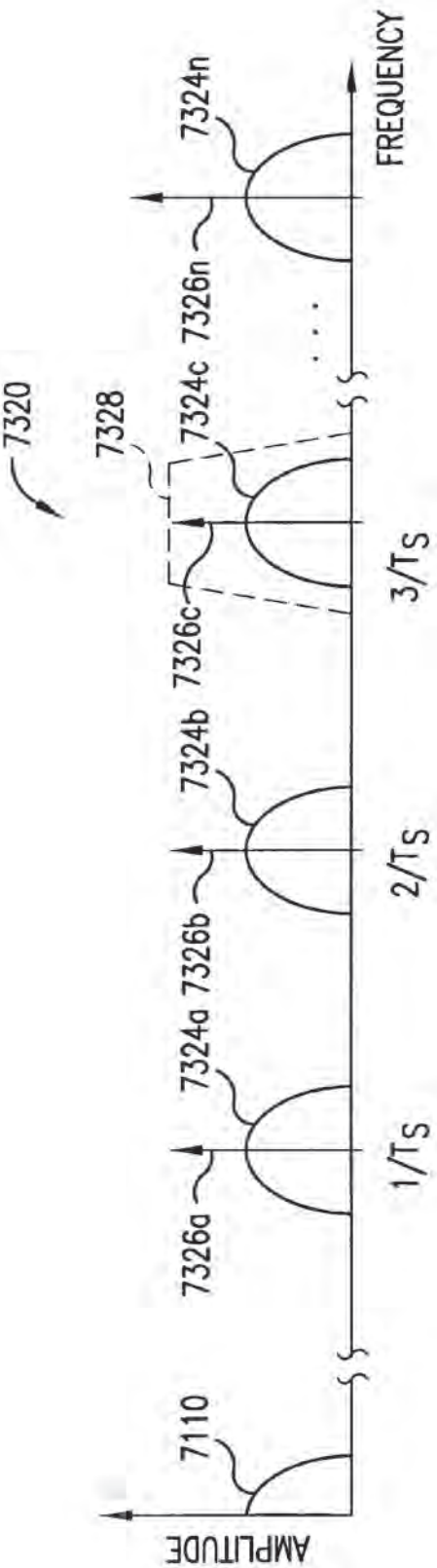

7320
7328
7324n
7326n
7324c
7326c
7324b
7326b
7324a
7326a
7110
AMPLITUDE
FREQUENCY
1/Ts
2/Ts
3/Ts

FIG. 73B

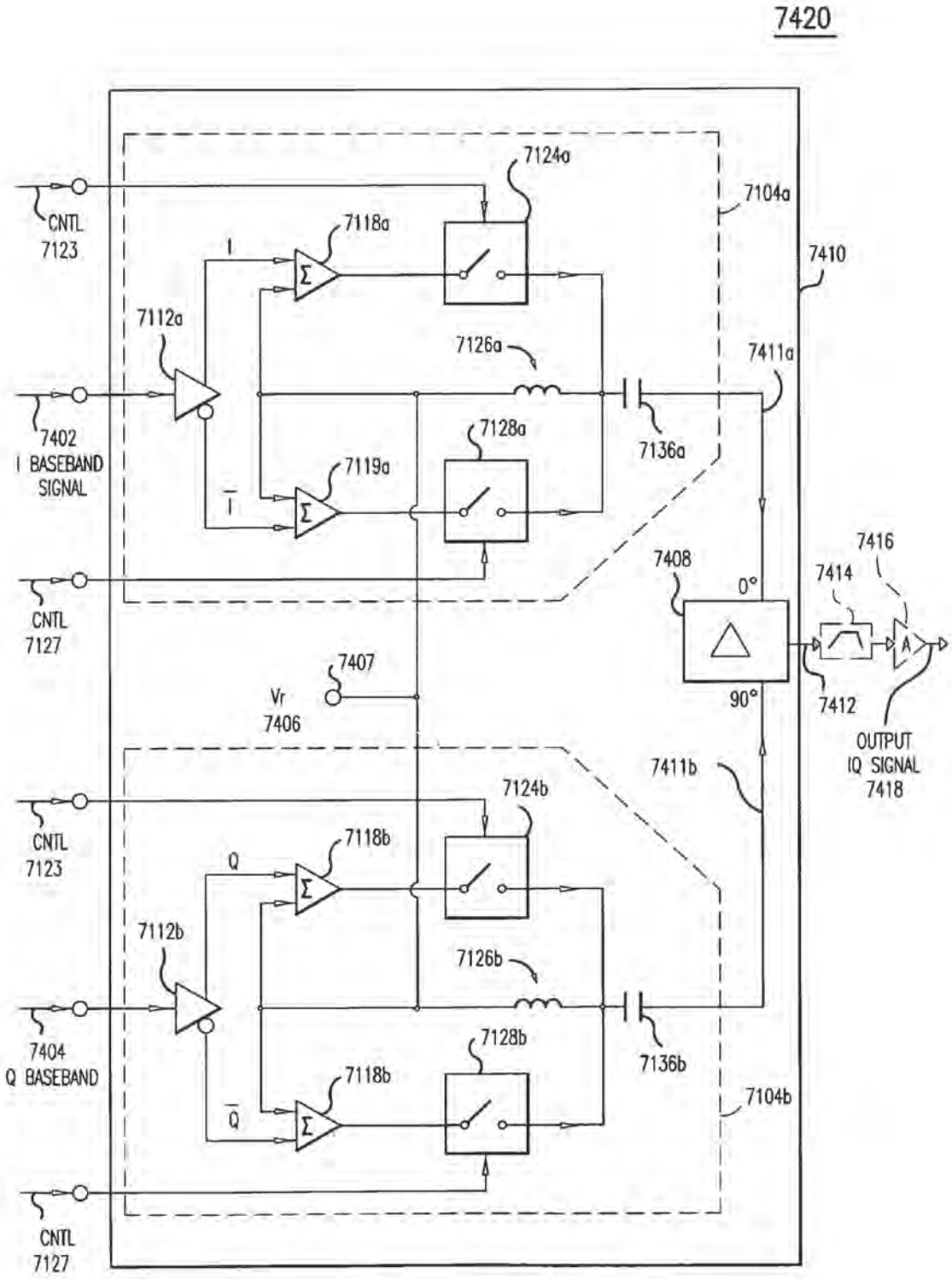

7420
7124a
7104a
7118a
CNTL
7123
I
7410
7112a
7126a
7411a
7402
I BASEBAND
SIGNAL
7128a
7136a
7119a
$\bar{I}$
7416
7408
7414
0°
CNTL
7127
7407
Vr
7406
90°
7412
OUTPUT
IQ SIGNAL
7418
7411b
7124b
CNTL
7123
7118b
Q
7112b
7126b
7404
Q BASEBAND
7128b
7136b
7118b
7104b
$\bar{Q}$
CNTL
7127

FIG. 74

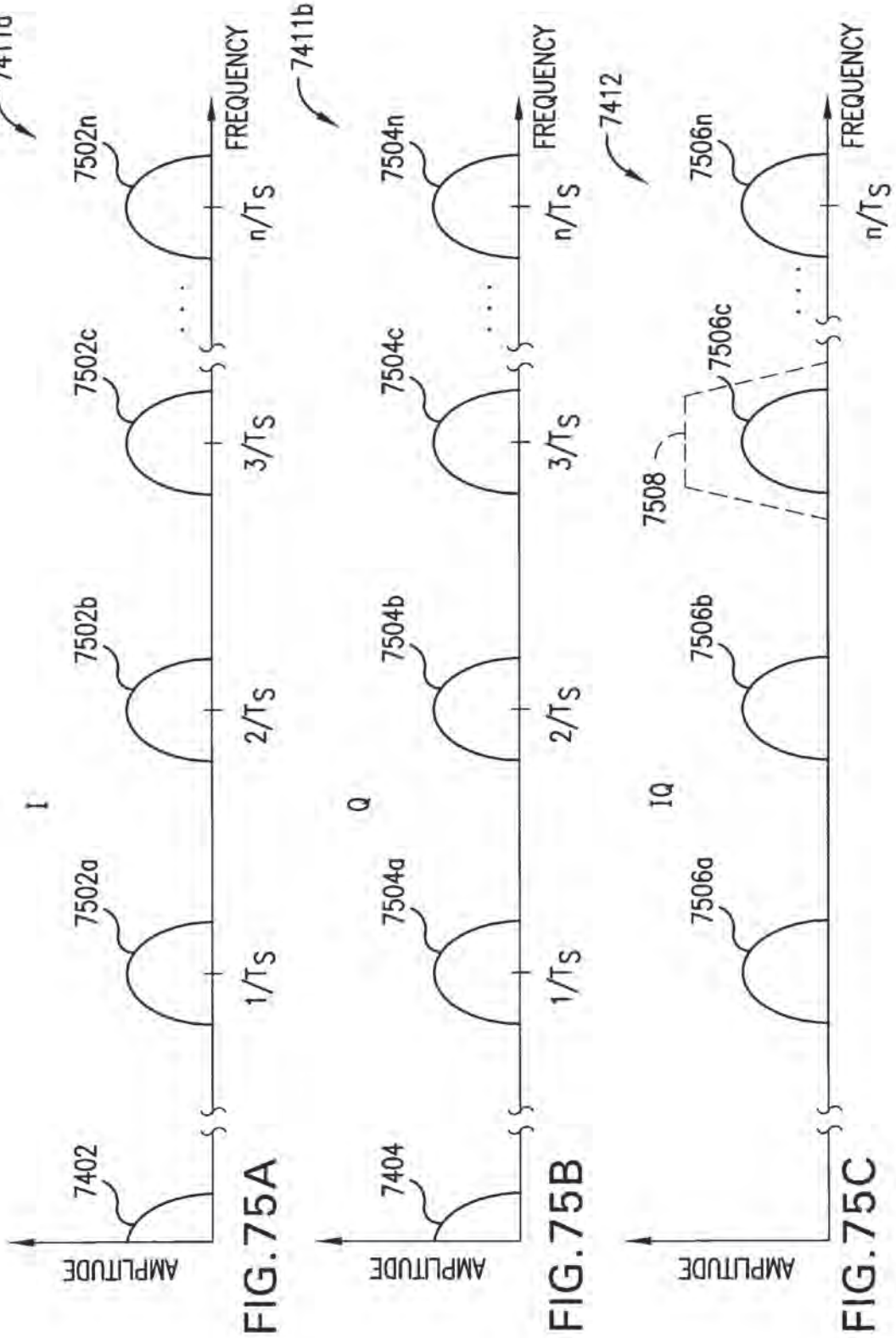


FIG. 75A

FIG. 75B

FIG. 75C

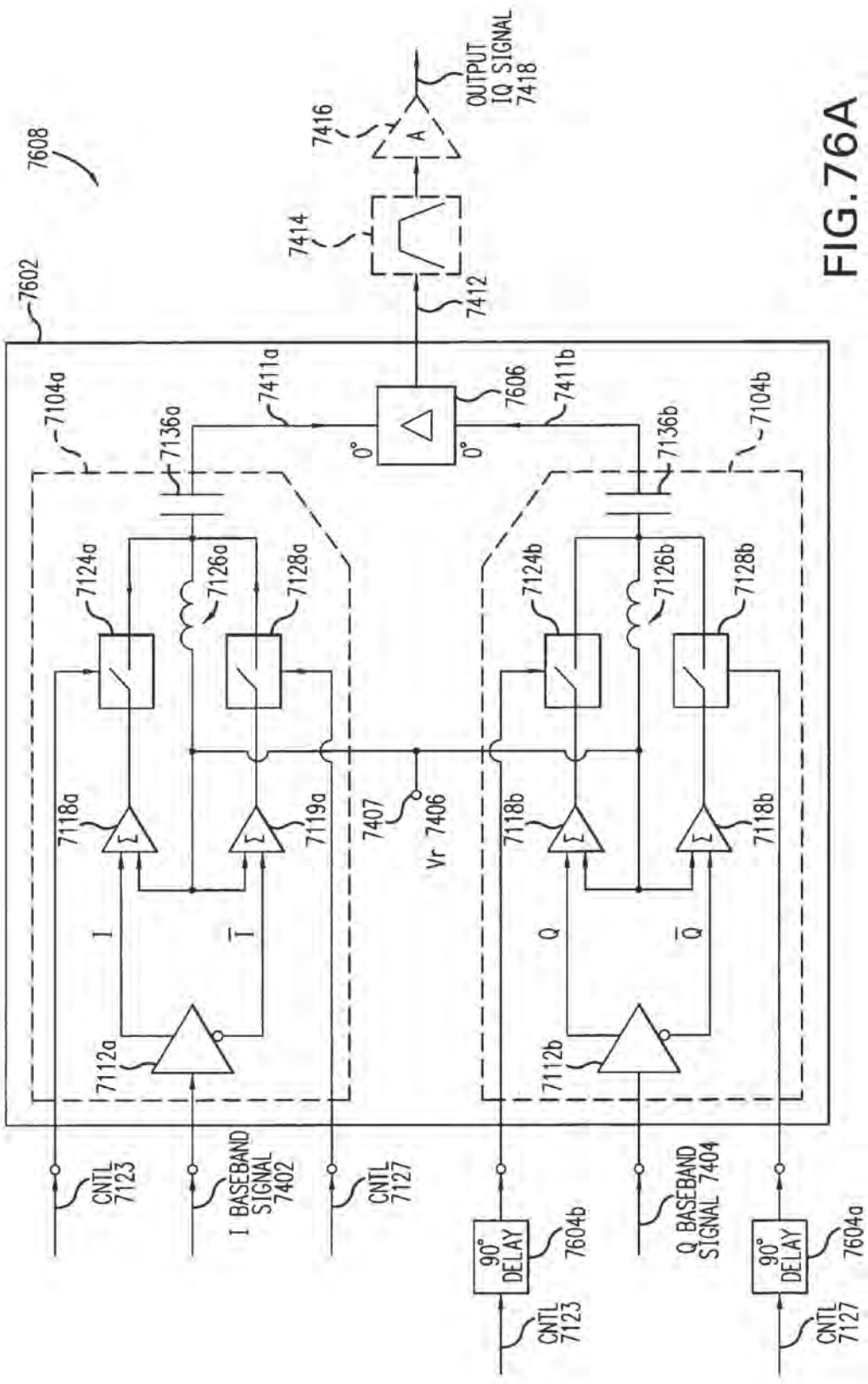

7608
7602
7104a
7104b
7136a
7136b
7411a
7411b
7606
7414
7412
7416
OUTPUT IQ SIGNAL 7418
0°
0°
7124a
7126a
7128a
7124b
7126b
7128b
7118a
7119a
7118b
7407
Vr 7406
I
Ī
Q
Q̄
7112a
7112b
CNTL 7123
I BASEBAND SIGNAL 7402
CNTL 7127
90° DELAY
7604b
Q BASEBAND SIGNAL 7404
90° DELAY
7604a
CNTL 7123
CNTL 7127

FIG. 76A

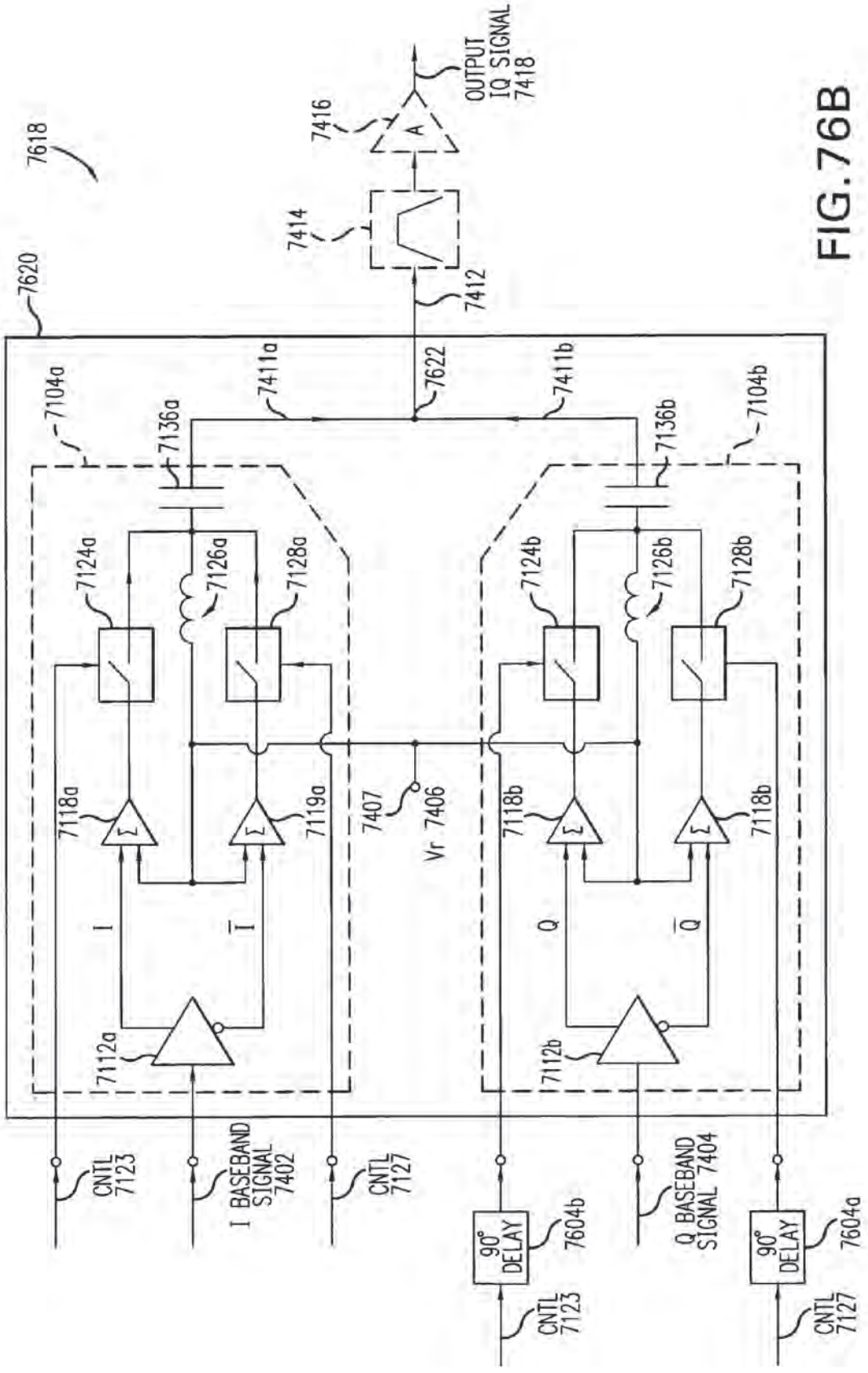

7618
7620
7416
OUTPUT IQ SIGNAL 7418
7414
7412
7622
7411a
7411b
7104a
7104b
7136a
7136b
7124a
7126a
7128a
7124b
7126b
7128b
7118a
7119a
7118b
7407
Vr 7406
I
Ī
Q
Q̄
7112a
7112b
CNTL 7123
I BASEBAND SIGNAL 7402
CNTL 7127
90° DELAY 7604b
Q BASEBAND SIGNAL 7404
90° DELAY 7604a
CNTL 7123
CNTL 7127

FIG. 76B

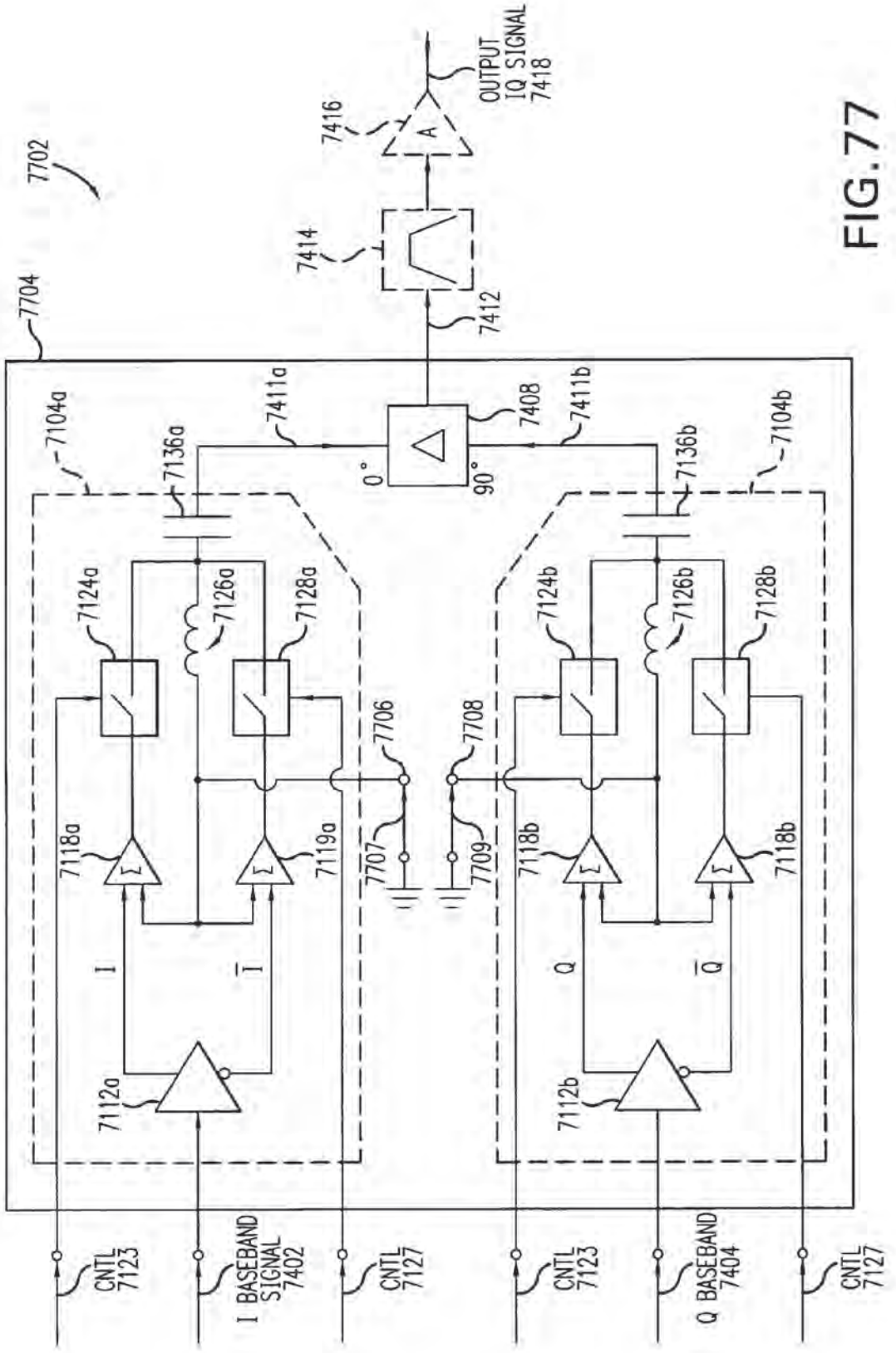

7702
7704
7416
OUTPUT IQ SIGNAL 7418
7414
7412
7104a
7136a
7411a
7408
7411b
7104b
7136b
0°
90°
7124a
7126a
7128a
7124b
7126b
7128b
7706
7708
7707
7709
7118a
7119a
7118b
I
Ī
Q
Q̄
7112a
7112b
CNTL 7123
I BASEBAND SIGNAL 7402
CNTL 7127
CNTL 7123
Q BASEBAND 7404
CNTL 7127

FIG. 77

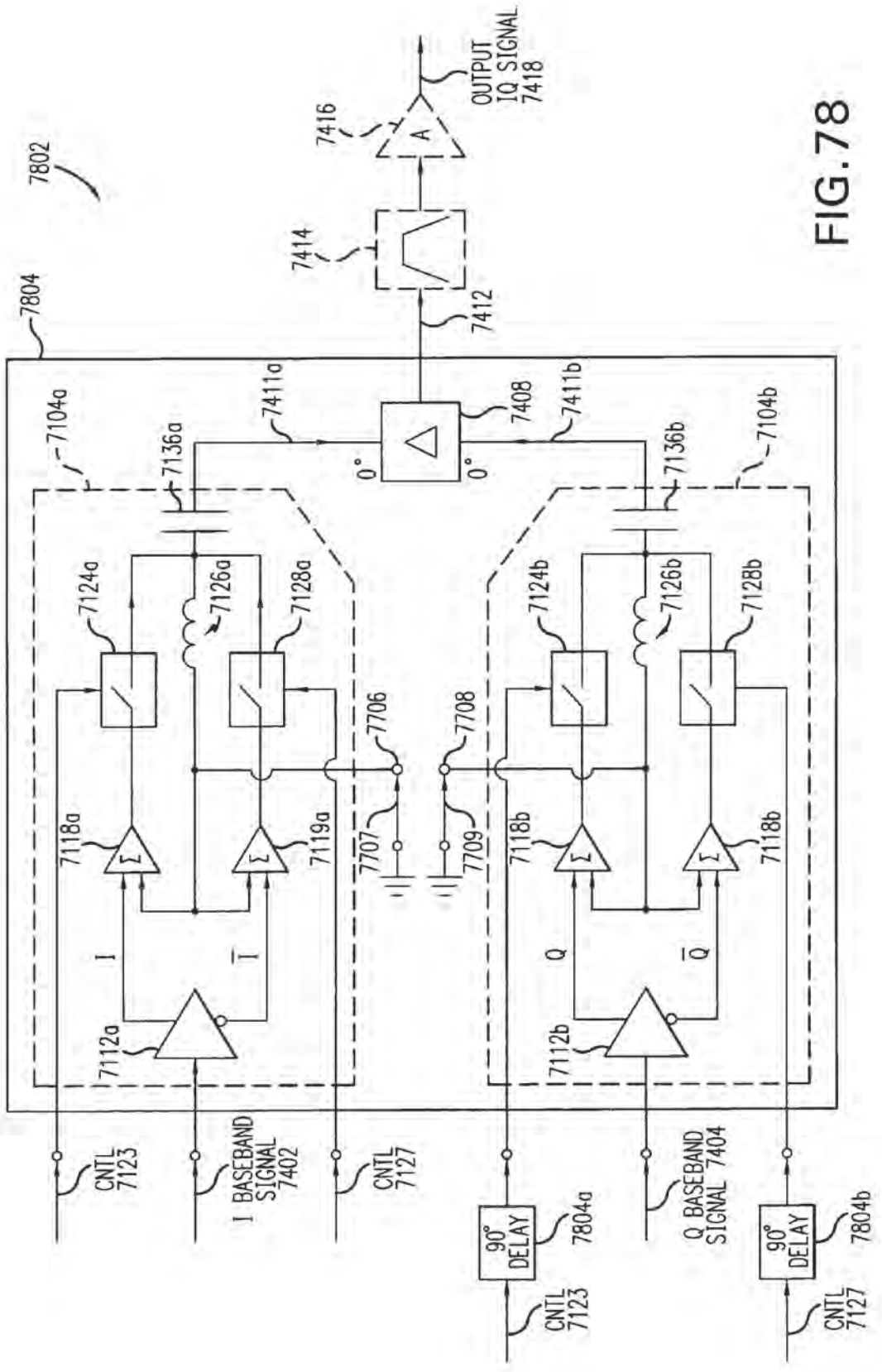

7802
7804
7104a
7136a
7411a
7408
7411b
7104b
7136b
7124a
7126a
7128a
7124b
7126b
7128b
7706
7708
7707
7709
7118a
7119a
7118b
7112a
7112b
I
Ī
Q
Q̄
7414
7412
7416
A
OUTPUT IQ SIGNAL 7418
0°
CNTL 7123
1 BASEBAND SIGNAL 7402
CNTL 7127
Q BASEBAND SIGNAL 7404
90° DELAY
7804a
7804b

FIG. 78

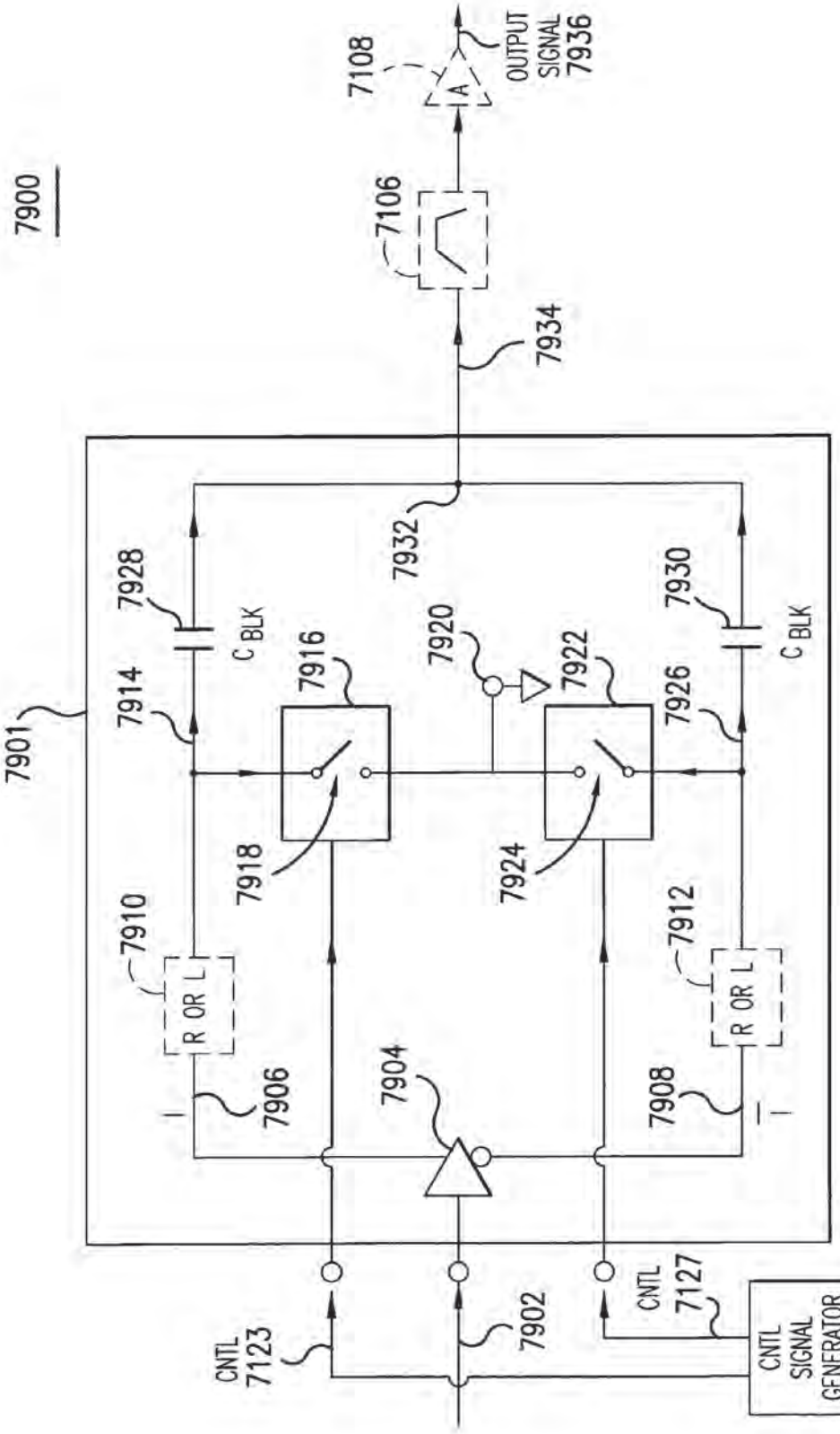

7900
7108
A
OUTPUT SIGNAL 7936
7106
7934
7932
7928
C BLK
7914
7916
7920
7922
7926
7930
C BLK
7901
7918
7924
7910
R OR L
7912
R OR L
7906
7904
7908
CNTL 7123
7902
CNTL 7127
CNTL SIGNAL GENERATOR
7142

FIG. 79A

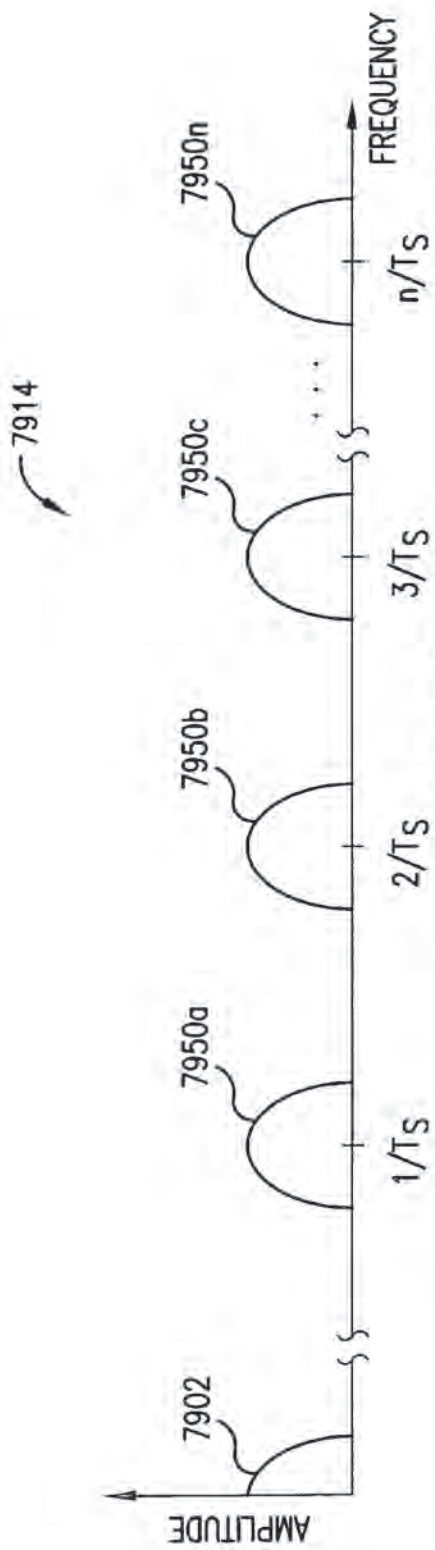


FIG.79B

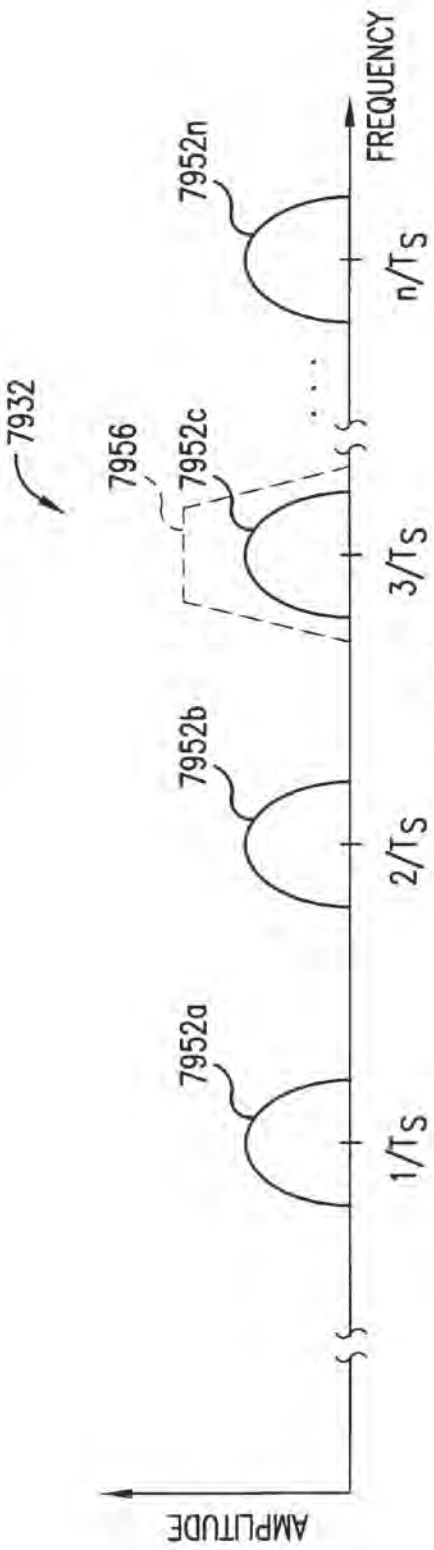


FIG.79C

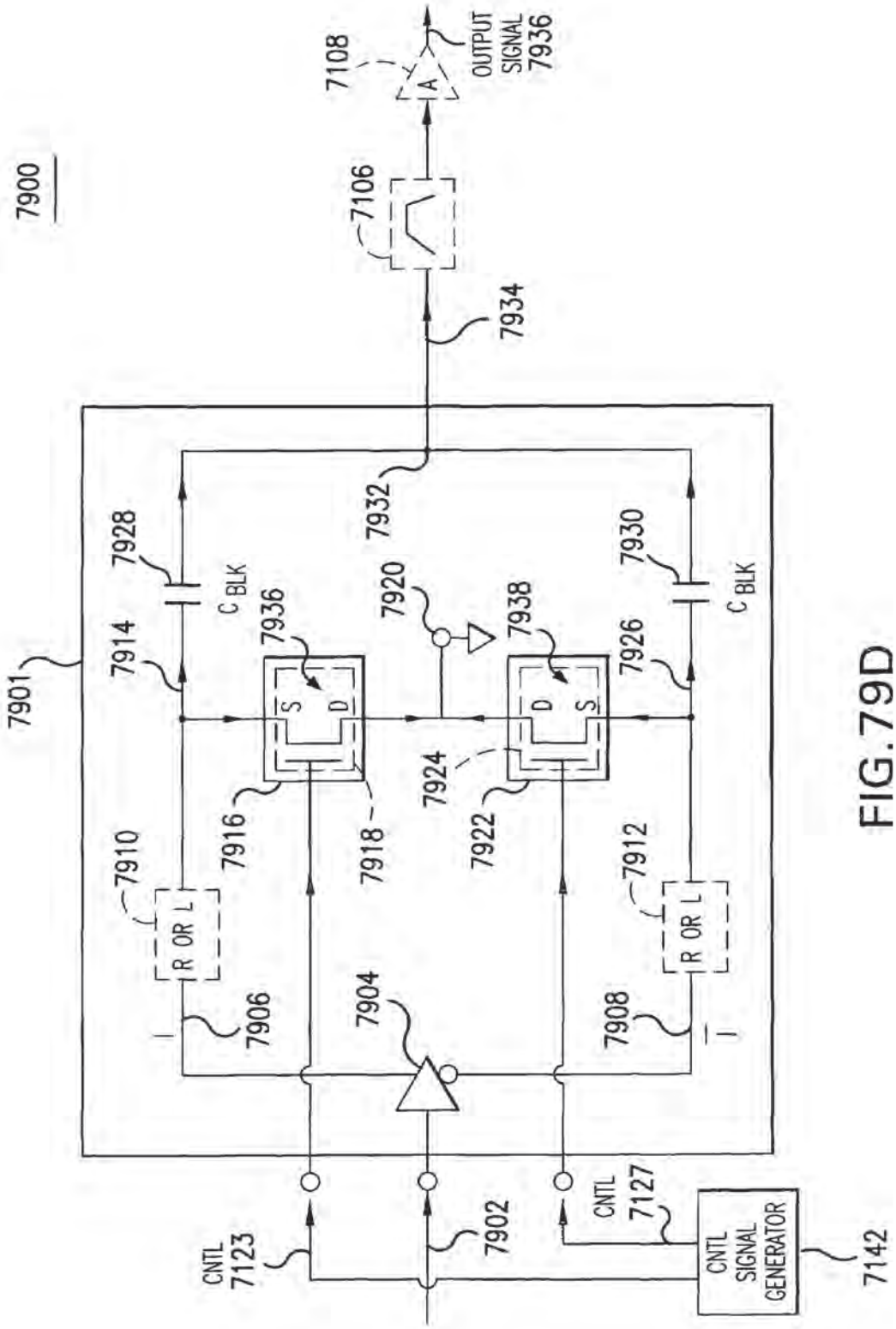

7900
7901
7108
A
OUTPUT SIGNAL 7936
7106
7934
7932
7928
C BLK
7914
7936
7920
7938
7930
C BLK
7926
S
D
D
S
7924
7916
7918
7922
7910
R OR L
7906
7904
7908
7912
R OR L
CNTL 7123
7902
CNTL 7127
CNTL SIGNAL GENERATOR
7142

FIG. 79D

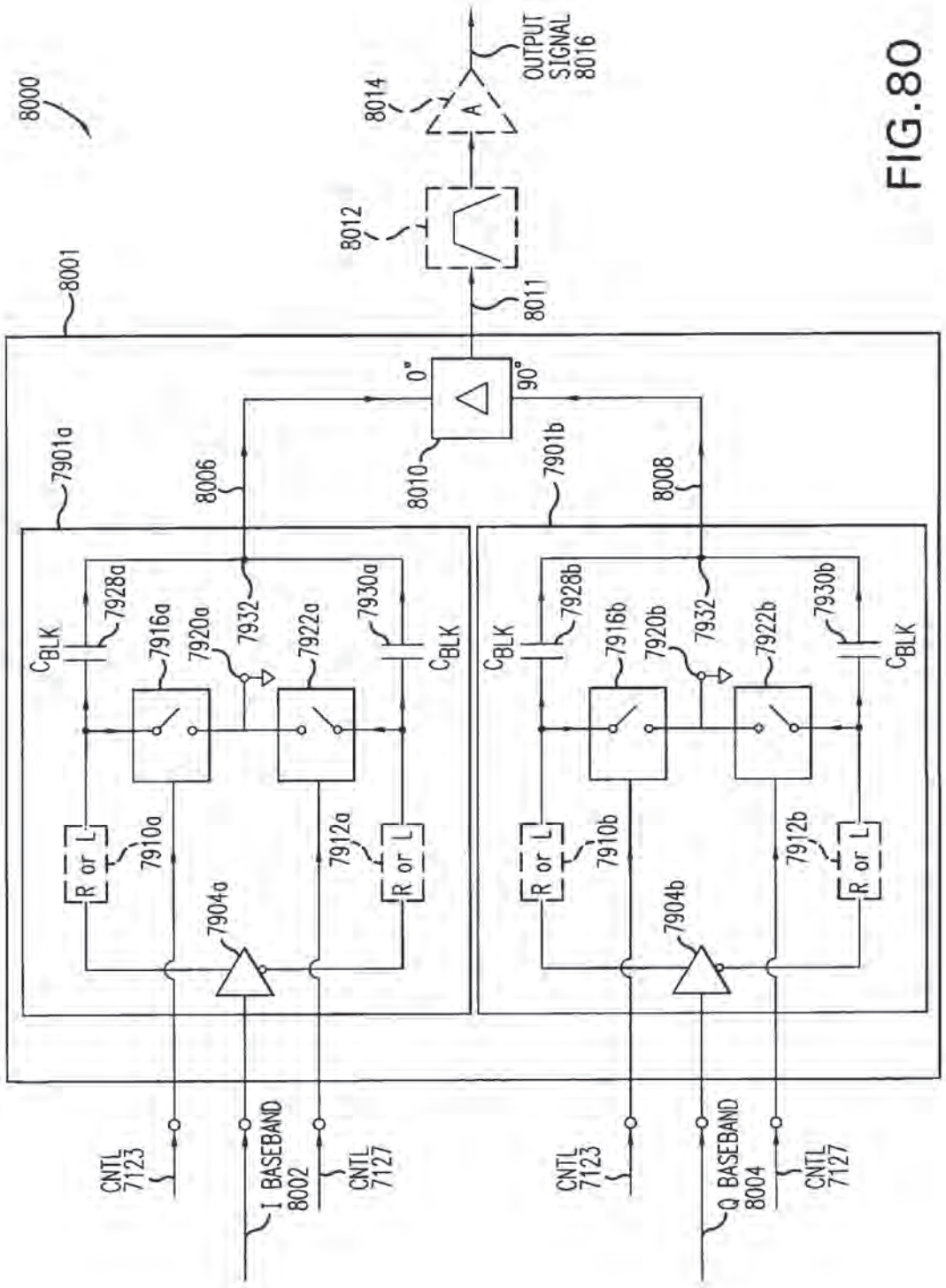

8000
8001
8012
8014
A
OUTPUT SIGNAL 8016
8011
0°
90°
8010
7901a
7901b
8006
8008
7928a
7916a
7920a
7932
7922a
7930a
C_{BLK}
7910a
7912a
R or L
7904a
7928b
7916b
7920b
7922b
7930b
7910b
7912b
7904b
CNTL 7123
I BASEBAND 8002
CNTL 7127
Q BASEBAND 8004

FIG.80

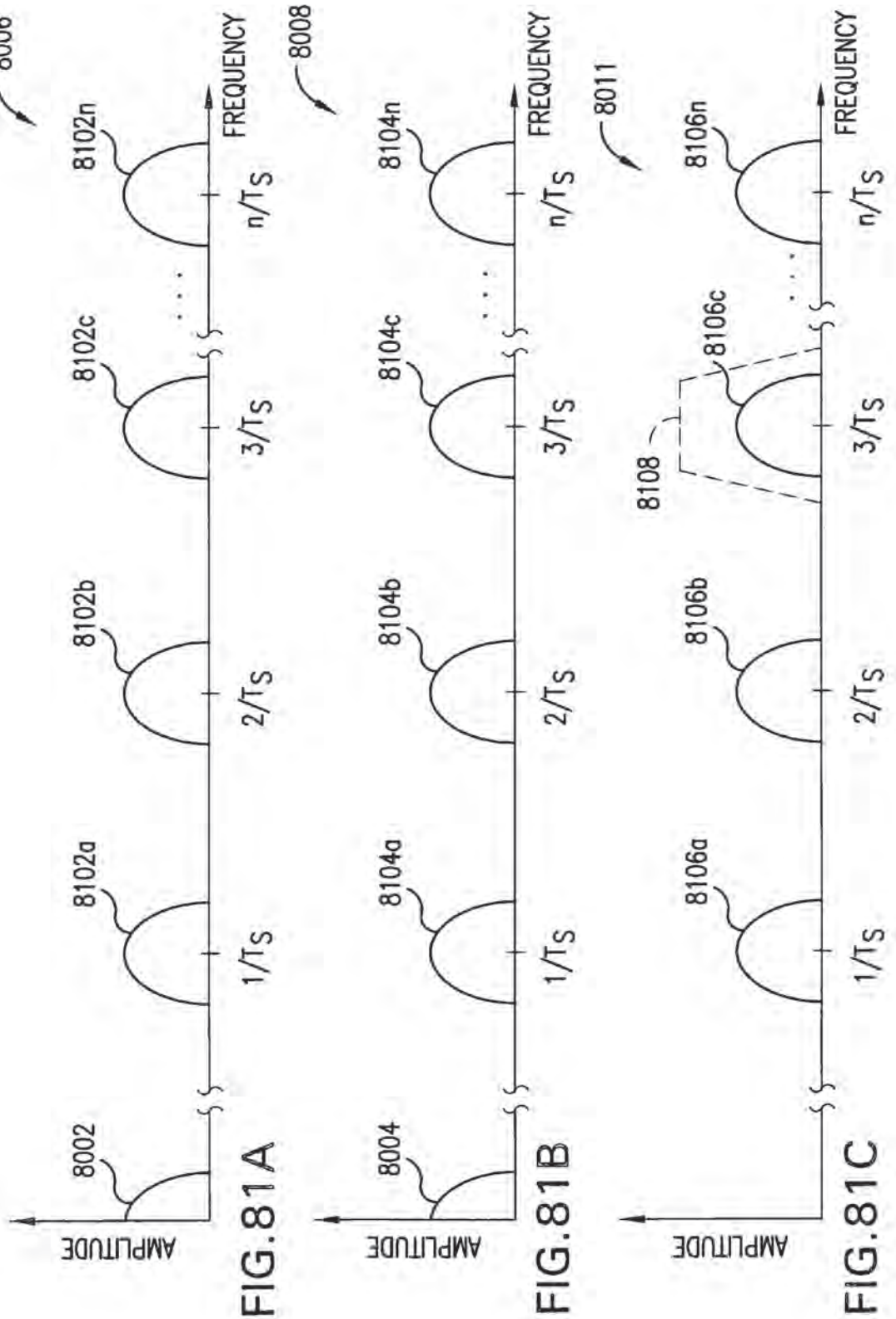


FIG.81A

FIG.81B

FIG.81C

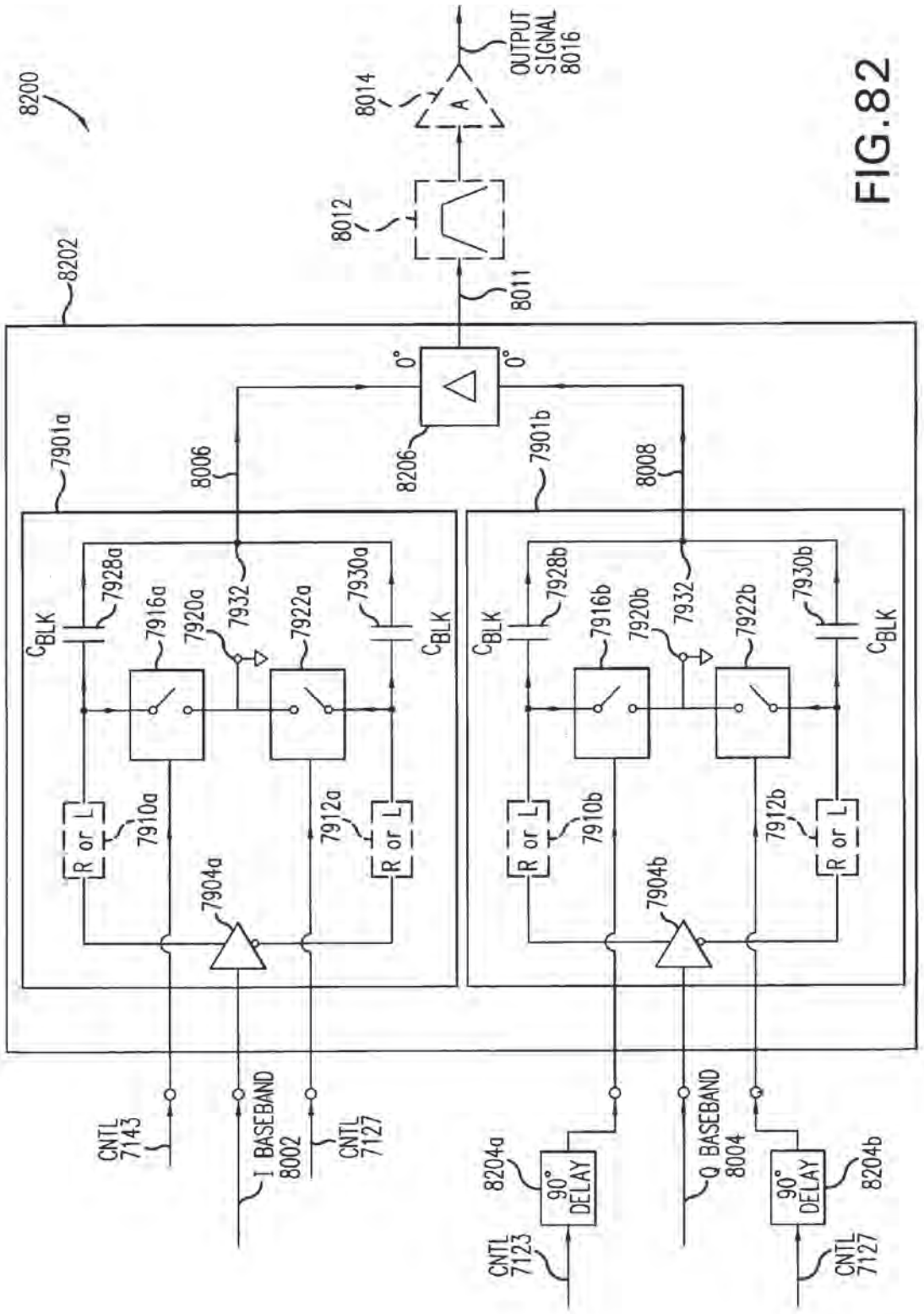

8200
8202
8014
OUTPUT SIGNAL 8016
8012
8011
0°
0°
8206
7901a
7901b
8006
8008
C_{BLK}
7928a
7916a
7920a
7932
7922a
7930a
7910a
7912a
7904a
7928b
7916b
7920b
7922b
7930b
7910b
7912b
7904b
R or L
CNTL 7143
I BASEBAND 8002
CNTL 7127
Q BASEBAND 8004
8204a
8204b
90° DELAY
CNTL 7123

FIG.82

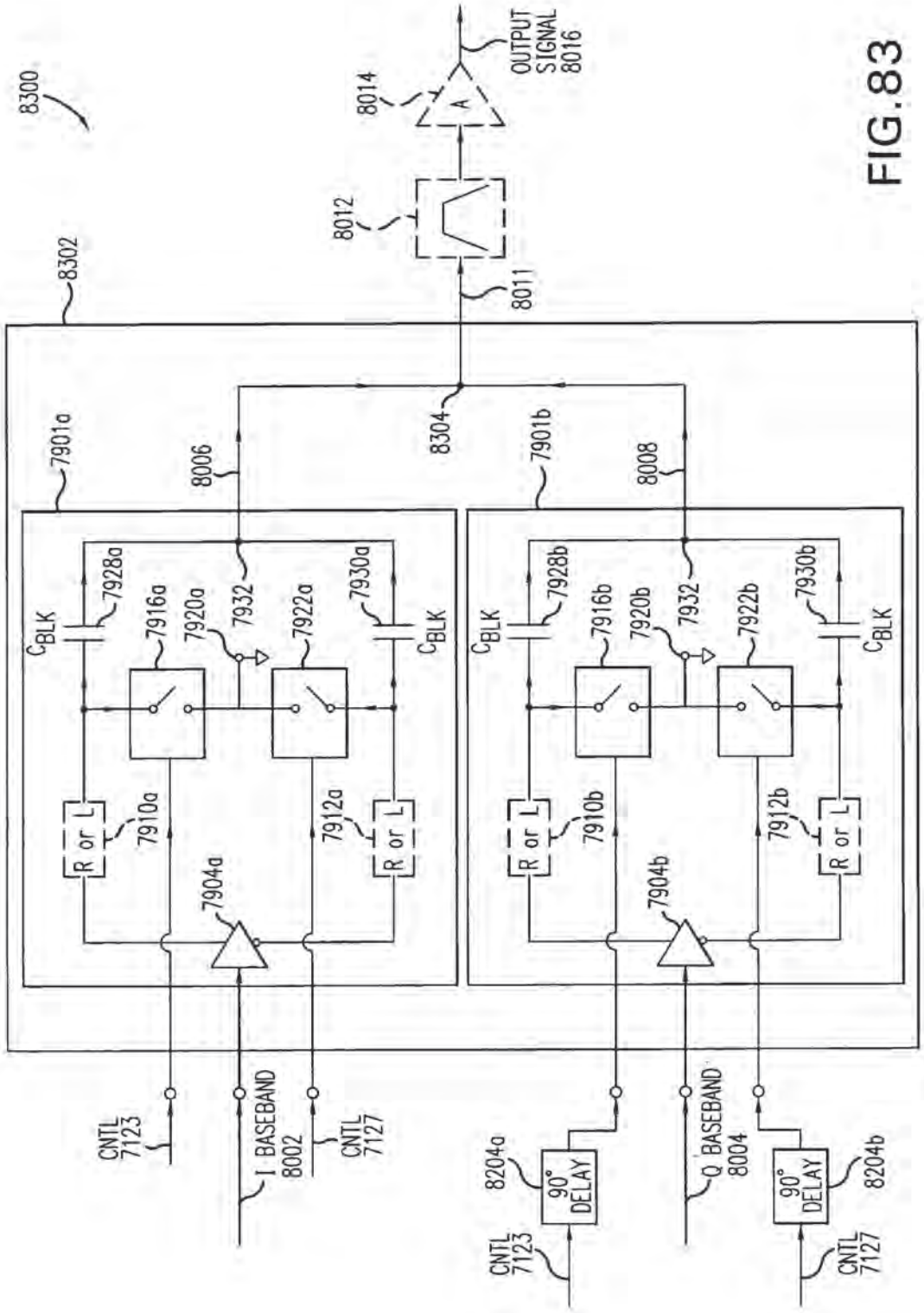

8300
8014
OUTPUT SIGNAL 8016
8012
8011
8302
8304
7901a
8006
7901b
8008
C_{BLK}
7928a
7916a
7920a
7932
7922a
7930a
7928b
7916b
7920b
7922b
7930b
R or L
7910a
7912a
7904a
7910b
7912b
7904b
CNTL 7123
I BASEBAND 8002
CNTL 7127
Q BASEBAND 8004
8204a
8204b
90° DELAY

FIG.83

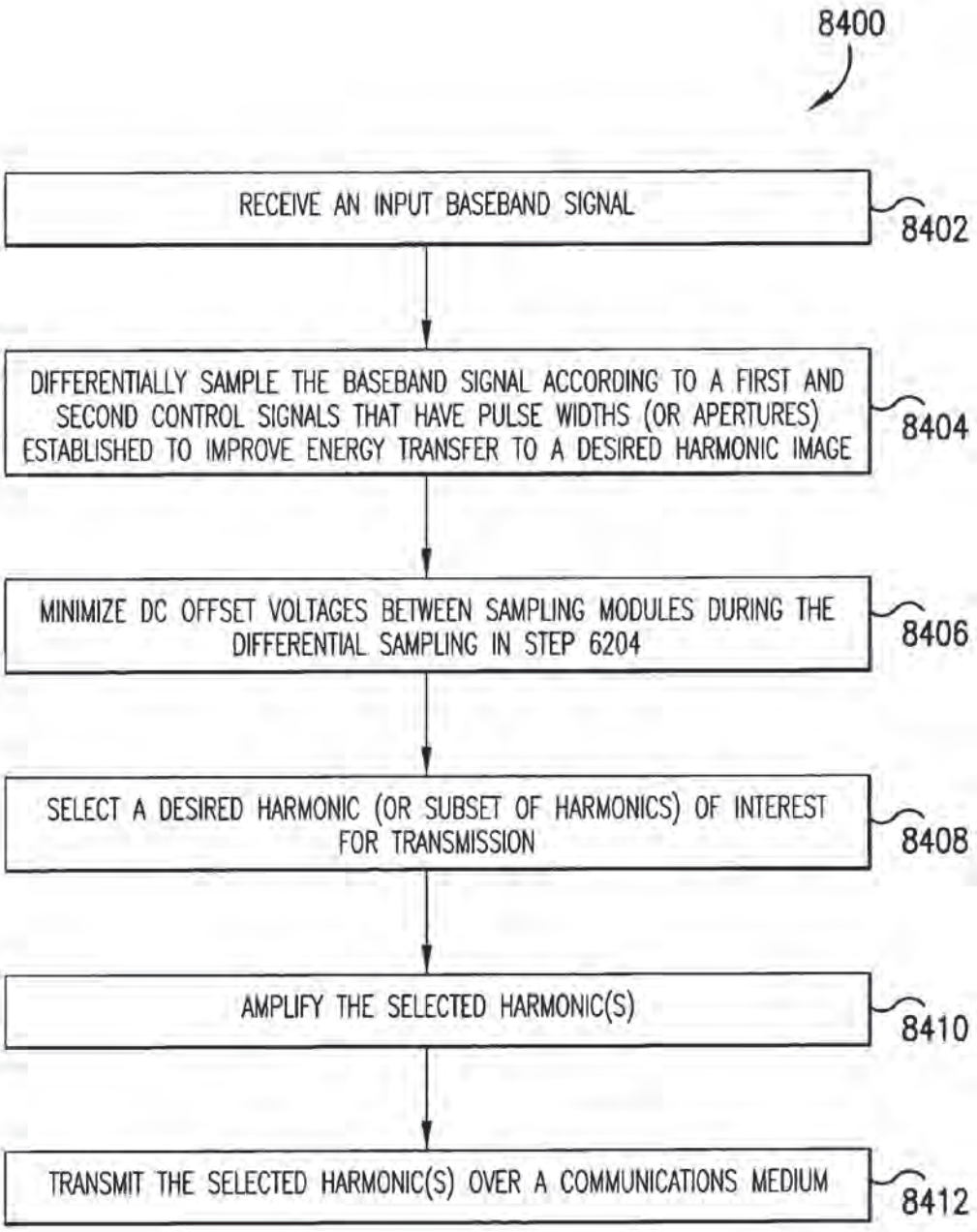

8400
RECEIVE AN INPUT BASEBAND SIGNAL
8402
DIFFERENTIALLY SAMPLE THE BASEBAND SIGNAL ACCORDING TO A FIRST AND SECOND CONTROL SIGNALS THAT HAVE PULSE WIDTHS (OR APERTURES) ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC IMAGE
8404
MINIMIZE DC OFFSET VOLTAGES BETWEEN SAMPLING MODULES DURING THE DIFFERENTIAL SAMPLING IN STEP 6204
8406
SELECT A DESIRED HARMONIC (OR SUBSET OF HARMONICS) OF INTEREST FOR TRANSMISSION
8408
AMPLIFY THE SELECTED HARMONIC(S)
8410
TRANSMIT THE SELECTED HARMONIC(S) OVER A COMMUNICATIONS MEDIUM
8412

FIG.84

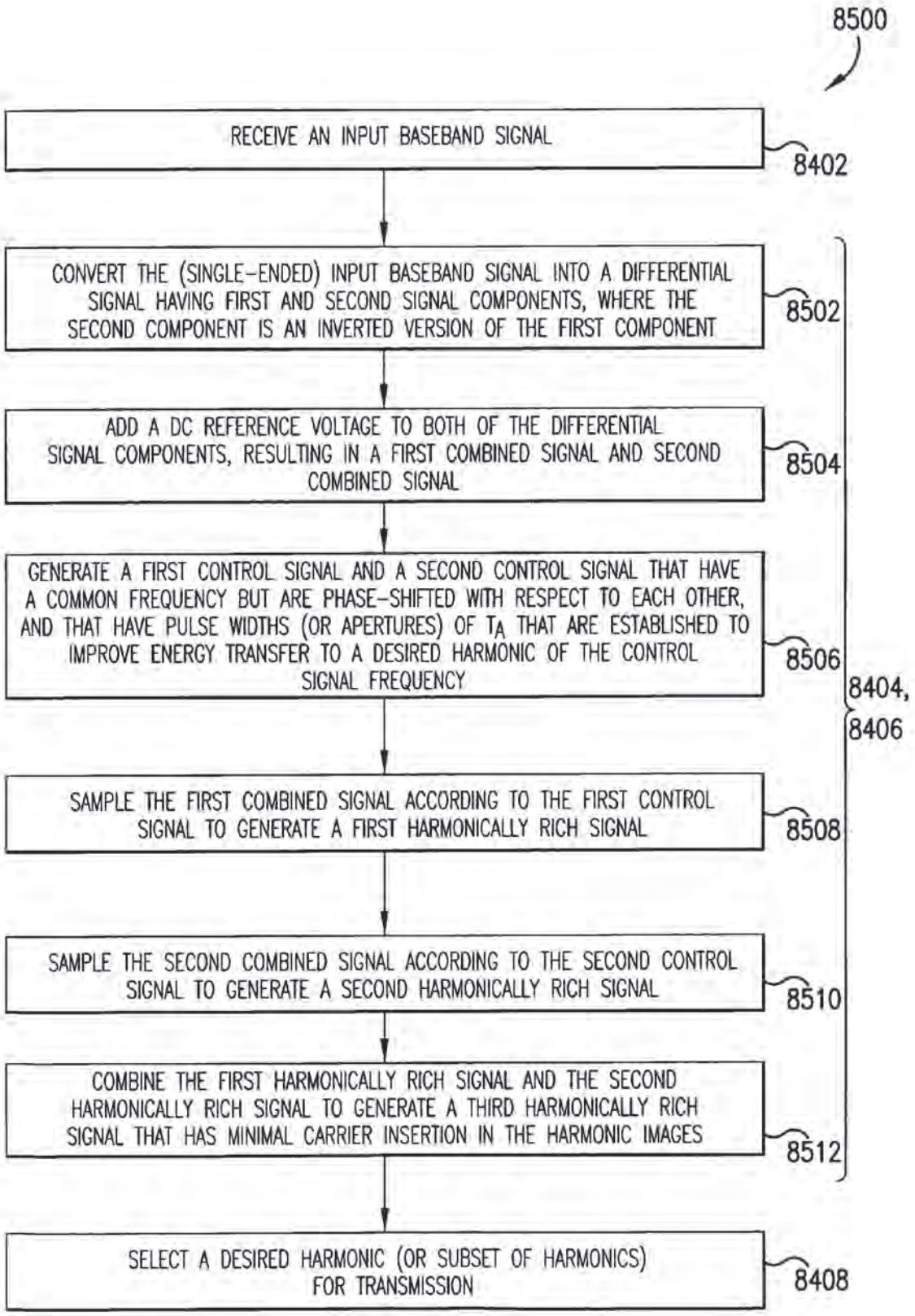

8500
RECEIVE AN INPUT BASEBAND SIGNAL
8402
CONVERT THE (SINGLE-ENDED) INPUT BASEBAND SIGNAL INTO A DIFFERENTIAL SIGNAL HAVING FIRST AND SECOND SIGNAL COMPONENTS, WHERE THE SECOND COMPONENT IS AN INVERTED VERSION OF THE FIRST COMPONENT
8502
ADD A DC REFERENCE VOLTAGE TO BOTH OF THE DIFFERENTIAL SIGNAL COMPONENTS, RESULTING IN A FIRST COMBINED SIGNAL AND SECOND COMBINED SIGNAL
8504
GENERATE A FIRST CONTROL SIGNAL AND A SECOND CONTROL SIGNAL THAT HAVE A COMMON FREQUENCY BUT ARE PHASE-SHIFTED WITH RESPECT TO EACH OTHER, AND THAT HAVE PULSE WIDTHS (OR APERTURES) OF T_A THAT ARE ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC OF THE CONTROL SIGNAL FREQUENCY
8506
8404, 8406
SAMPLE THE FIRST COMBINED SIGNAL ACCORDING TO THE FIRST CONTROL SIGNAL TO GENERATE A FIRST HARMONICALLY RICH SIGNAL
8508
SAMPLE THE SECOND COMBINED SIGNAL ACCORDING TO THE SECOND CONTROL SIGNAL TO GENERATE A SECOND HARMONICALLY RICH SIGNAL
8510
COMBINE THE FIRST HARMONICALLY RICH SIGNAL AND THE SECOND HARMONICALLY RICH SIGNAL TO GENERATE A THIRD HARMONICALLY RICH SIGNAL THAT HAS MINIMAL CARRIER INSERTION IN THE HARMONIC IMAGES
8512
SELECT A DESIRED HARMONIC (OR SUBSET OF HARMONICS) FOR TRANSMISSION
8408

FIG.85

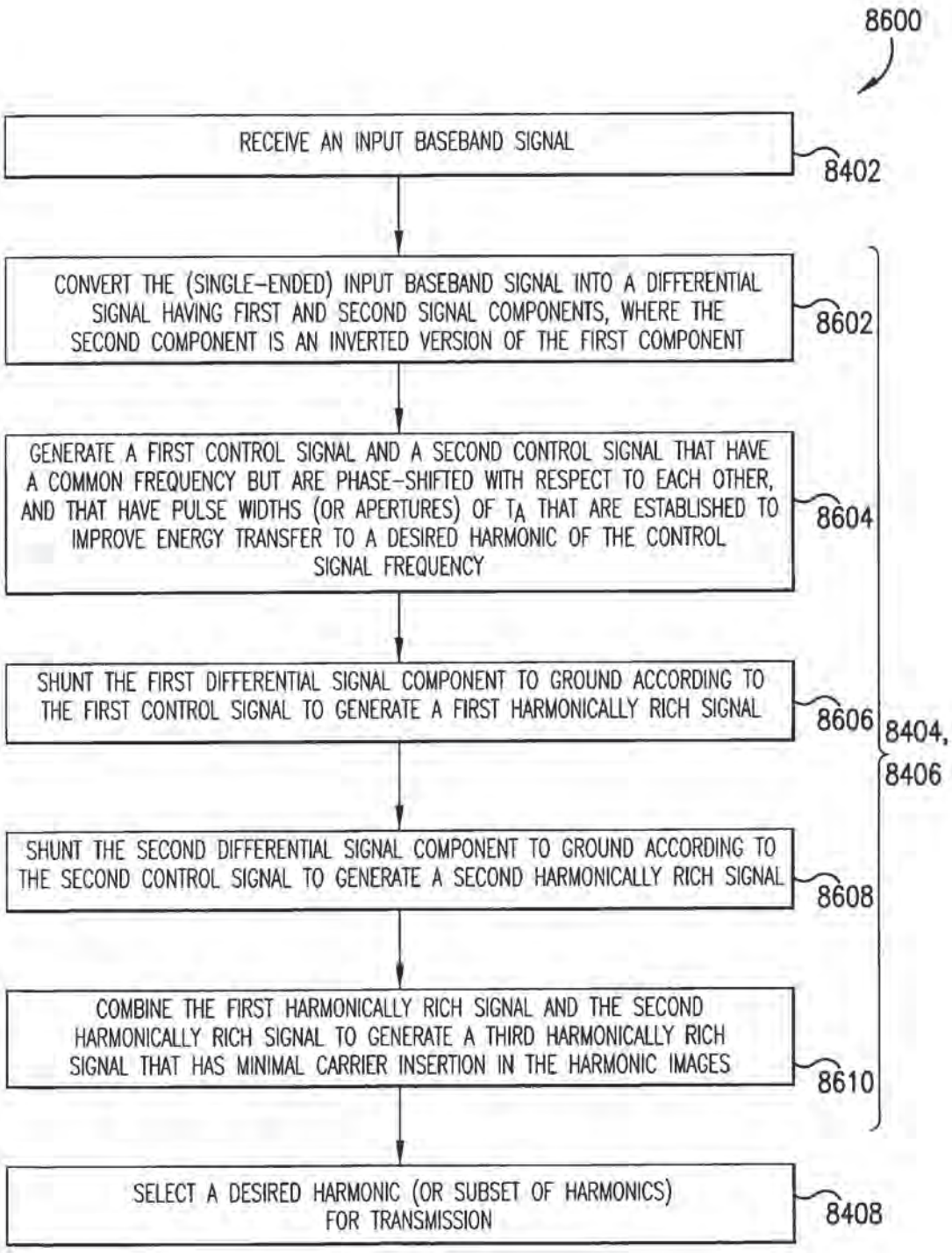

8600
RECEIVE AN INPUT BASEBAND SIGNAL
8402
CONVERT THE (SINGLE-ENDED) INPUT BASEBAND SIGNAL INTO A DIFFERENTIAL SIGNAL HAVING FIRST AND SECOND SIGNAL COMPONENTS, WHERE THE SECOND COMPONENT IS AN INVERTED VERSION OF THE FIRST COMPONENT
8602
GENERATE A FIRST CONTROL SIGNAL AND A SECOND CONTROL SIGNAL THAT HAVE A COMMON FREQUENCY BUT ARE PHASE-SHIFTED WITH RESPECT TO EACH OTHER, AND THAT HAVE PULSE WIDTHS (OR APERTURES) OF T_A THAT ARE ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC OF THE CONTROL SIGNAL FREQUENCY
8604
SHUNT THE FIRST DIFFERENTIAL SIGNAL COMPONENT TO GROUND ACCORDING TO THE FIRST CONTROL SIGNAL TO GENERATE A FIRST HARMONICALLY RICH SIGNAL
8606
SHUNT THE SECOND DIFFERENTIAL SIGNAL COMPONENT TO GROUND ACCORDING TO THE SECOND CONTROL SIGNAL TO GENERATE A SECOND HARMONICALLY RICH SIGNAL
8608
COMBINE THE FIRST HARMONICALLY RICH SIGNAL AND THE SECOND HARMONICALLY RICH SIGNAL TO GENERATE A THIRD HARMONICALLY RICH SIGNAL THAT HAS MINIMAL CARRIER INSERTION IN THE HARMONIC IMAGES
8610
8404, 8406
SELECT A DESIRED HARMONIC (OR SUBSET OF HARMONICS) FOR TRANSMISSION
8408

FIG.86

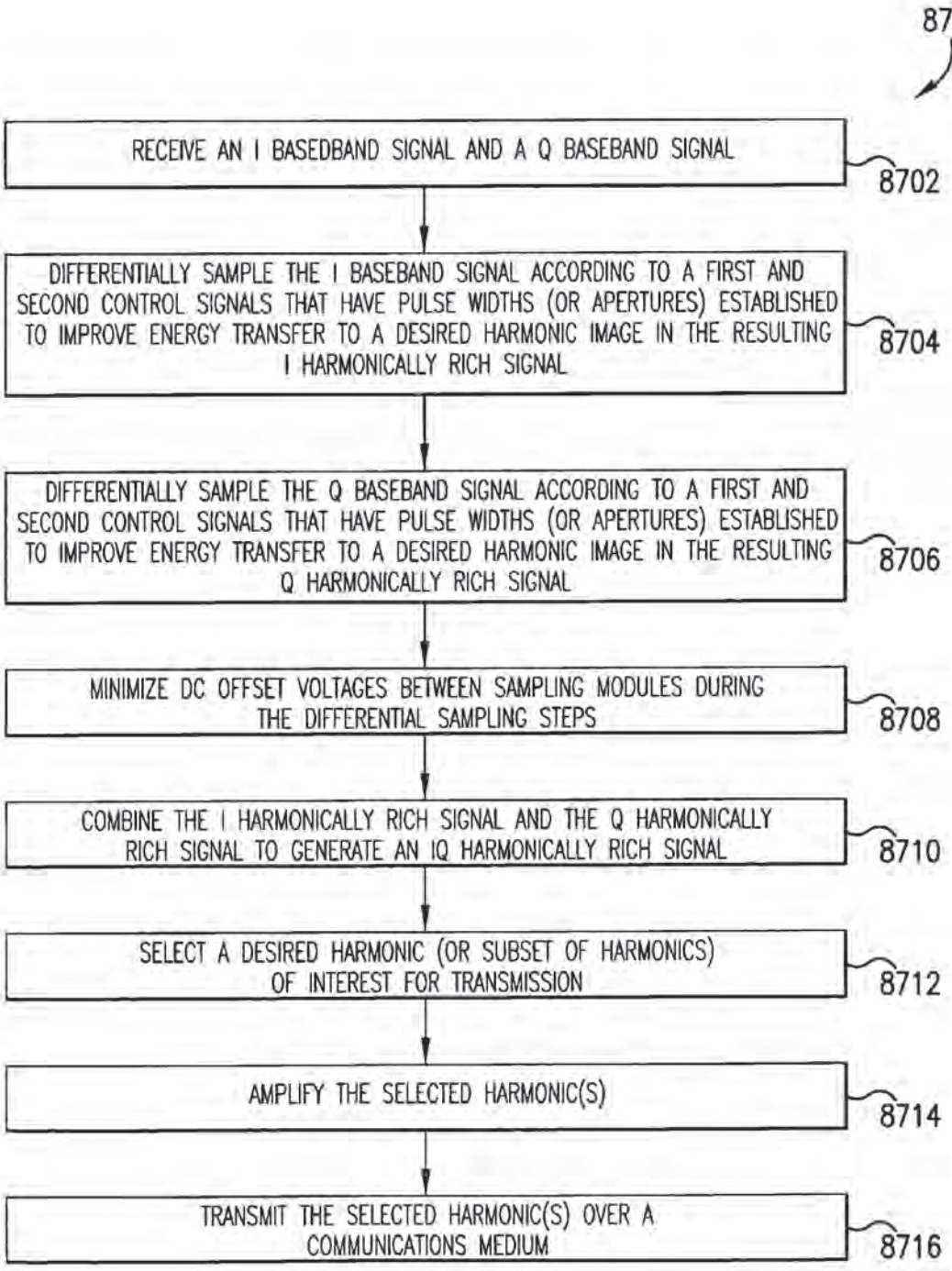

8700
RECEIVE AN I BASEDBAND SIGNAL AND A Q BASEBAND SIGNAL
8702
DIFFERENTIALLY SAMPLE THE I BASEBAND SIGNAL ACCORDING TO A FIRST AND SECOND CONTROL SIGNALS THAT HAVE PULSE WIDTHS (OR APERTURES) ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC IMAGE IN THE RESULTING I HARMONICALLY RICH SIGNAL
8704
DIFFERENTIALLY SAMPLE THE Q BASEBAND SIGNAL ACCORDING TO A FIRST AND SECOND CONTROL SIGNALS THAT HAVE PULSE WIDTHS (OR APERTURES) ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC IMAGE IN THE RESULTING Q HARMONICALLY RICH SIGNAL
8706
MINIMIZE DC OFFSET VOLTAGES BETWEEN SAMPLING MODULES DURING THE DIFFERENTIAL SAMPLING STEPS
8708
COMBINE THE I HARMONICALLY RICH SIGNAL AND THE Q HARMONICALLY RICH SIGNAL TO GENERATE AN IQ HARMONICALLY RICH SIGNAL
8710
SELECT A DESIRED HARMONIC (OR SUBSET OF HARMONICS) OF INTEREST FOR TRANSMISSION
8712
AMPLIFY THE SELECTED HARMONIC(S)
8714
TRANSMIT THE SELECTED HARMONIC(S) OVER A COMMUNICATIONS MEDIUM
8716

FIG.87

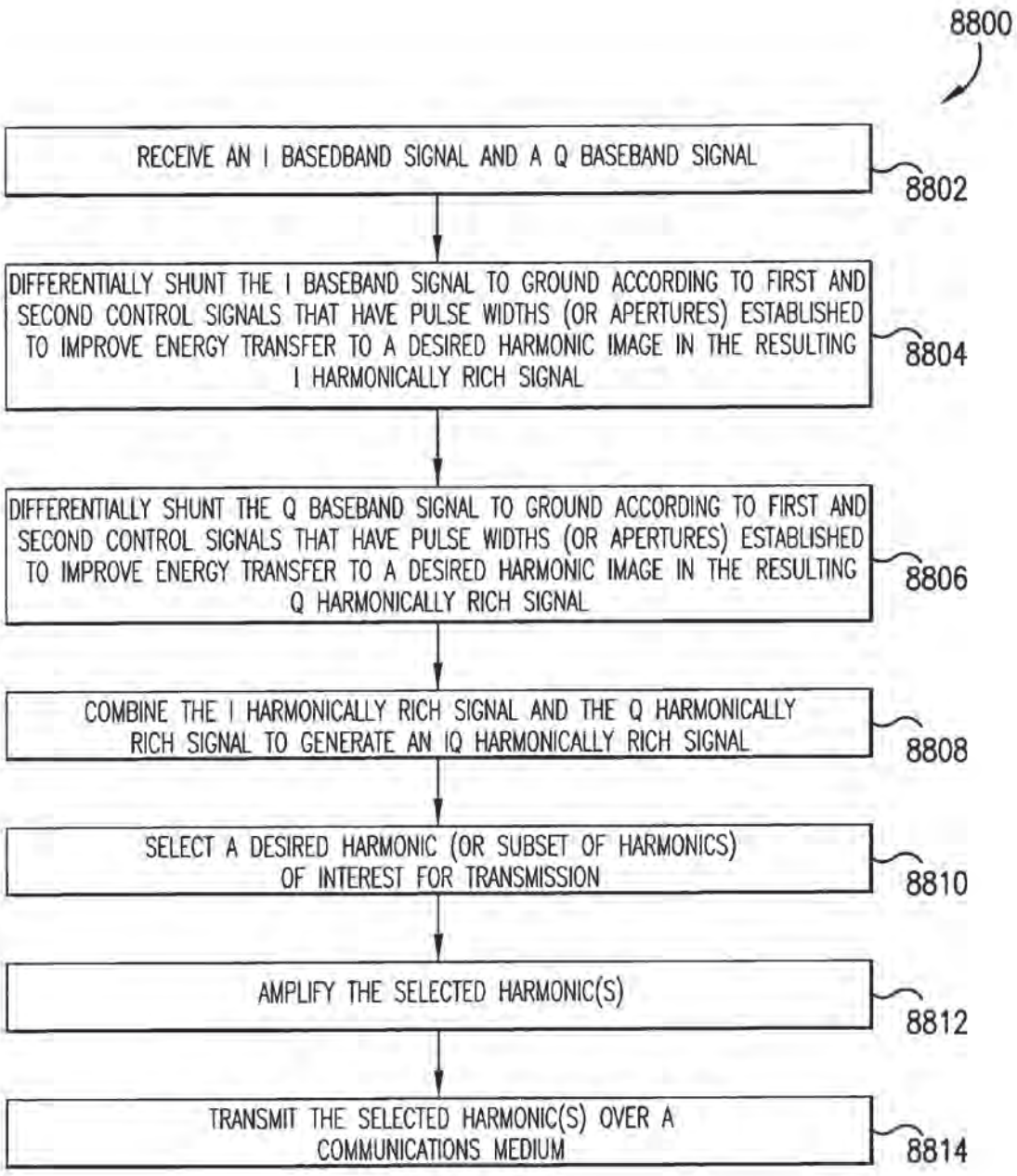

8800
RECEIVE AN I BASEDBAND SIGNAL AND A Q BASEBAND SIGNAL
8802
DIFFERENTIALLY SHUNT THE I BASEBAND SIGNAL TO GROUND ACCORDING TO FIRST AND SECOND CONTROL SIGNALS THAT HAVE PULSE WIDTHS (OR APERTURES) ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC IMAGE IN THE RESULTING I HARMONICALLY RICH SIGNAL
8804
DIFFERENTIALLY SHUNT THE Q BASEBAND SIGNAL TO GROUND ACCORDING TO FIRST AND SECOND CONTROL SIGNALS THAT HAVE PULSE WIDTHS (OR APERTURES) ESTABLISHED TO IMPROVE ENERGY TRANSFER TO A DESIRED HARMONIC IMAGE IN THE RESULTING Q HARMONICALLY RICH SIGNAL
8806
COMBINE THE I HARMONICALLY RICH SIGNAL AND THE Q HARMONICALLY RICH SIGNAL TO GENERATE AN IQ HARMONICALLY RICH SIGNAL
8808
SELECT A DESIRED HARMONIC (OR SUBSET OF HARMONICS) OF INTEREST FOR TRANSMISSION
8810
AMPLIFY THE SELECTED HARMONIC(S)
8812
TRANSMIT THE SELECTED HARMONIC(S) OVER A COMMUNICATIONS MEDIUM
8814

FIG.88

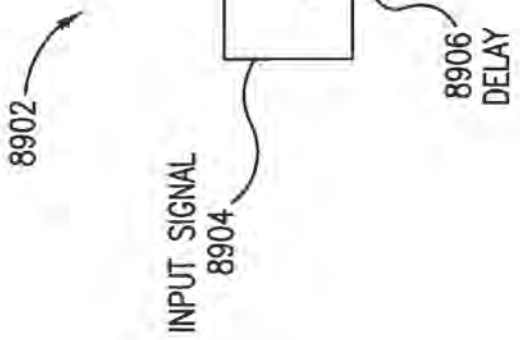


FIG.89A

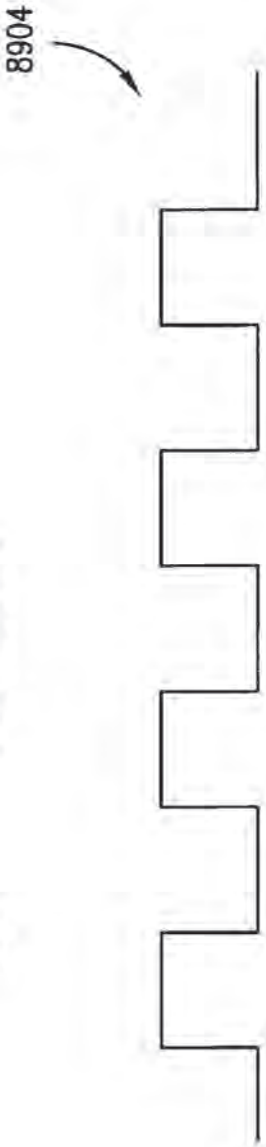


FIG.89B

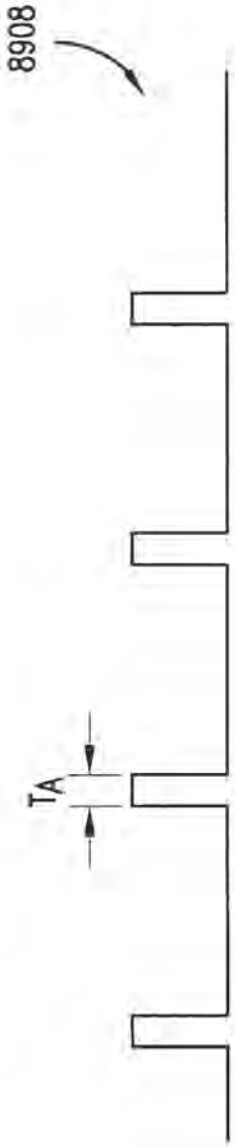


FIG.89C

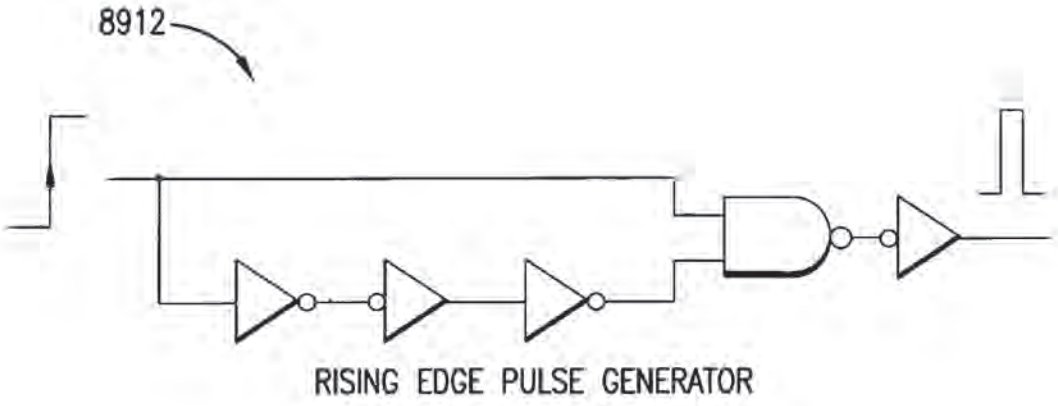


FIG.89D

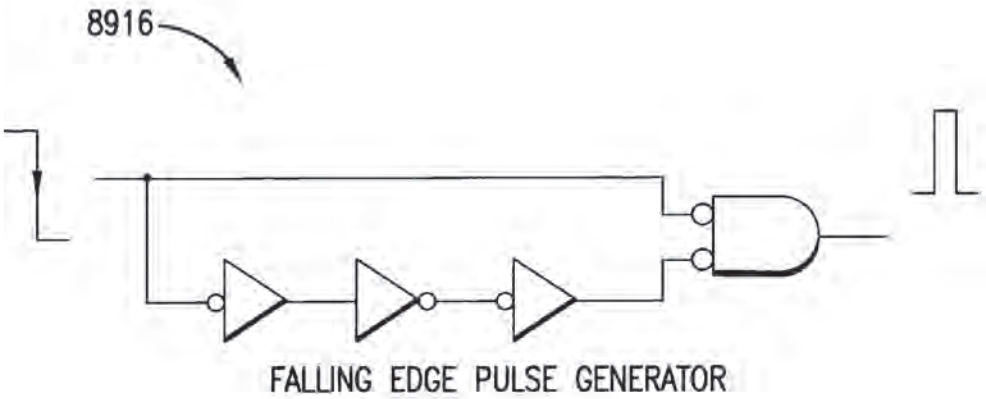


FIG.89E

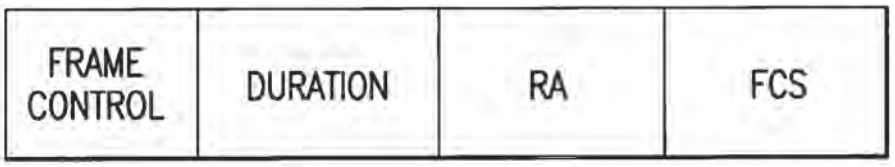

FRAME CONTROL
DURATION
RA
FCS
2
2
6
4

FIG.90

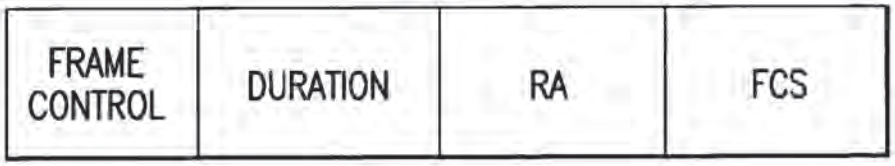

FRAME CONTROL
DURATION
RA
FCS
2
2
6
4

FIG.91

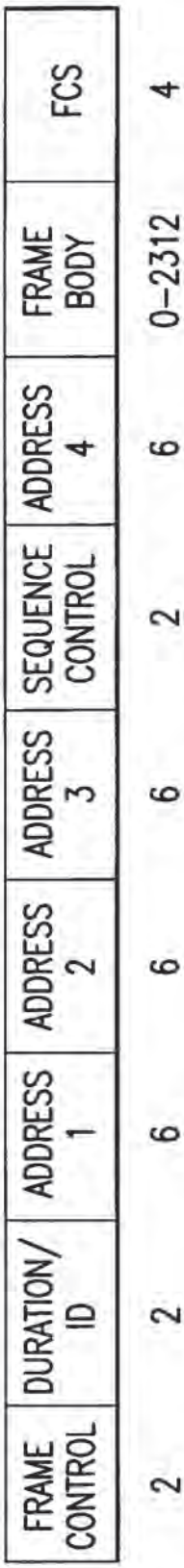

FRAME CONTROL
DURATION/ ID
ADDRESS 1
ADDRESS 2
ADDRESS 3
SEQUENCE CONTROL
ADDRESS 4
FRAME BODY
FCS
2
2
6
6
6
2
6
0–2312
4

FIG.92

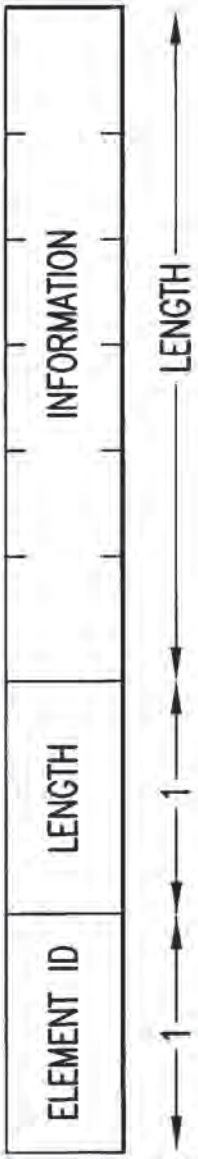

ELEMENT ID
LENGTH
INFORMATION
LENGTH
OCTETS:
1
1
1

FIG.93

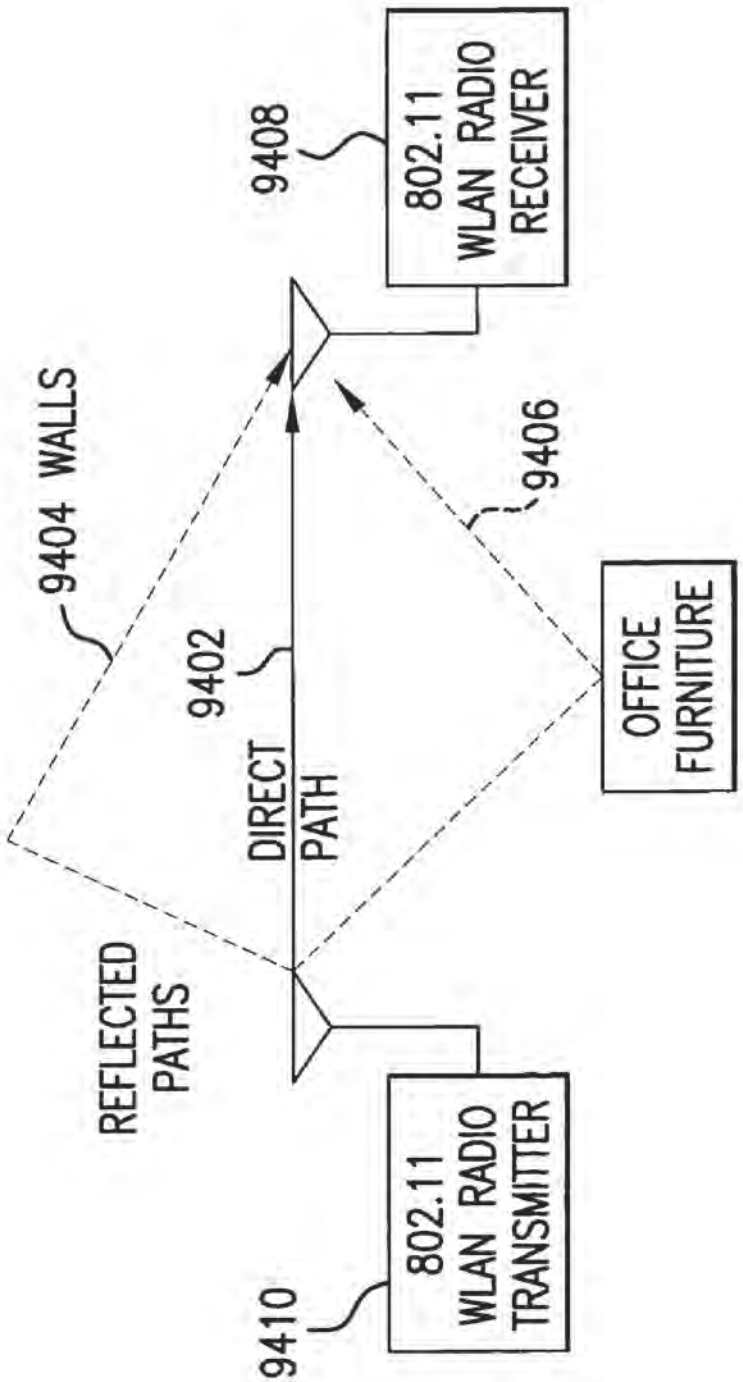

9408
802.11
WLAN RADIO
RECEIVER
9404 WALLS
9406
9402
DIRECT
PATH
OFFICE
FURNITURE
REFLECTED
PATHS
9410
802.11
WLAN RADIO
TRANSMITTER

FIG.94

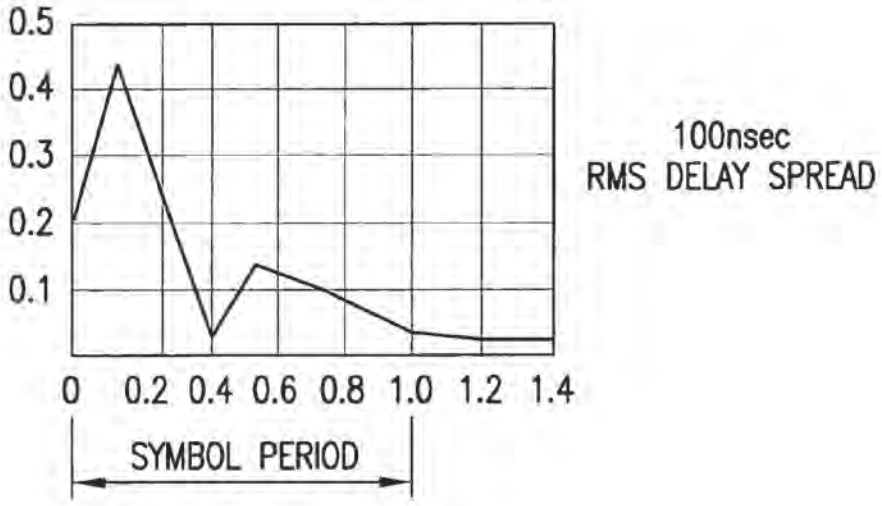

0.5
0.4
0.3
0.2
0.1
0 0.2 0.4 0.6 0.8 1.0 1.2 1.4
SYMBOL PERIOD
100nsec
RMS DELAY SPREAD

FIG.95

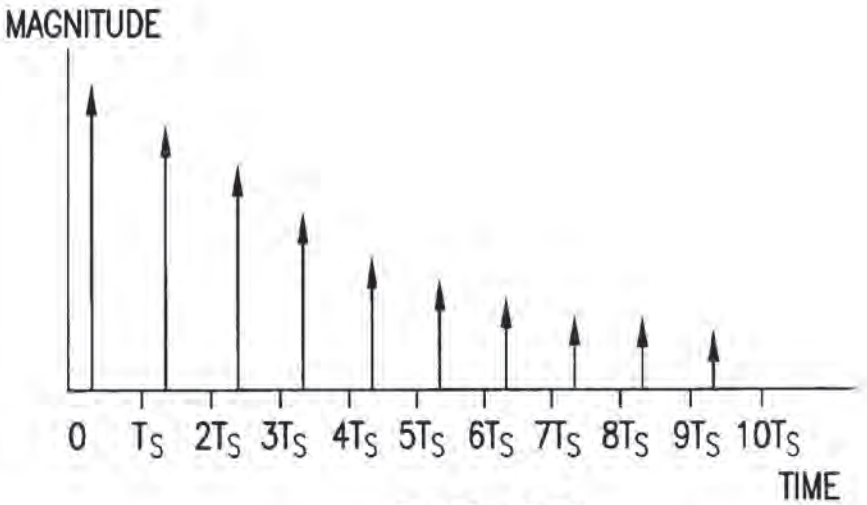

MAGNITUDE
0 T_S $2T_S$ $3T_S$ $4T_S$ $5T_S$ $6T_S$ $7T_S$ $8T_S$ $9T_S$ $10T_S$
TIME

FIG.96

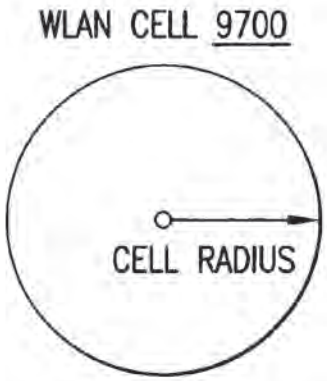
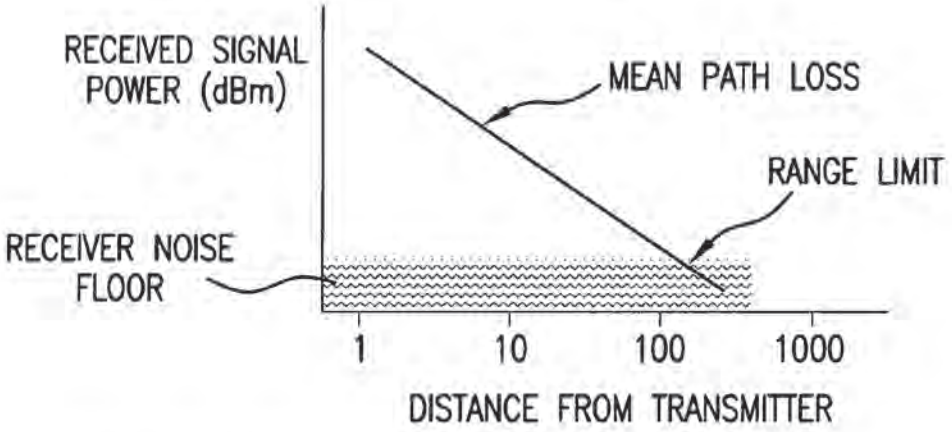


FIG.97



PATH LOSS (dB) = 20 LOG_{10} (4 x PI x D/LAMBDA)

WHERE:

r = D IS THE RADIUS OF THE WLAN CELL

LAMBDA = c/f WHERE: c = SPEED OF LIGHT (3 x $10^8 ms^{-1}$)

f = SIGNAL FREQUENCY IN Hz

FIG.98

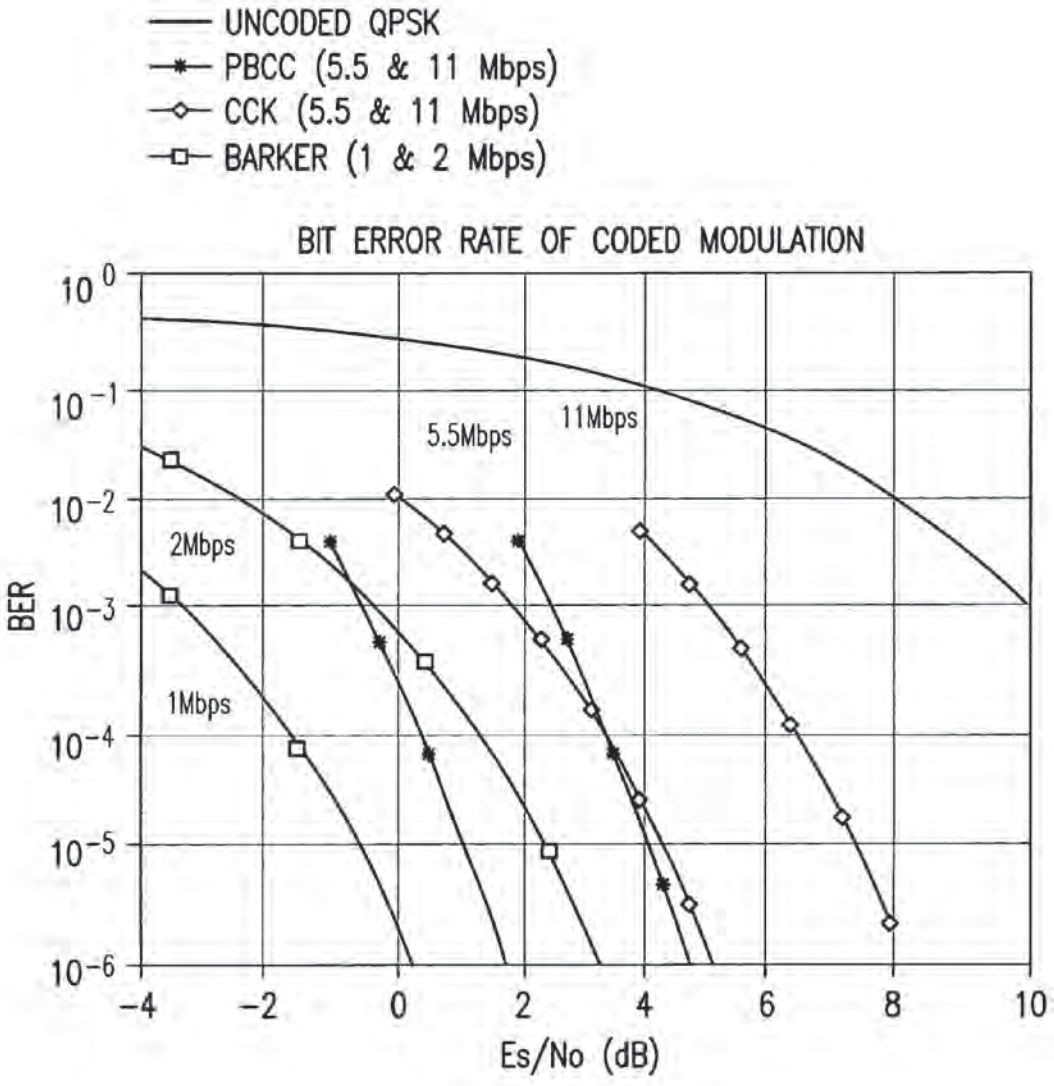

UNCODED QPSK
PBCC (5.5 & 11 Mbps)
CCK (5.5 & 11 Mbps)
BARKER (1 & 2 Mbps)
BIT ERROR RATE OF CODED MODULATION
BER
Es/No (dB)
11Mbps
5.5Mbps
2Mbps
1Mbps

FIG.99

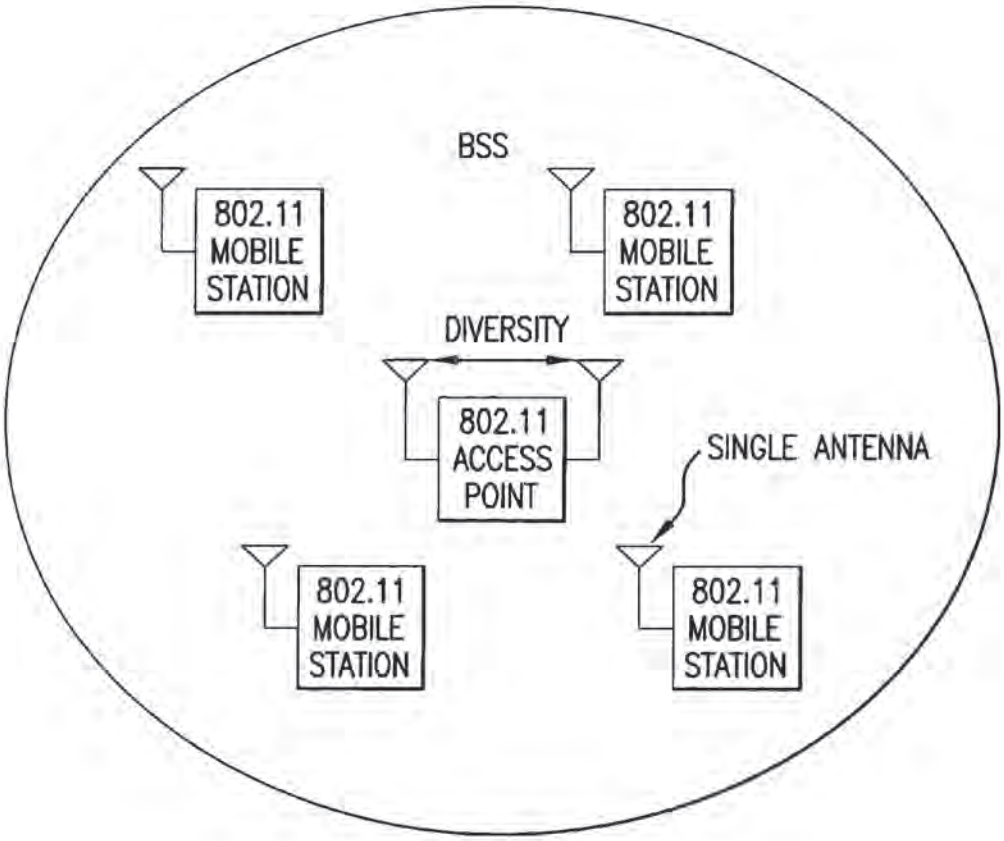

BSS
802.11 MOBILE STATION
802.11 MOBILE STATION
DIVERSITY
802.11 ACCESS POINT
SINGLE ANTENNA
802.11 MOBILE STATION
802.11 MOBILE STATION

FIG. 100

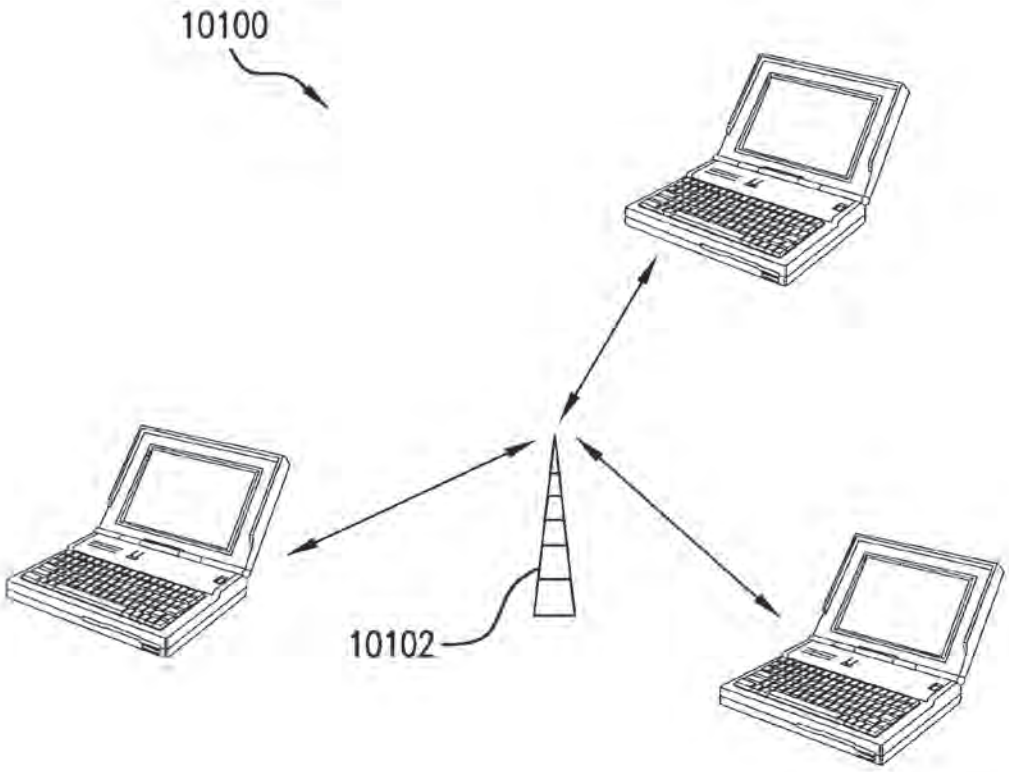


FIG.101A

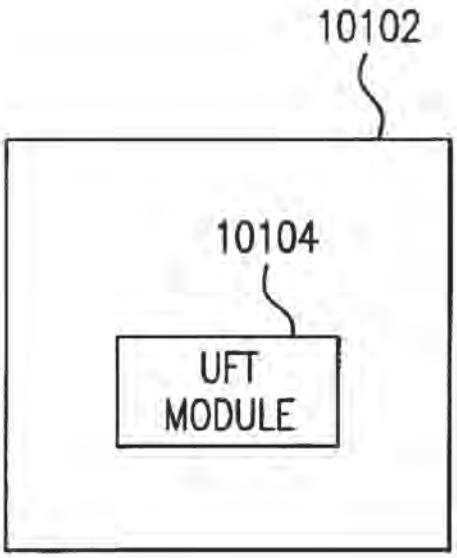


FIG. 101B

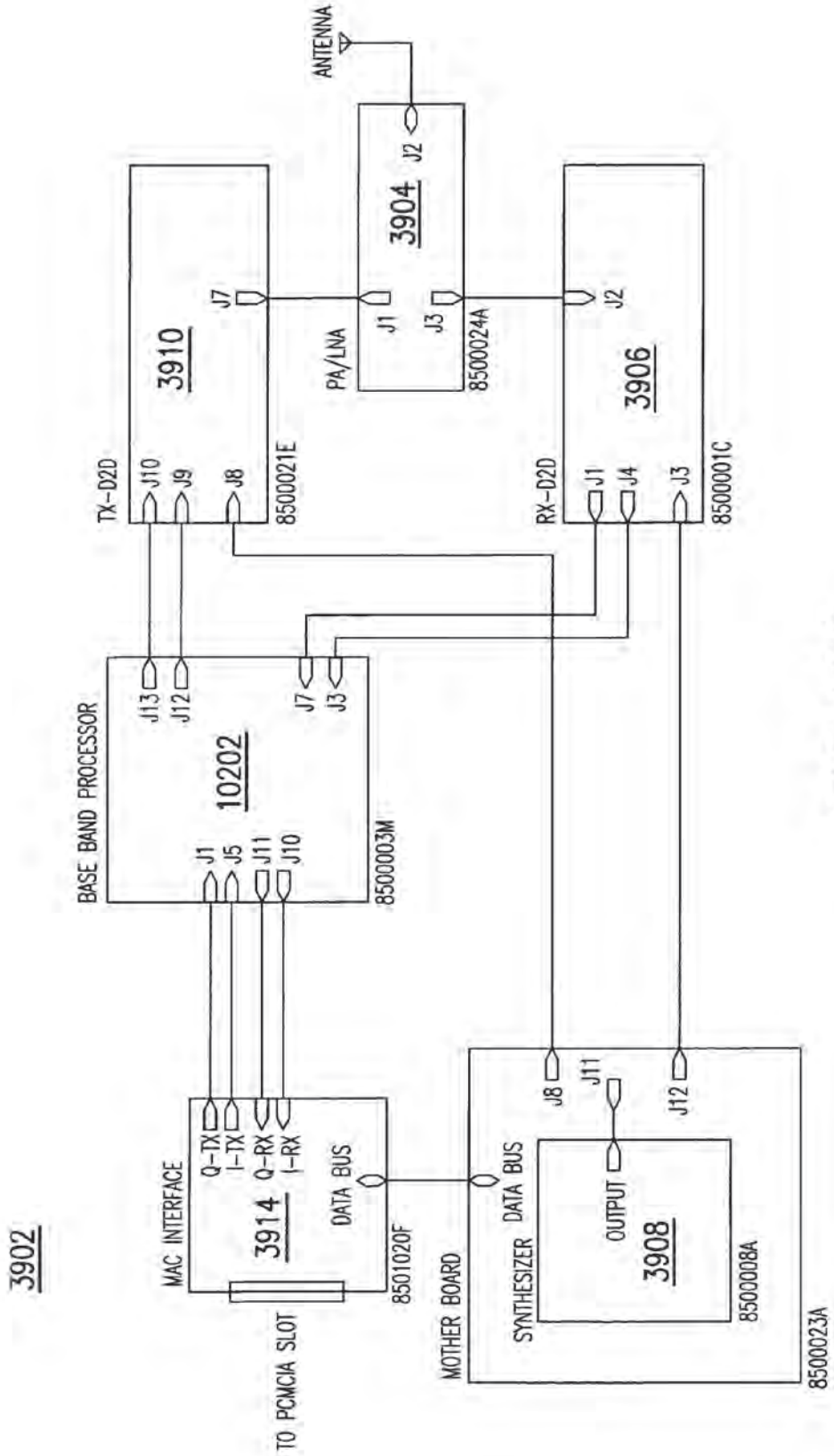

3902
ANTENNA
3904
J2
J1
J3
PA/LNA
8500024A
3910
J7
J10
J9
J8
TX-D2D
8500021E
3906
J2
J1
J4
J3
RX-D2D
8500001C
BASE BAND PROCESSOR
10202
J13
J12
J7
J3
J1
J5
J11
J10
8500003M
MAC INTERFACE
3914
Q-TX
I-TX
Q-RX
I-RX
DATA BUS
8501020F
TO PCMCIA SLOT
MOTHER BOARD
SYNTHESIZER
DATA BUS
J8
J11
J12
OUTPUT
3908
8500008A
8500023A

FIG. 102

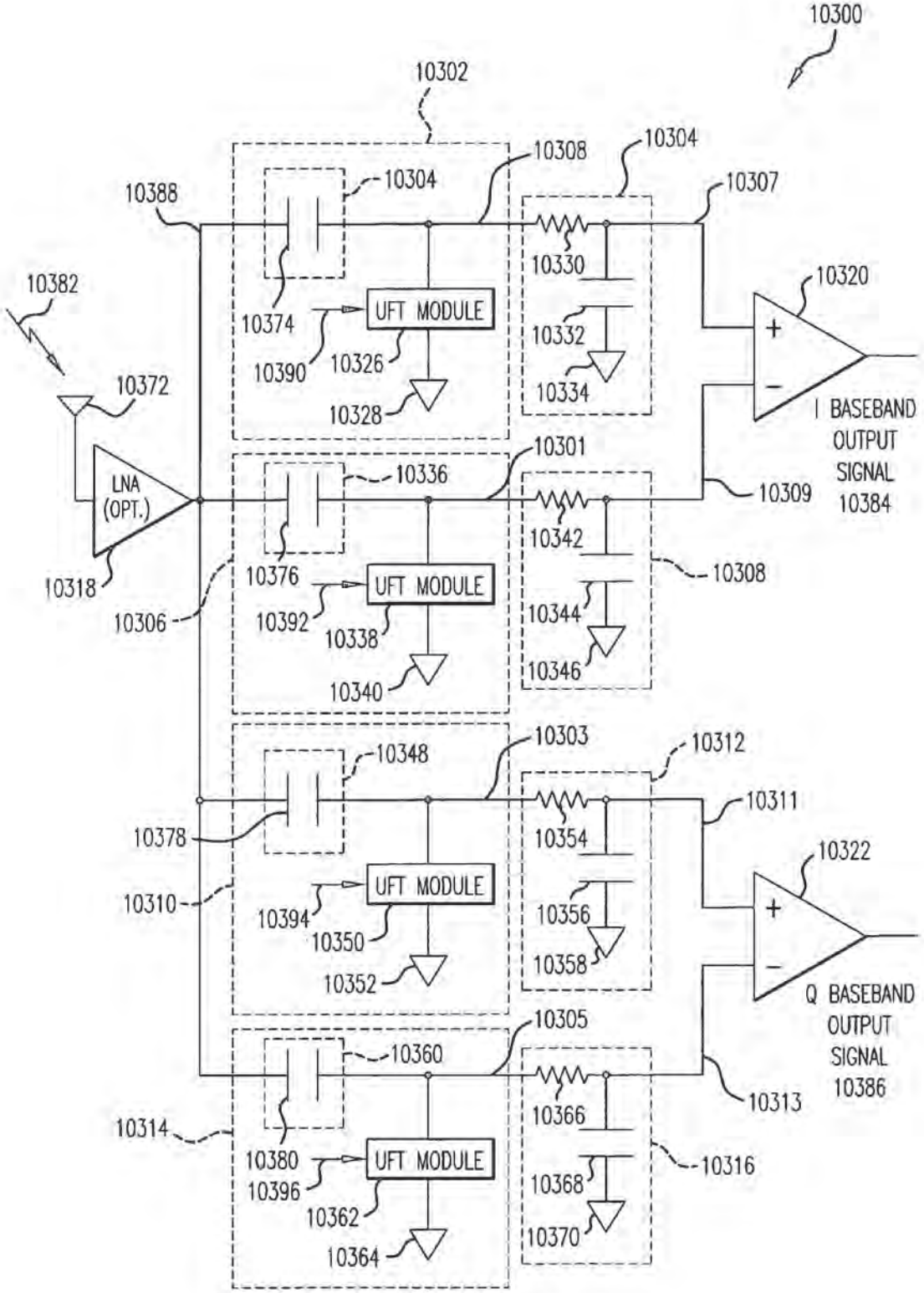

10300
10302
10304
10308
10304
10307
10388
10330
10320
10382
10374
UFT MODULE
10332
10390
10326
10334
10372
10328
I BASEBAND OUTPUT SIGNAL 10384
10301
10336
LNA (OPT.)
10309
10342
10318
10376
10308
UFT MODULE
10344
10306
10392
10338
10346
10340
10303
10312
10348
10311
10378
10354
10322
10310
UFT MODULE
10356
10394
10350
10358
10352
Q BASEBAND OUTPUT SIGNAL 10386
10305
10360
10313
10366
10314
10380
UFT MODULE
10316
10368
10396
10362
10370
10364

FIG. 103

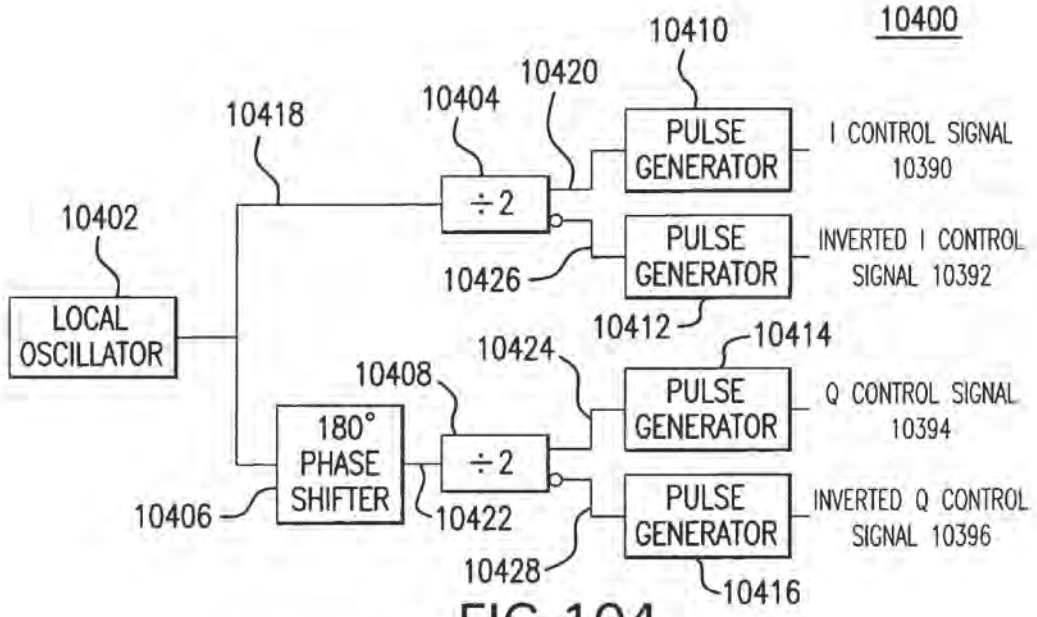


FIG.104

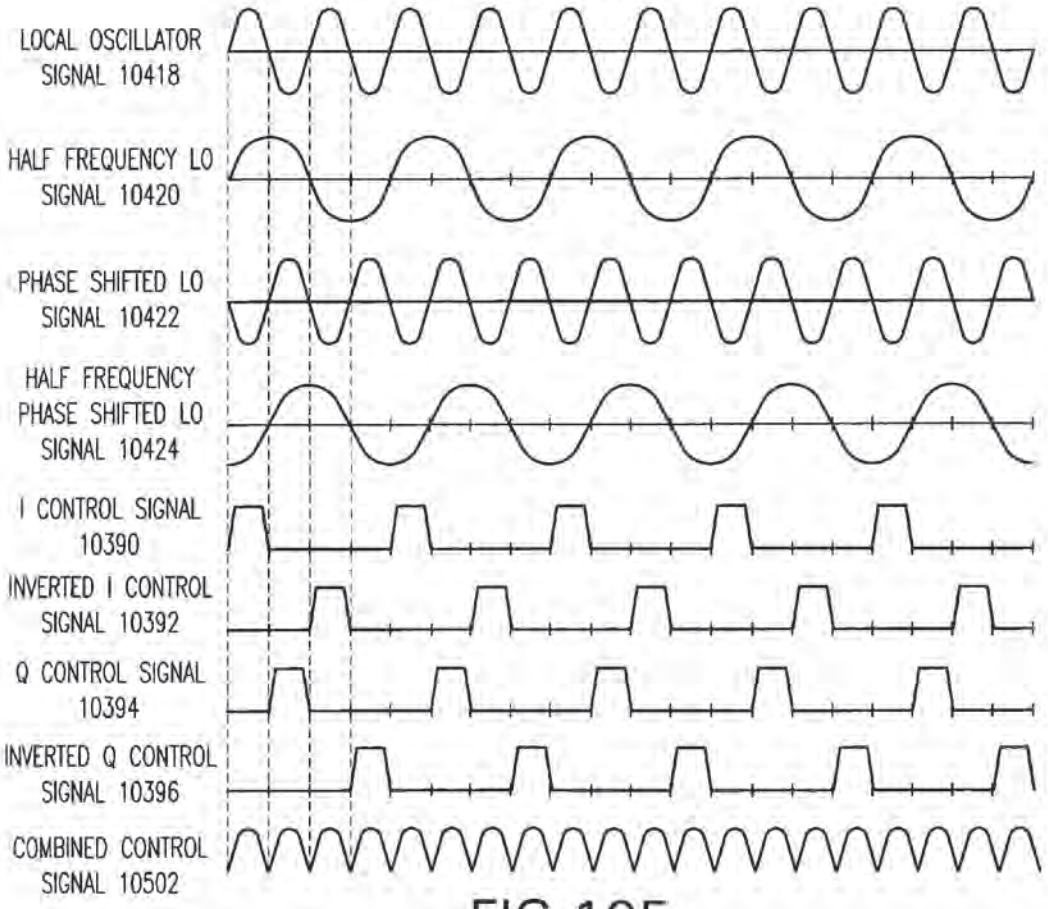


FIG.105

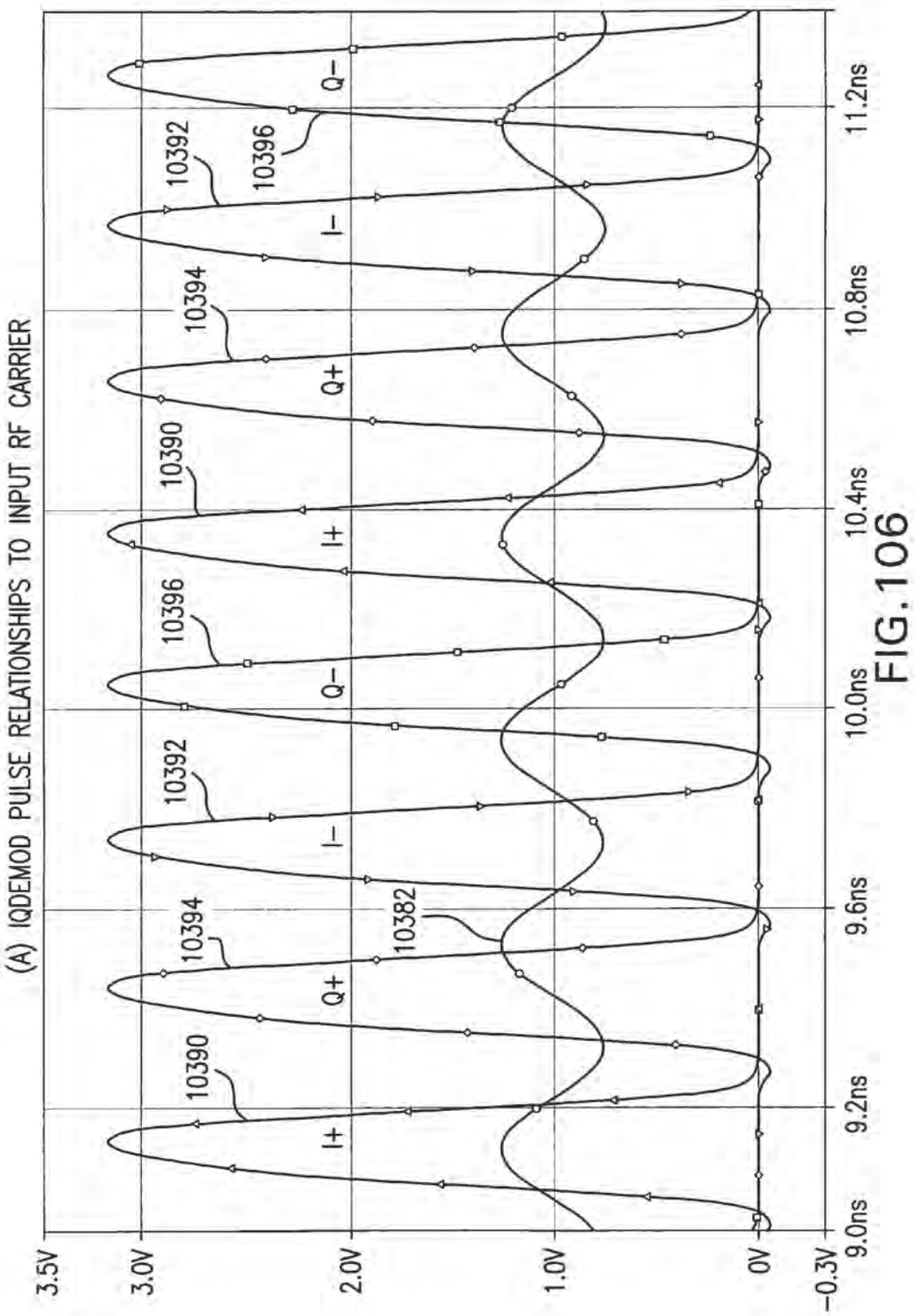

(A) IQDEMOD PULSE RELATIONSHIPS TO INPUT RF CARRIER
3.5V
3.0V
2.0V
1.0V
0V
−0.3V
9.0ns
9.2ns
9.6ns
10.0ns
10.4ns
10.8ns
11.2ns
I+
I−
Q+
Q−
10390
10392
10394
10396
10382

FIG.106

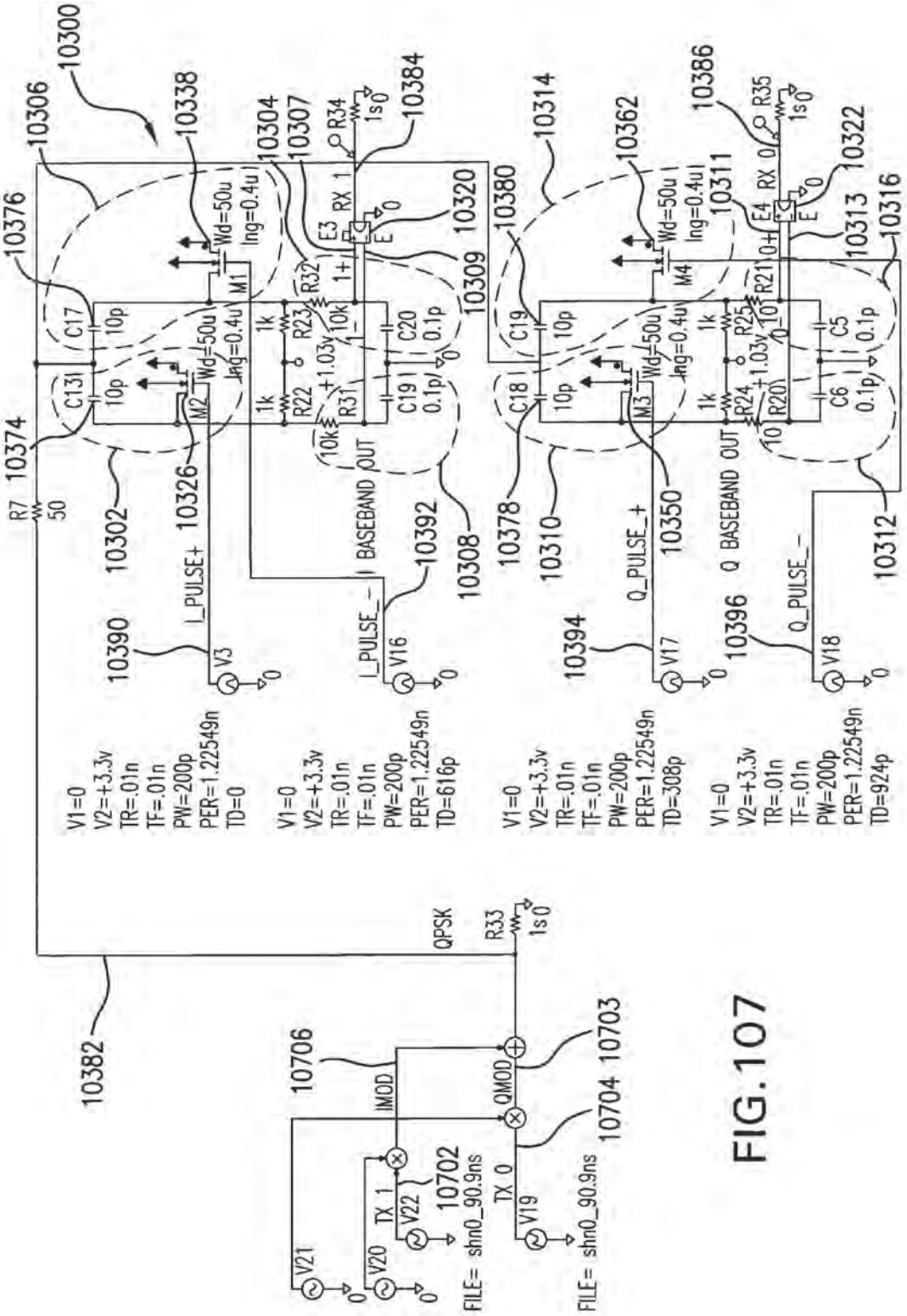

10300
10306
10376
10374
10338
10304
10307
10384
10320
10309
10326
10302
10390
10392
10308
10378
10310
10314
10380
10362
10386
10311
10322
10313
10316
10312
10350
10394
10396
R7
50
C131
10p
C17
10p
M2
Wd=50u
lng=0.4u
M1
1k
R22
R23
10k
R31
+1.03v
10k
R32
1+
E3
RX 1
R34
1s 0
C19
0.1p
C20
0.1p
I_PULSE+
I_PULSE_
BASEBAND OUT
V3
V16
V1=0
V2=+3.3v
TR=.01n
TF=.01n
PW=200p
PER=1.22549n
TD=0
TD=616p
C18
C19
M3
M4
R24
R25
R20
R21
10
E4
RX 0
R35
C6
C5
Q_PULSE_+
Q_PULSE_-
Q BASEBAND OUT
V17
V18
TD=308p
TD=924p
10382
QPSK
R33
10706
IMOD
QMOD
10703
10704
10702
TX 1
TX 0
V22
V19
V21
V20
FILE= shn0_90.9ns

FIG. 107

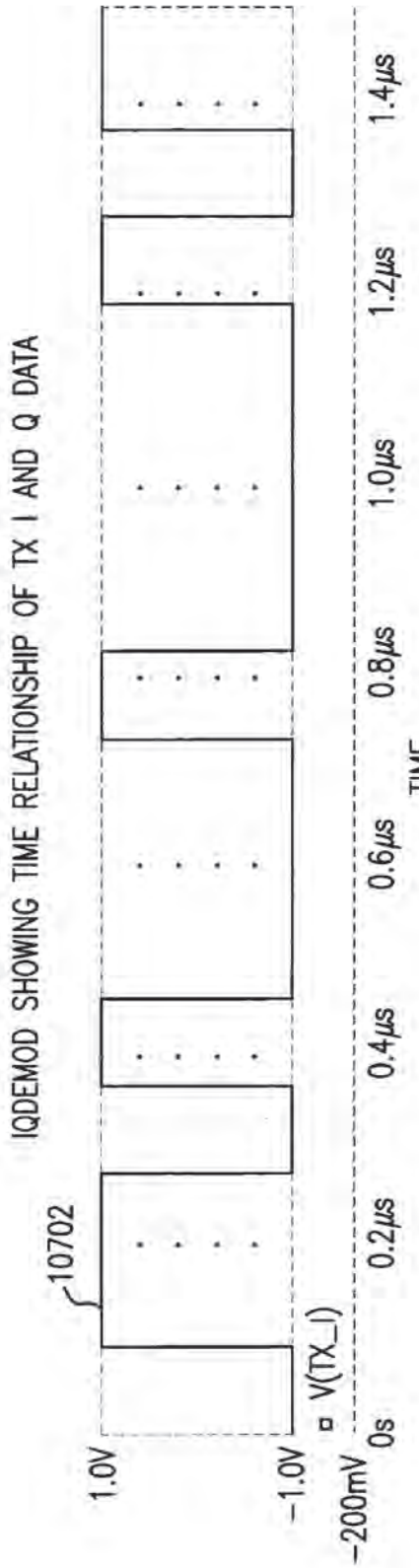


FIG.108

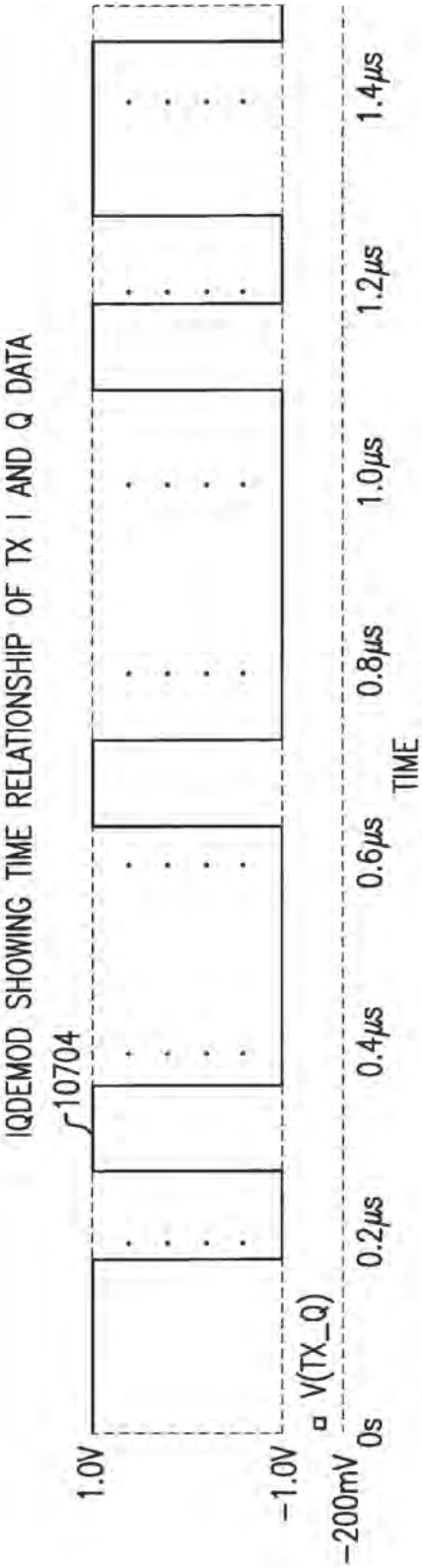


FIG.109

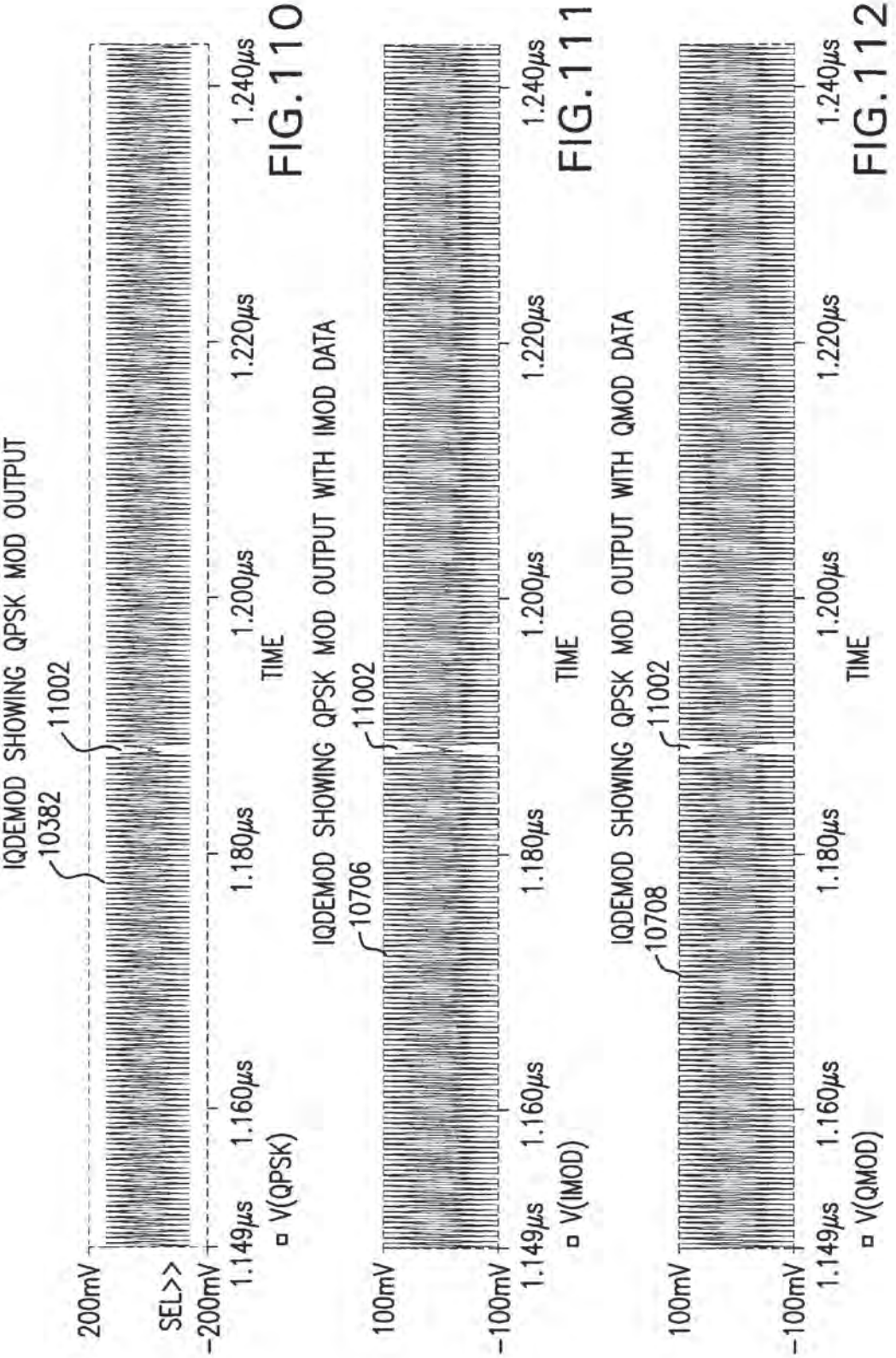


FIG.110

FIG.111

FIG.112

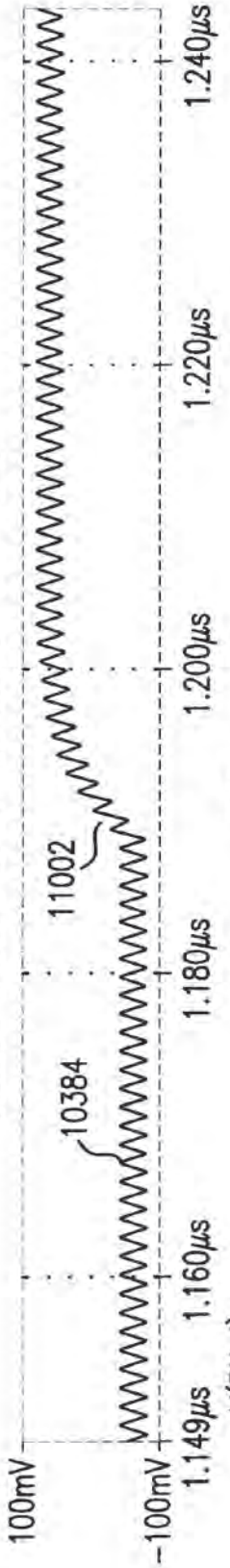


FIG.113



FIG.114

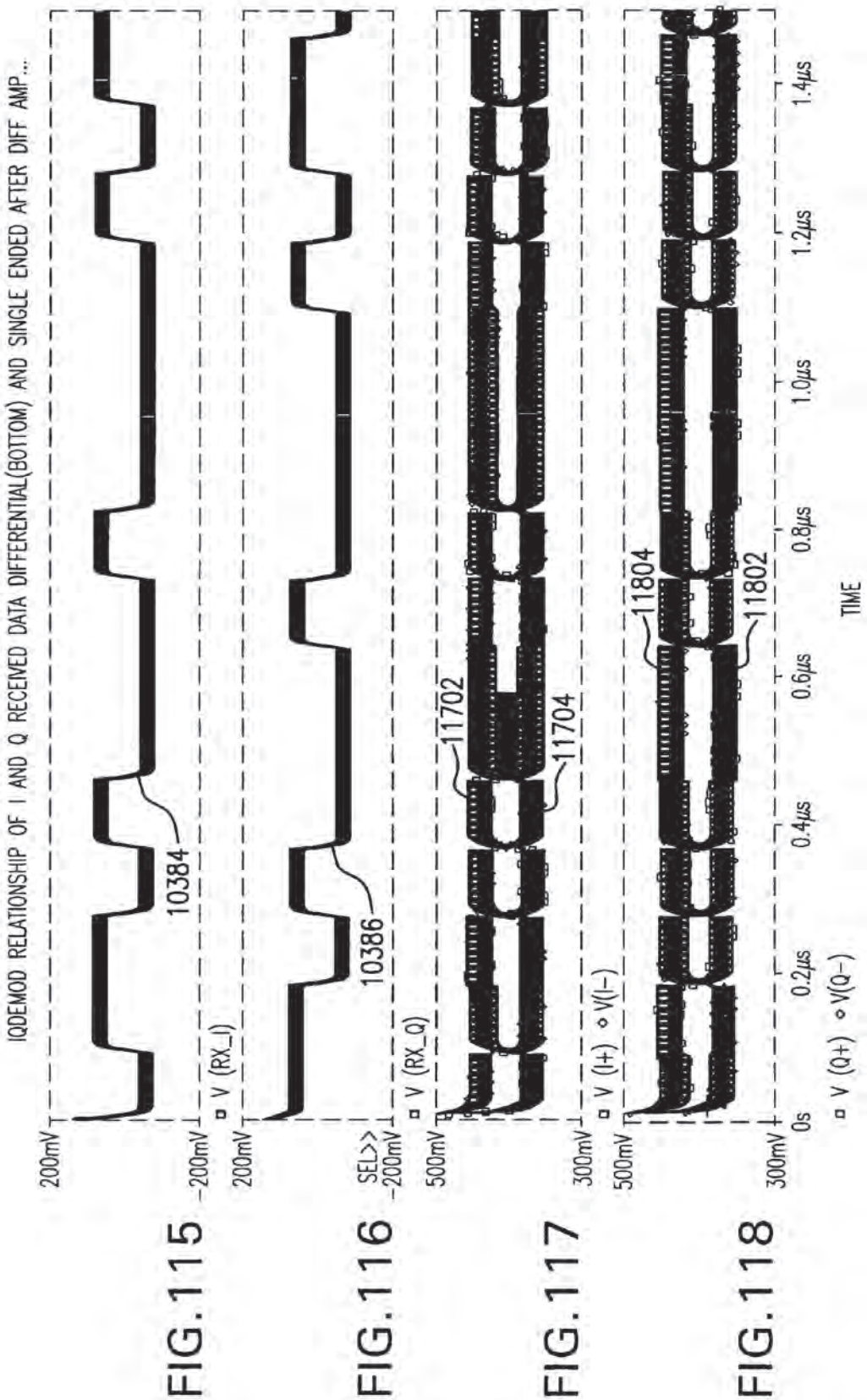


FIG.115

FIG.116

FIG.117

FIG.118

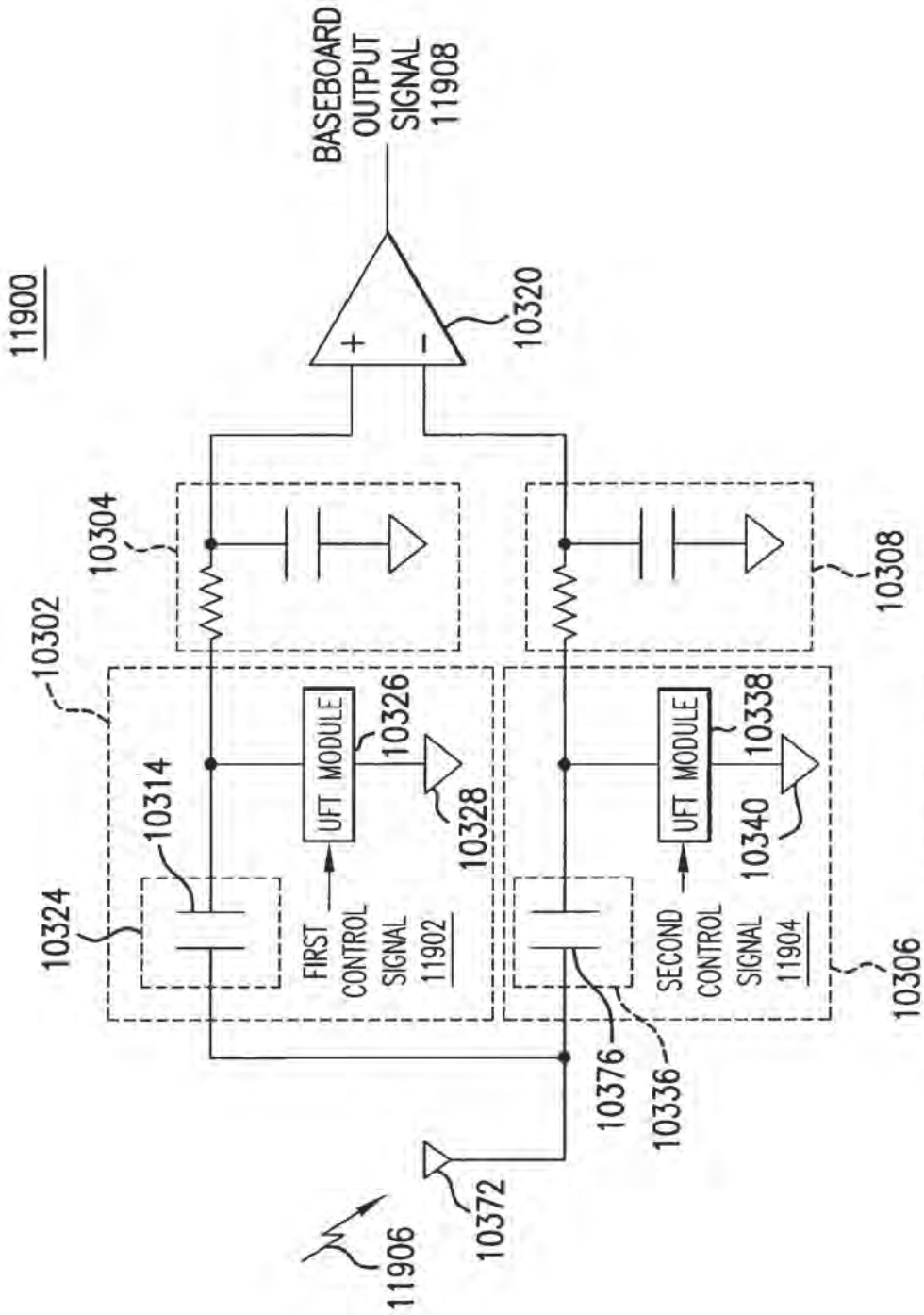

11900
BASEBOARD OUTPUT SIGNAL 11908
10320
10304
10308
10302
10314
UFT MODULE
10326
10328
FIRST CONTROL SIGNAL 11902
10324
10338
10340
SECOND CONTROL SIGNAL 11904
10306
10376
10336
10372
11906

FIG. 119

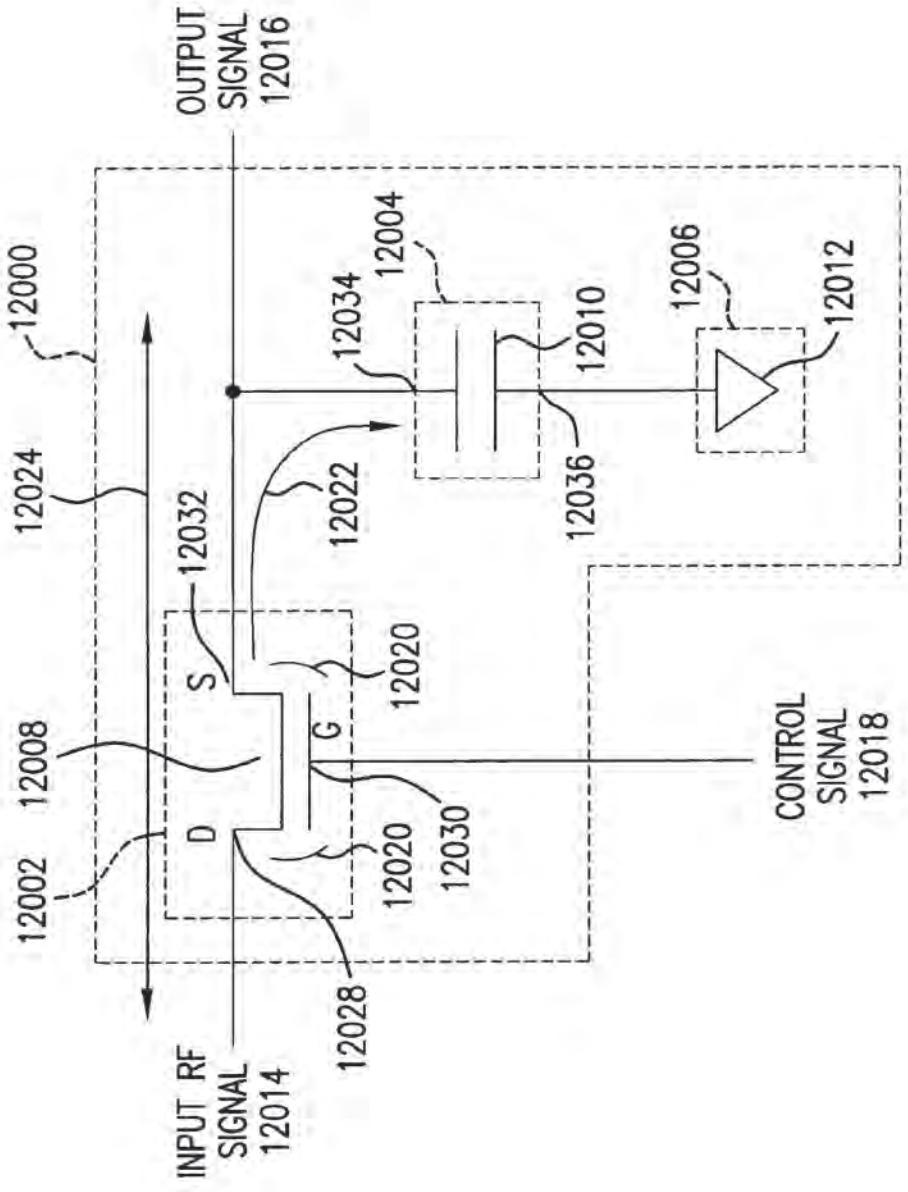

OUTPUT SIGNAL 12016
12000
12004
12034
12010
12006
12012
12024
12032
12022
12036
12008
S
12020
G
CONTROL SIGNAL 12018
12002
D
12020
12030
12028
INPUT RF SIGNAL 12014

FIG. 120

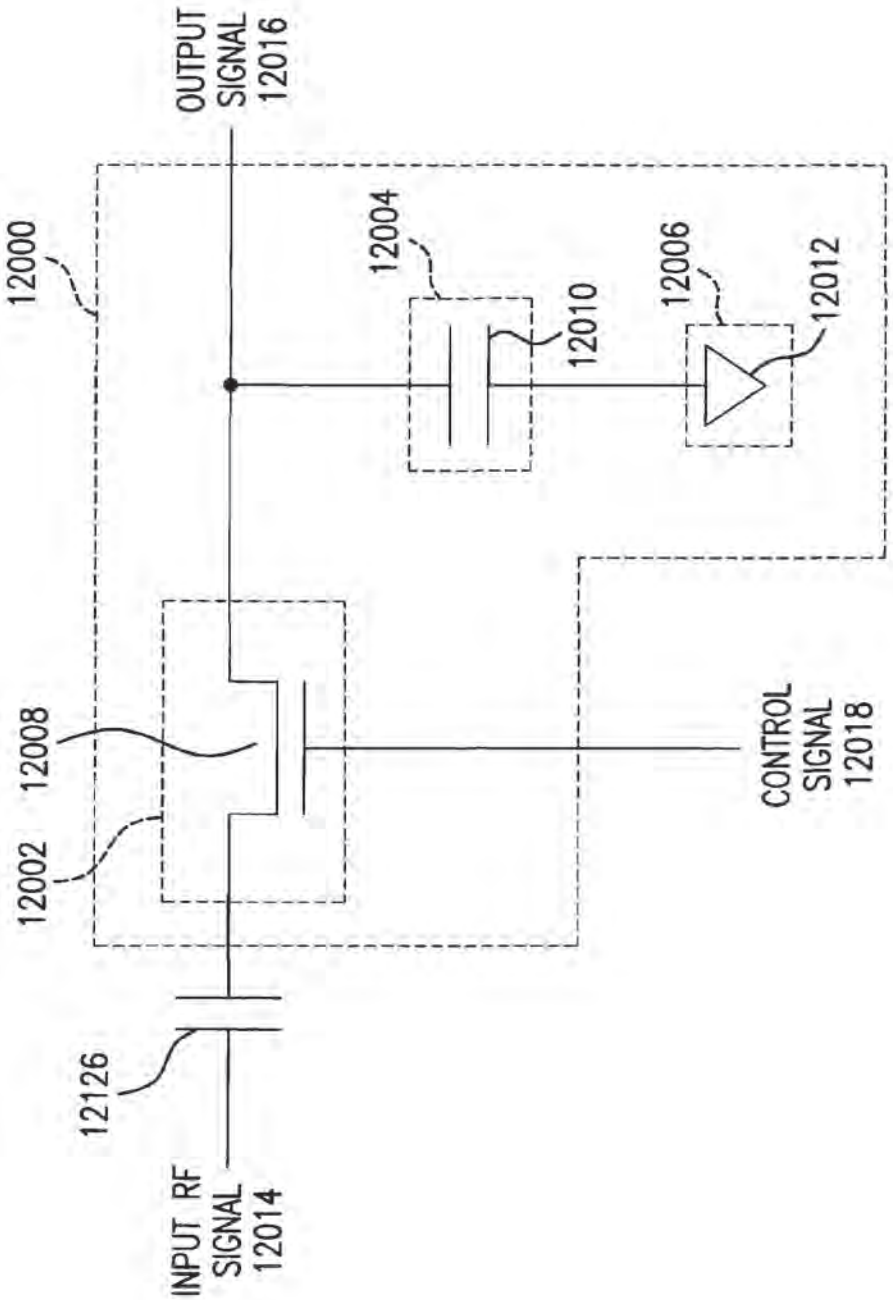

OUTPUT SIGNAL 12016
12000
12004
12010
12006
12012
12008
12002
CONTROL SIGNAL 12018
12126
INPUT RF SIGNAL 12014

FIG. 121

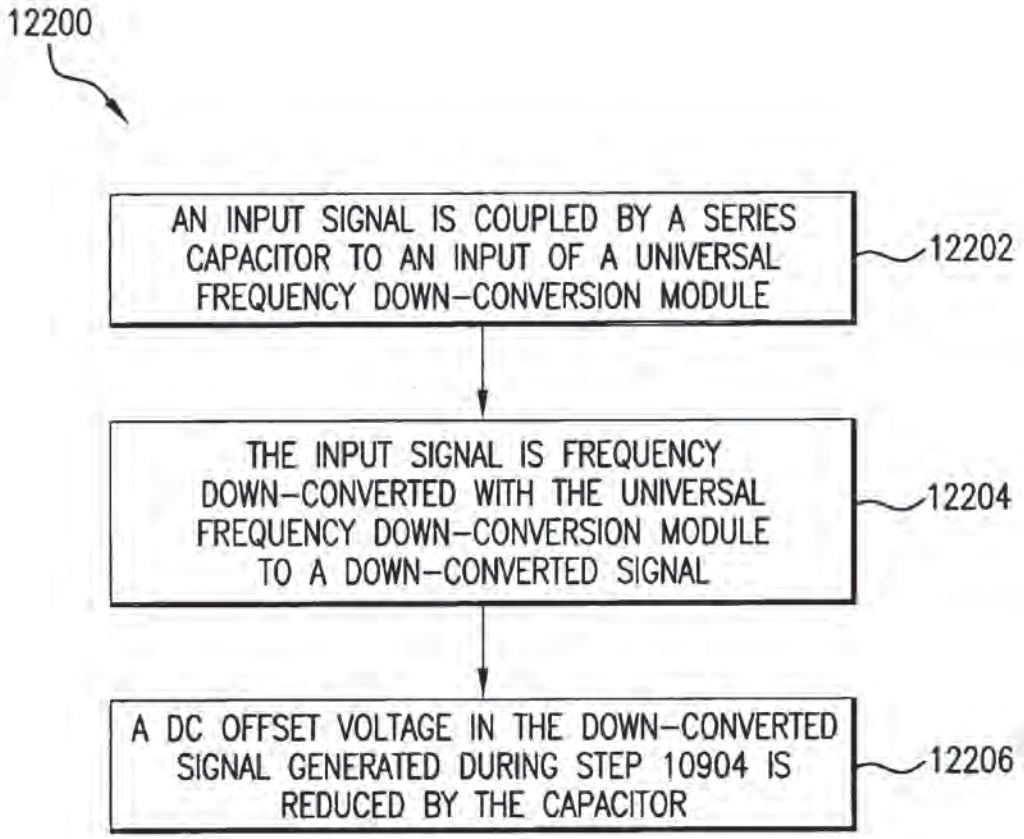

12200
AN INPUT SIGNAL IS COUPLED BY A SERIES CAPACITOR TO AN INPUT OF A UNIVERSAL FREQUENCY DOWN-CONVERSION MODULE
12202
THE INPUT SIGNAL IS FREQUENCY DOWN-CONVERTED WITH THE UNIVERSAL FREQUENCY DOWN-CONVERSION MODULE TO A DOWN-CONVERTED SIGNAL
12204
A DC OFFSET VOLTAGE IN THE DOWN-CONVERTED SIGNAL GENERATED DURING STEP 10904 IS REDUCED BY THE CAPACITOR
12206

FIG.122

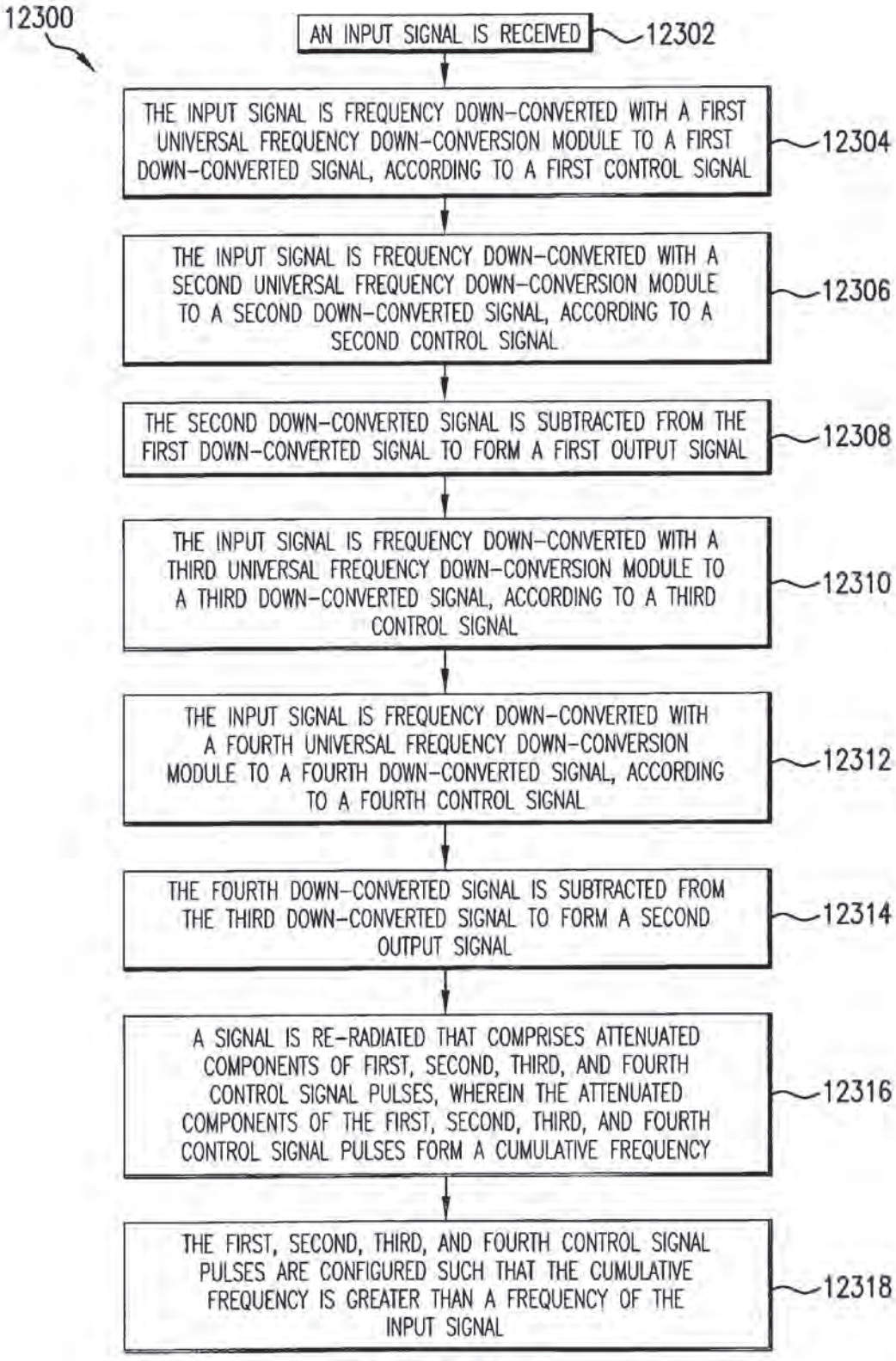

12300
AN INPUT SIGNAL IS RECEIVED
12302
THE INPUT SIGNAL IS FREQUENCY DOWN-CONVERTED WITH A FIRST UNIVERSAL FREQUENCY DOWN-CONVERSION MODULE TO A FIRST DOWN-CONVERTED SIGNAL, ACCORDING TO A FIRST CONTROL SIGNAL
12304
THE INPUT SIGNAL IS FREQUENCY DOWN-CONVERTED WITH A SECOND UNIVERSAL FREQUENCY DOWN-CONVERSION MODULE TO A SECOND DOWN-CONVERTED SIGNAL, ACCORDING TO A SECOND CONTROL SIGNAL
12306
THE SECOND DOWN-CONVERTED SIGNAL IS SUBTRACTED FROM THE FIRST DOWN-CONVERTED SIGNAL TO FORM A FIRST OUTPUT SIGNAL
12308
THE INPUT SIGNAL IS FREQUENCY DOWN-CONVERTED WITH A THIRD UNIVERSAL FREQUENCY DOWN-CONVERSION MODULE TO A THIRD DOWN-CONVERTED SIGNAL, ACCORDING TO A THIRD CONTROL SIGNAL
12310
THE INPUT SIGNAL IS FREQUENCY DOWN-CONVERTED WITH A FOURTH UNIVERSAL FREQUENCY DOWN-CONVERSION MODULE TO A FOURTH DOWN-CONVERTED SIGNAL, ACCORDING TO A FOURTH CONTROL SIGNAL
12312
THE FOURTH DOWN-CONVERTED SIGNAL IS SUBTRACTED FROM THE THIRD DOWN-CONVERTED SIGNAL TO FORM A SECOND OUTPUT SIGNAL
12314
A SIGNAL IS RE-RADIATED THAT COMPRISES ATTENUATED COMPONENTS OF FIRST, SECOND, THIRD, AND FOURTH CONTROL SIGNAL PULSES, WHEREIN THE ATTENUATED COMPONENTS OF THE FIRST, SECOND, THIRD, AND FOURTH CONTROL SIGNAL PULSES FORM A CUMULATIVE FREQUENCY
12316
THE FIRST, SECOND, THIRD, AND FOURTH CONTROL SIGNAL PULSES ARE CONFIGURED SUCH THAT THE CUMULATIVE FREQUENCY IS GREATER THAN A FREQUENCY OF THE INPUT SIGNAL
12318

FIG.123

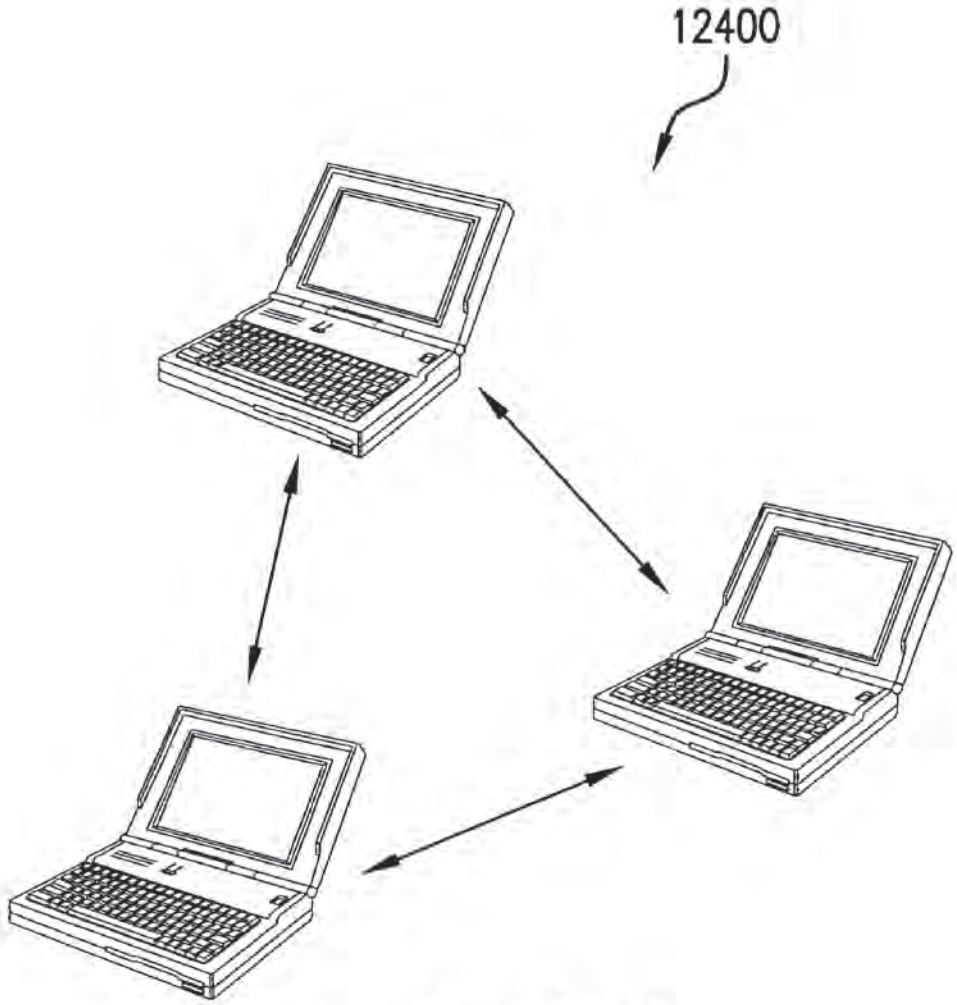


FIG. 124

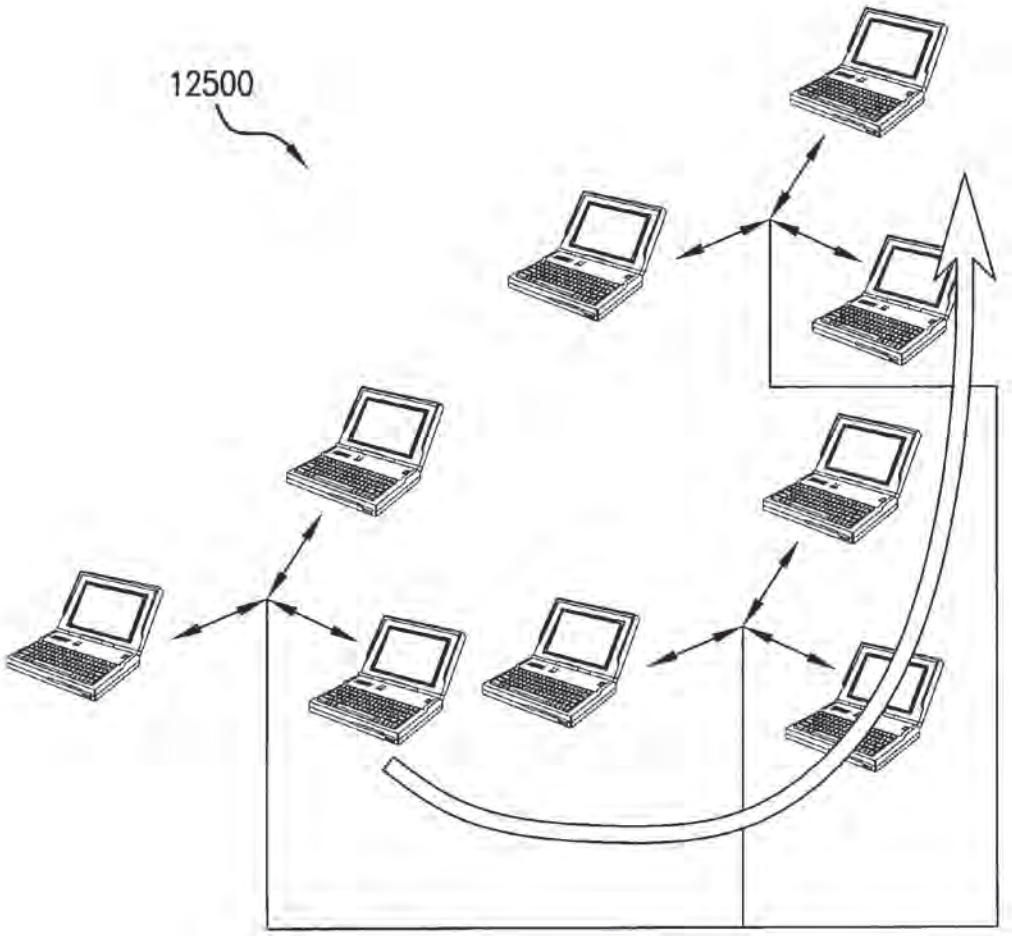


FIG. 125

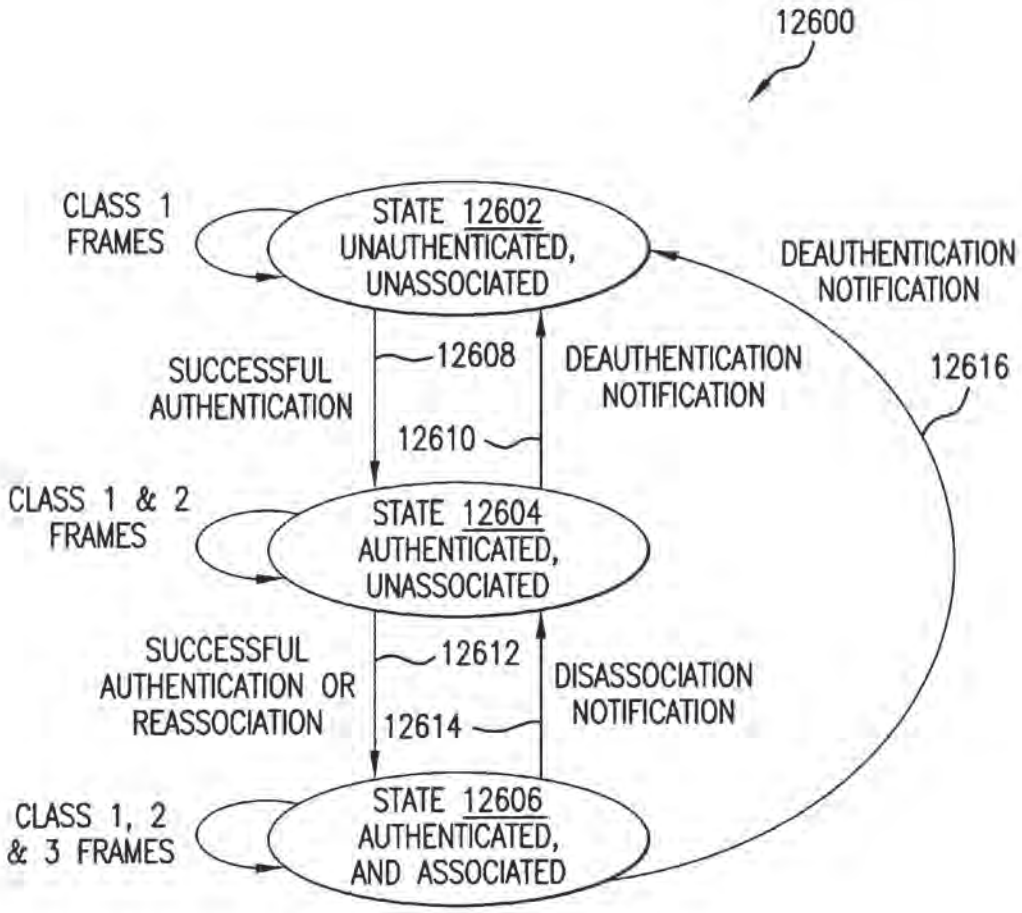

12600
CLASS 1 FRAMES
STATE 12602 UNAUTHENTICATED, UNASSOCIATED
DEAUTHENTICATION NOTIFICATION
SUCCESSFUL AUTHENTICATION
12608
DEAUTHENTICATION NOTIFICATION
12616
12610
CLASS 1 & 2 FRAMES
STATE 12604 AUTHENTICATED, UNASSOCIATED
SUCCESSFUL AUTHENTICATION OR REASSOCIATION
12612
DISASSOCIATION NOTIFICATION
12614
CLASS 1, 2 & 3 FRAMES
STATE 12606 AUTHENTICATED, AND ASSOCIATED

FIG. 126

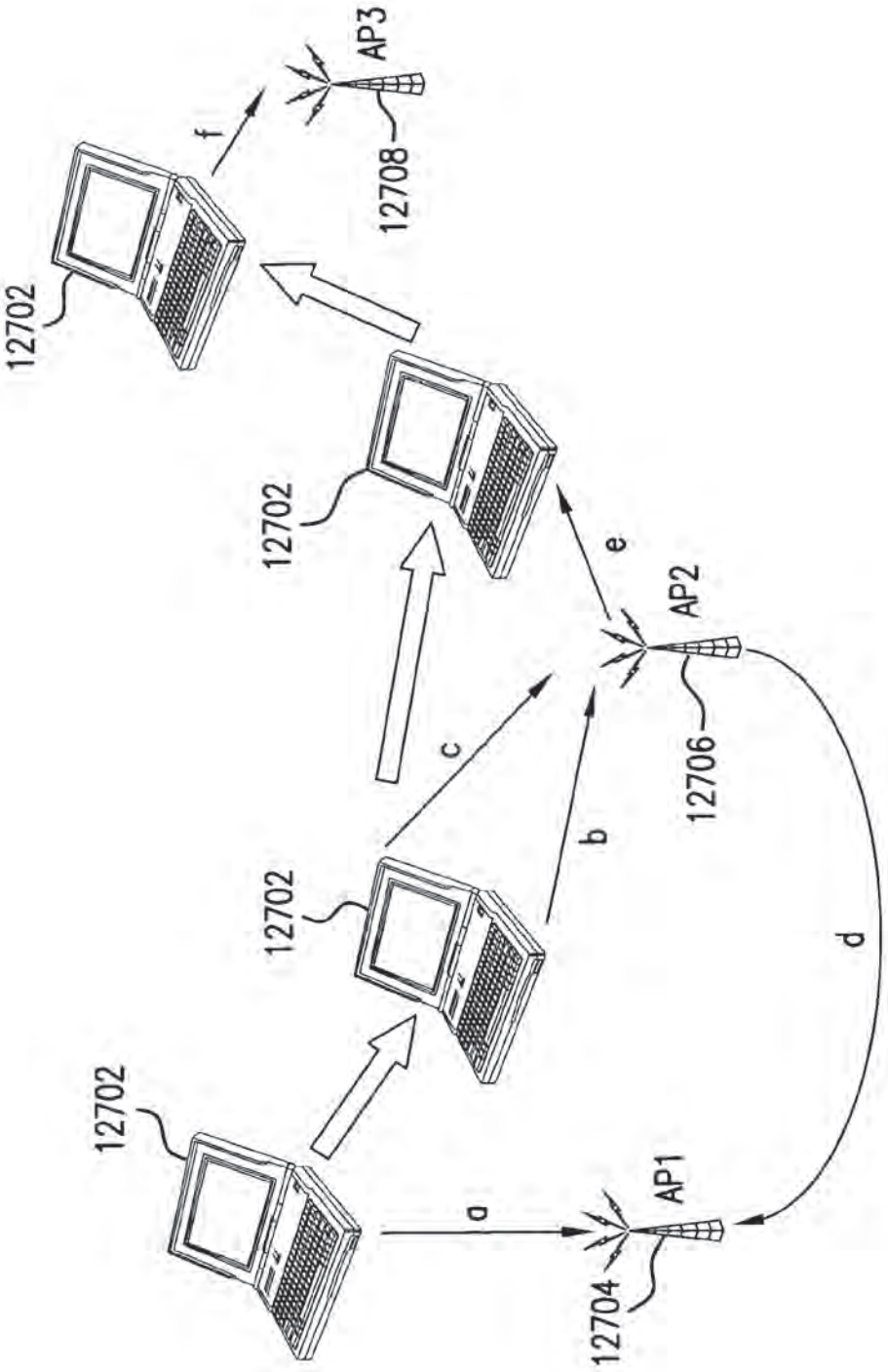

12702
12702
12702
12702
12702
AP1
AP2
AP3
12704
12706
12708
a
b
c
d
e
f

FIG. 127

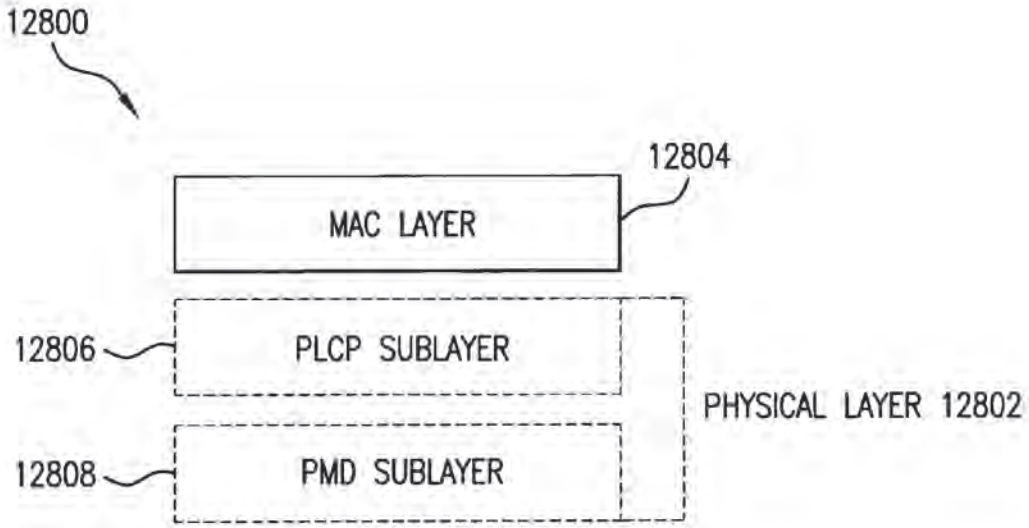

12800
12804
MAC LAYER
12806
PLCP SUBLAYER
PHYSICAL LAYER 12802
12808
PMD SUBLAYER

FIG. 128A

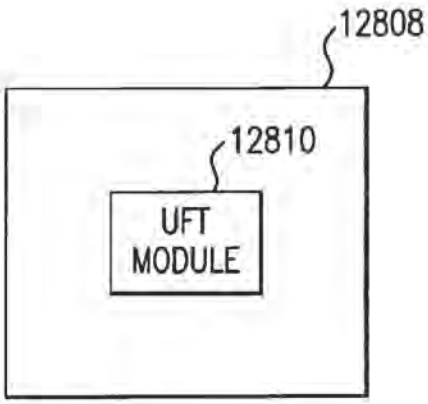


FIG.128B

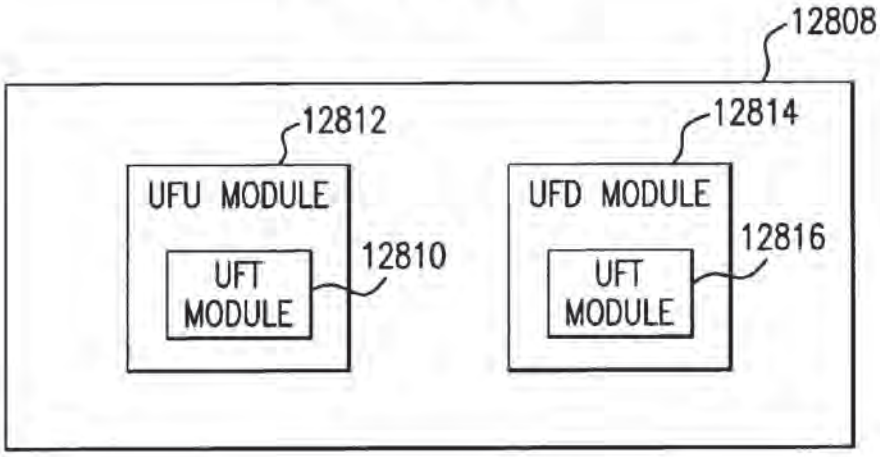


FIG.128C

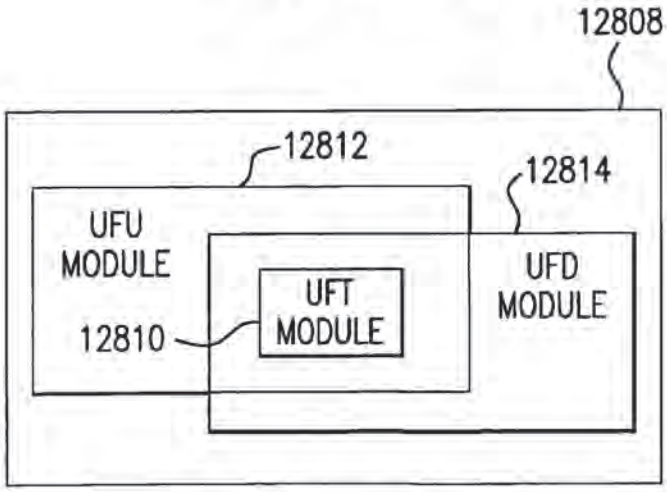


FIG.128D

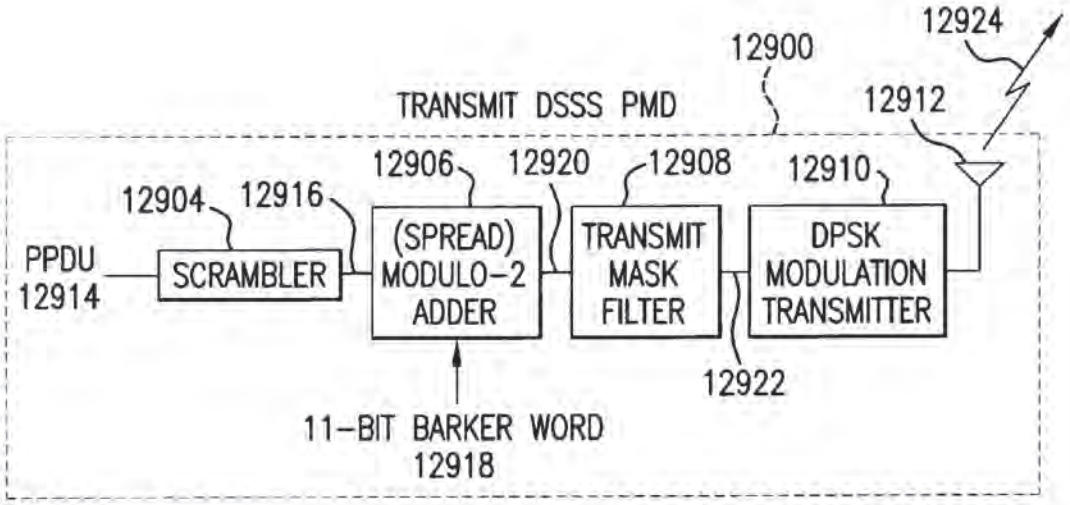


FIG.129A

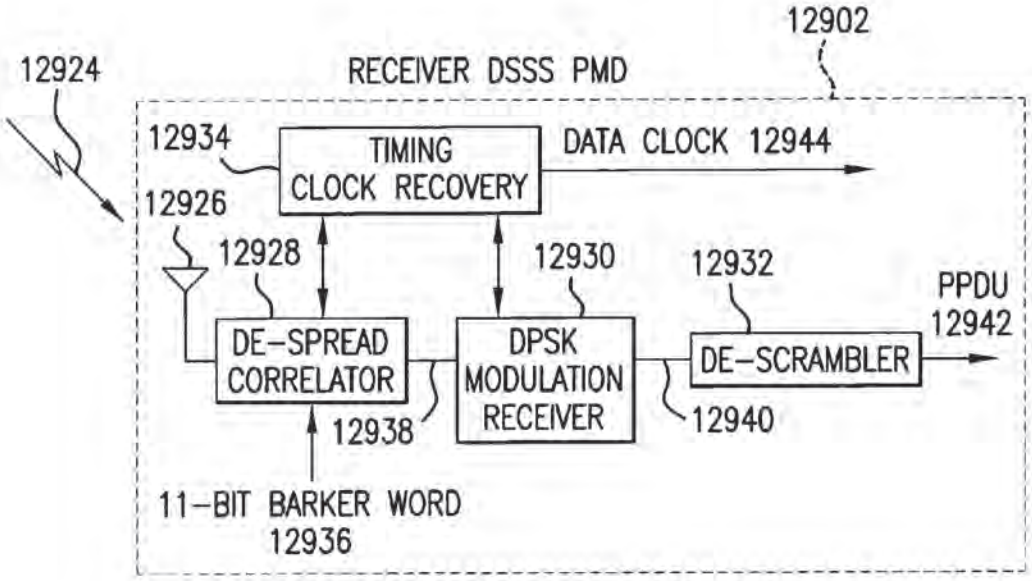


FIG.129B

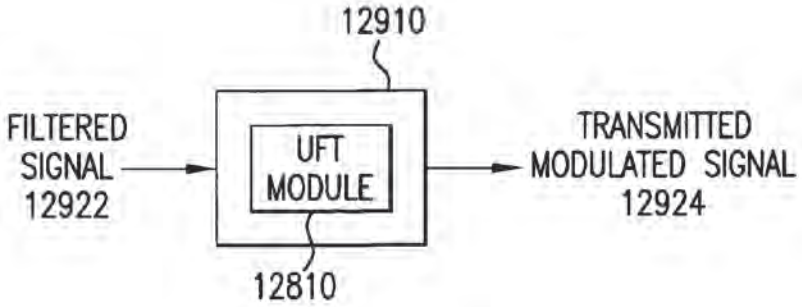


FIG.129C

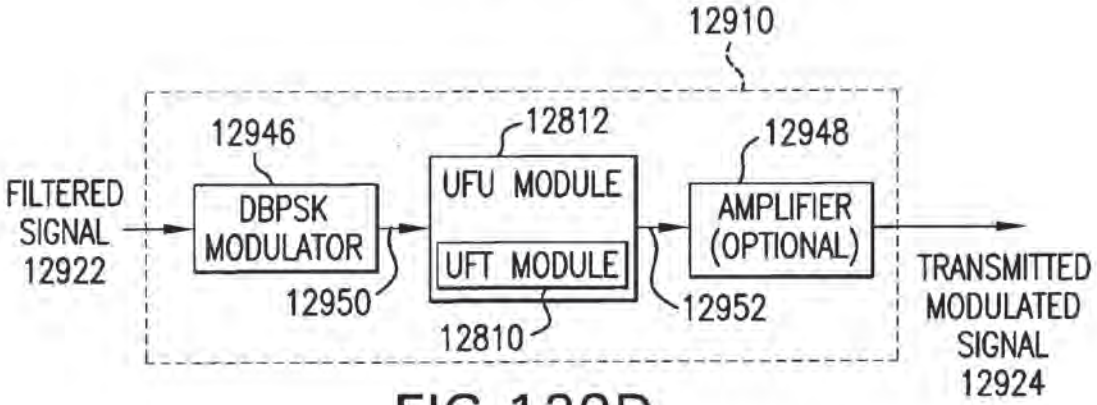


FIG.129D

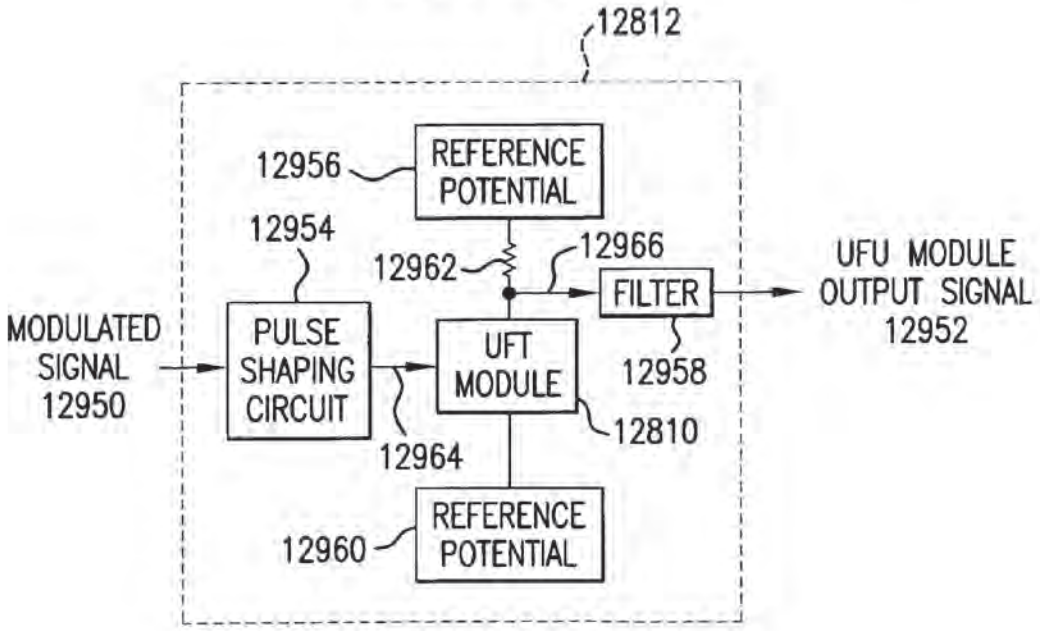


FIG.129E

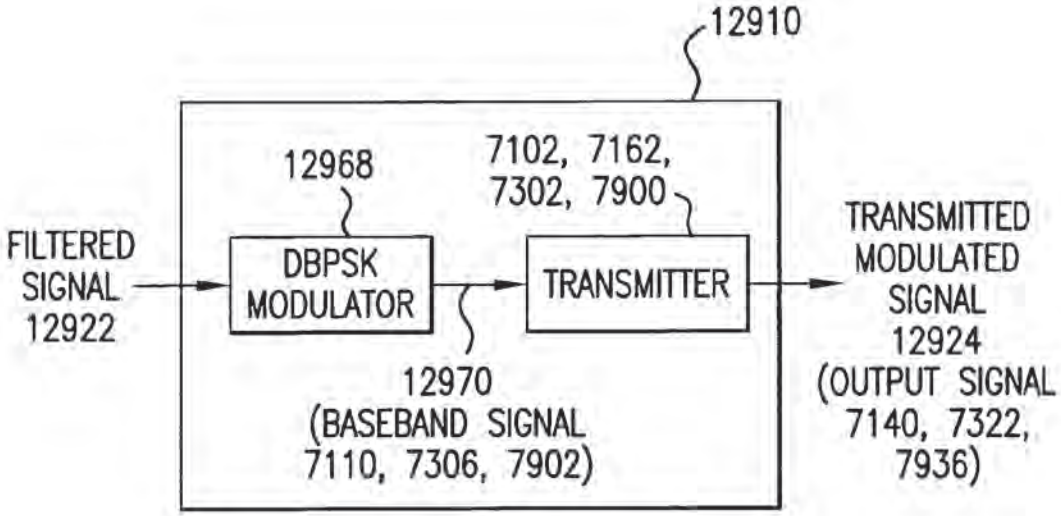


FIG. 129F

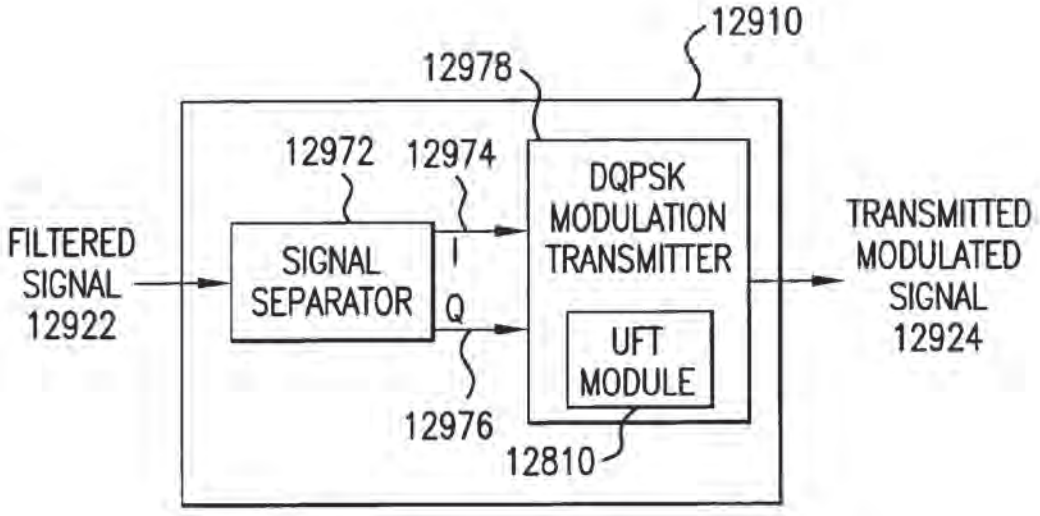


FIG. 129G

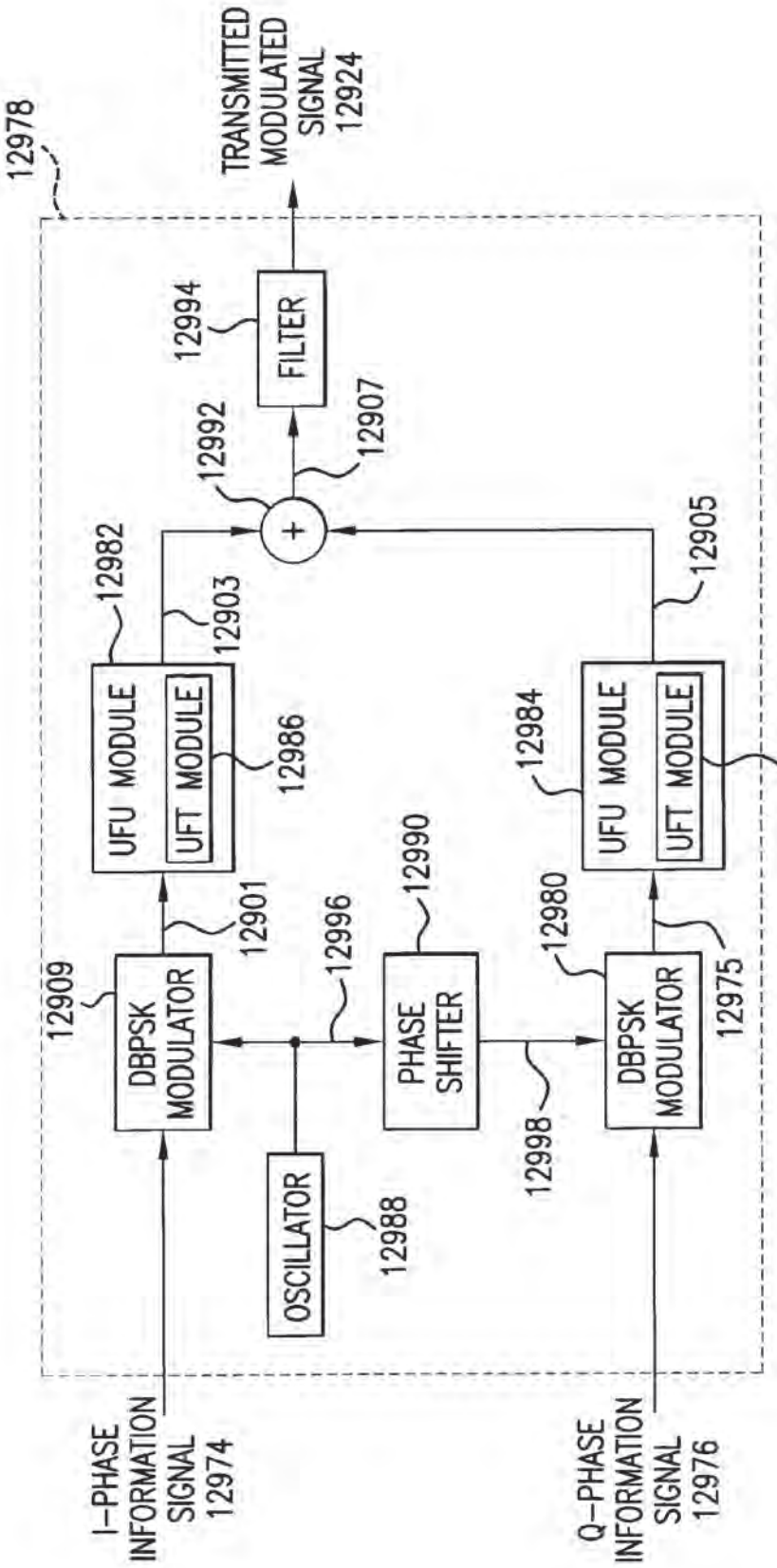

12978
TRANSMITTED MODULATED SIGNAL 12924
12994
FILTER
12907
12992
+
12905
12982
12903
UFU MODULE
UFT MODULE
12986
12984
UFU MODULE
UFT MODULE
12973
12909
DBPSK MODULATOR
12901
12996
PHASE SHIFTER
12990
12980
DBPSK MODULATOR
12975
OSCILLATOR
12988
12998
I-PHASE INFORMATION SIGNAL 12974
Q-PHASE INFORMATION SIGNAL 12976

FIG.129H

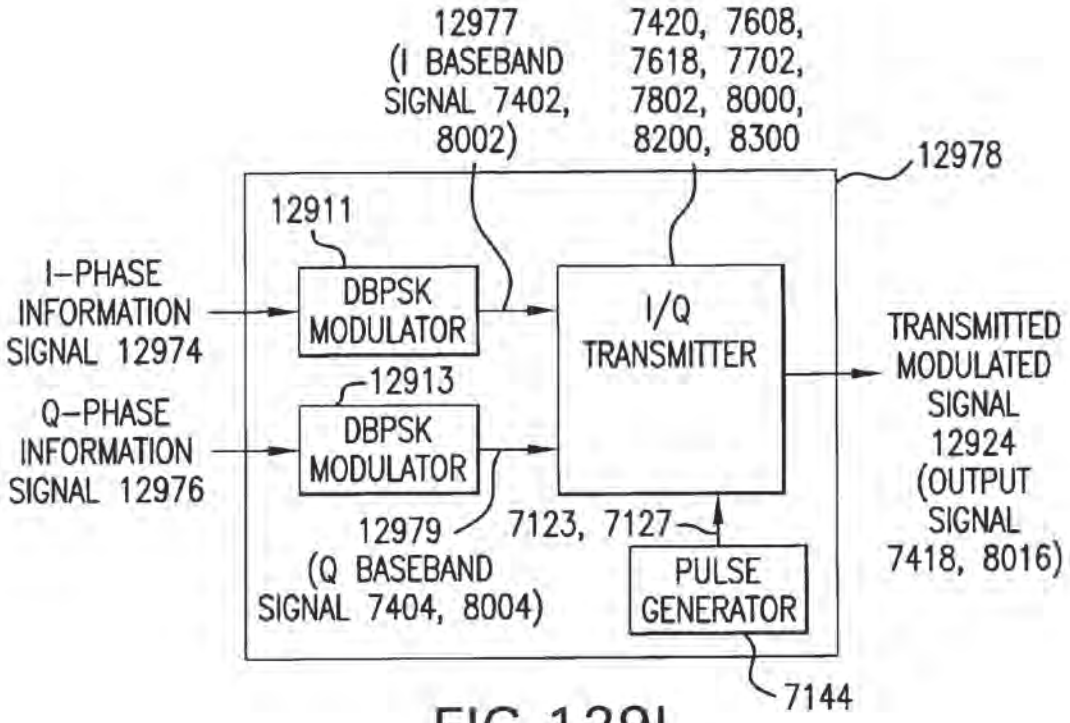


FIG.129I

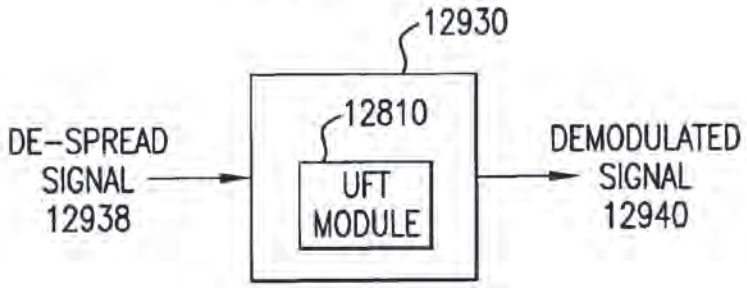


FIG.129J

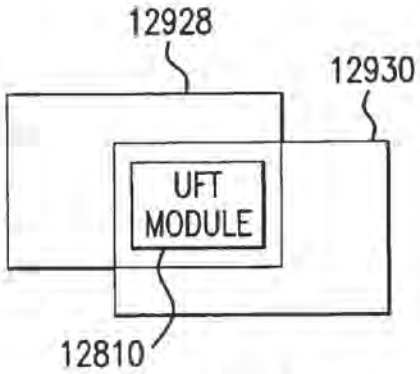


FIG.129K

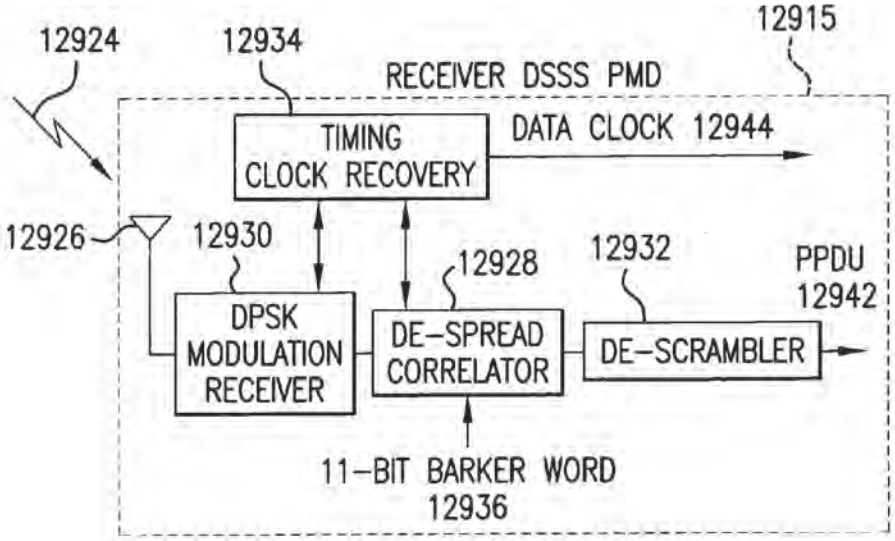


FIG.129L

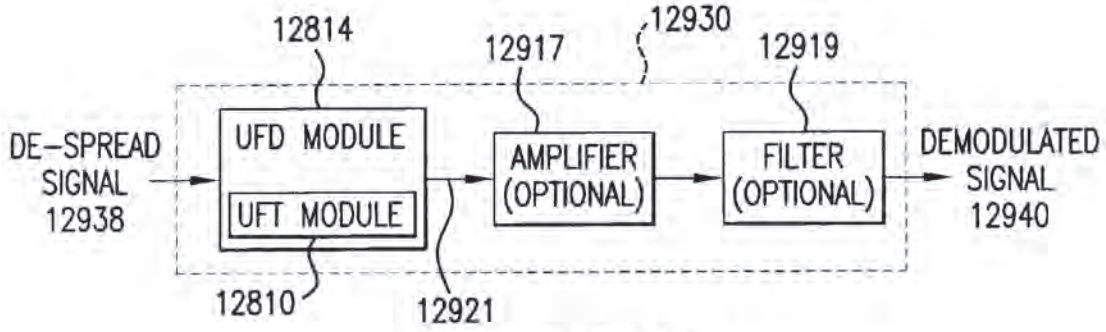


FIG.129M

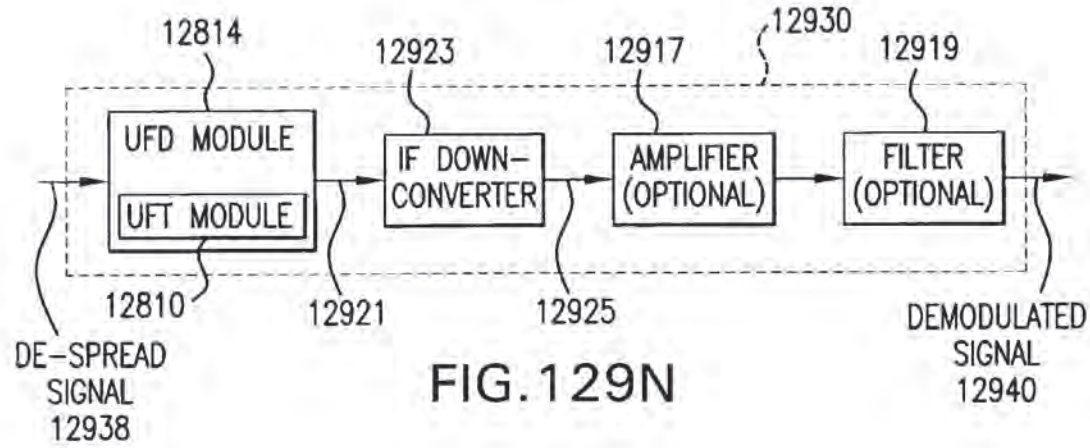


FIG.129N

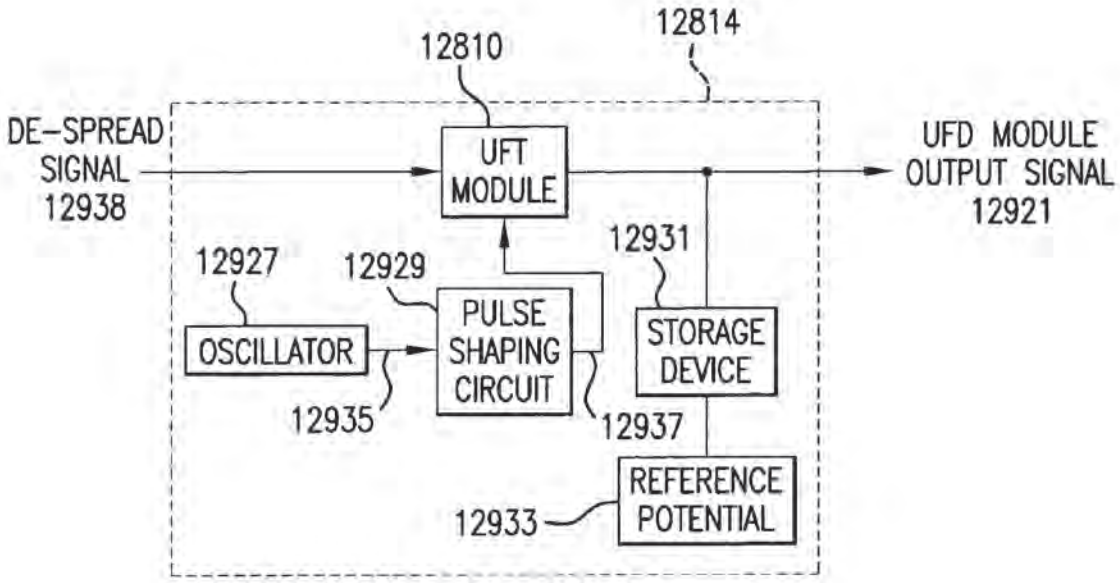


FIG. 129O

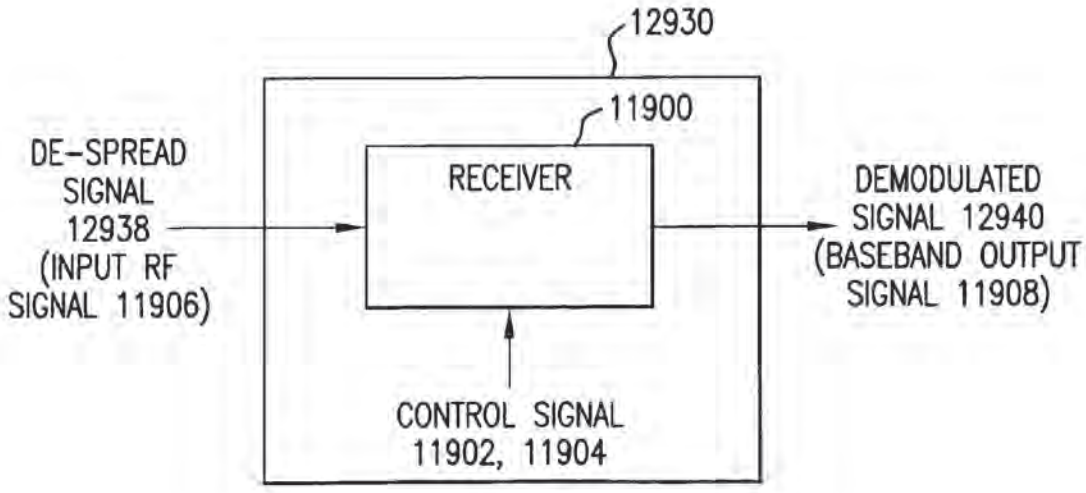


FIG. 129P

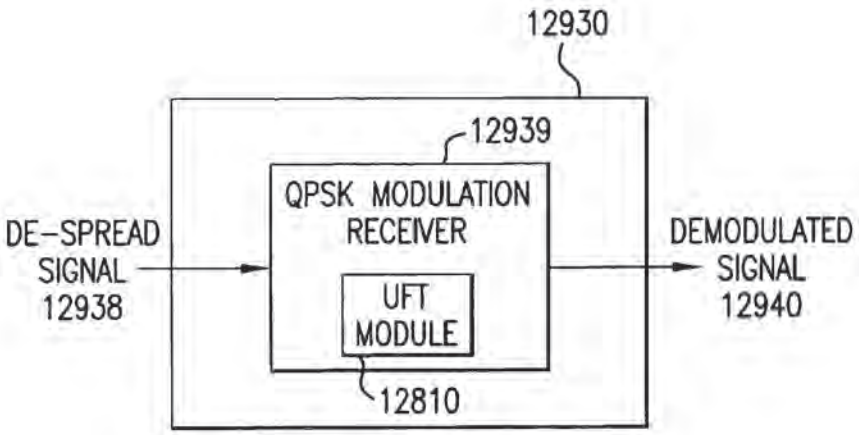


FIG.129Q

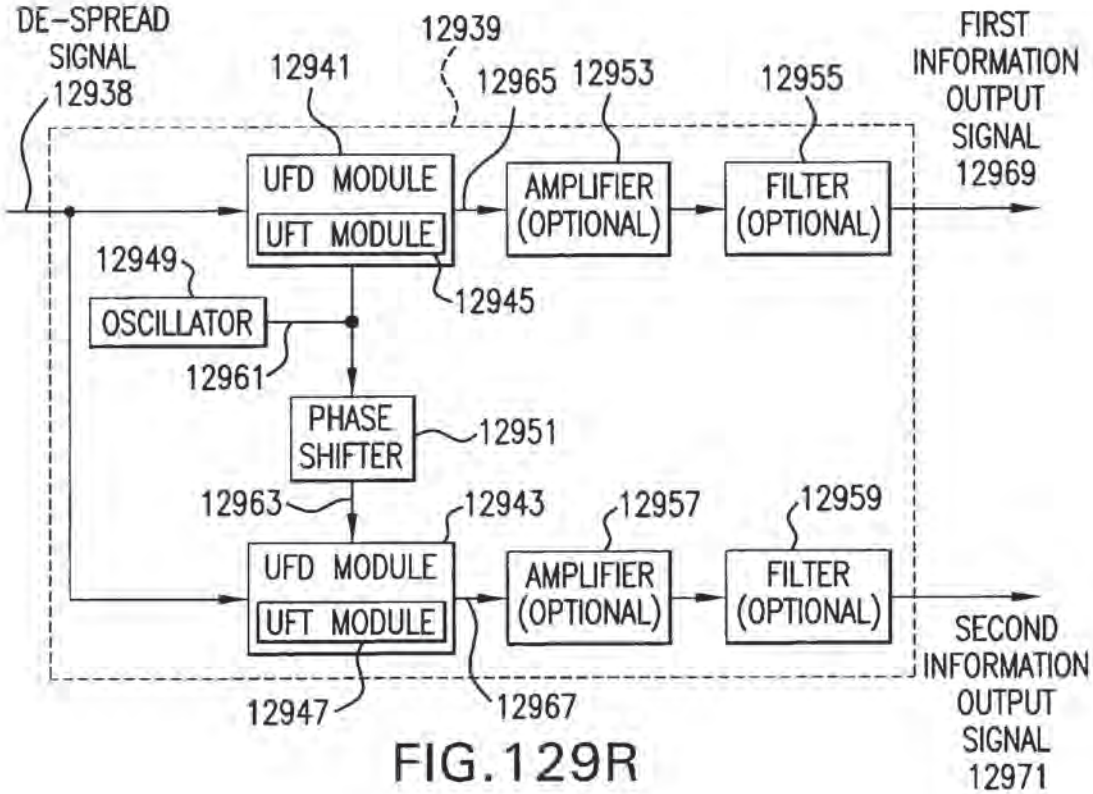


FIG.129R

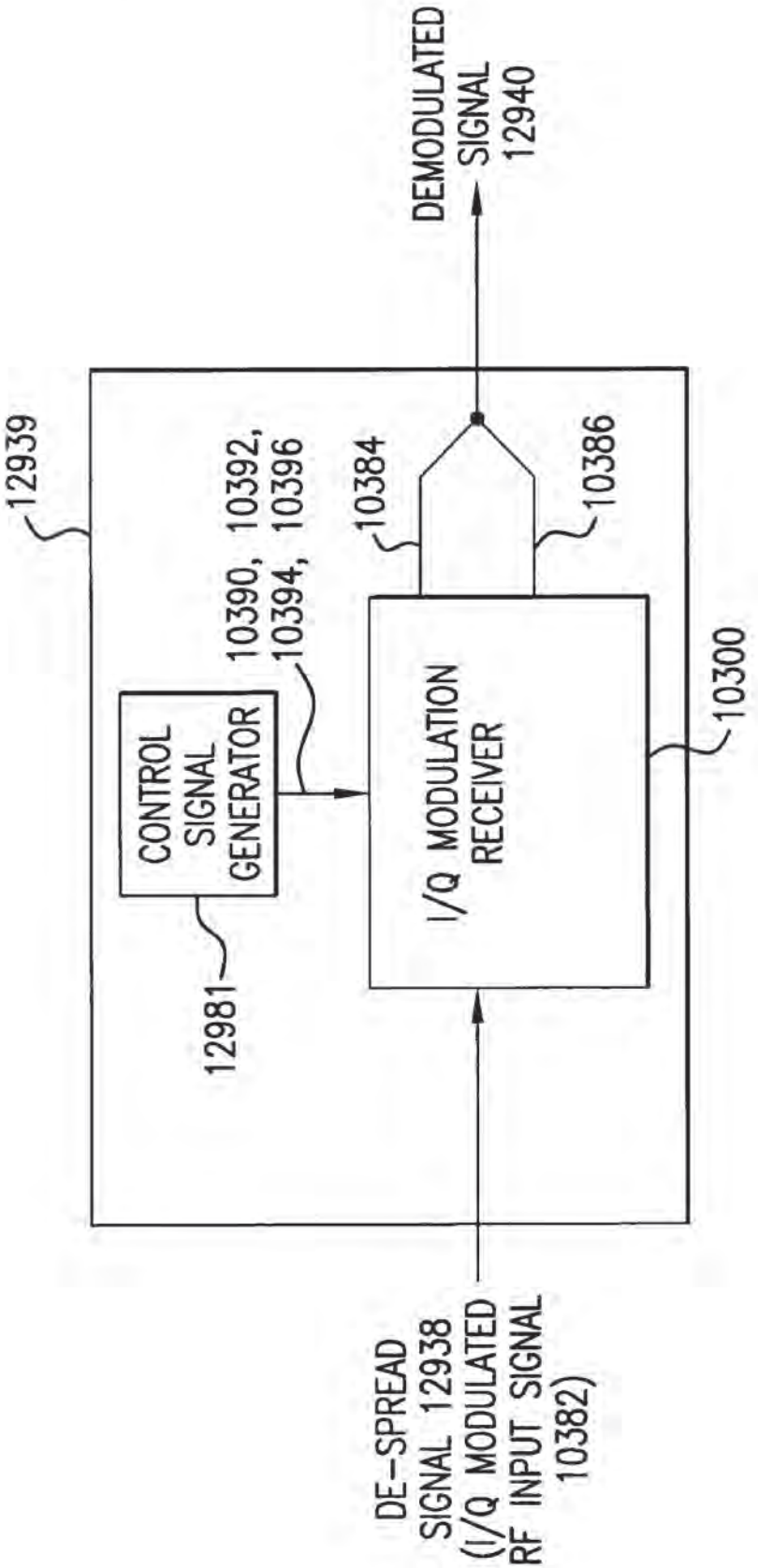

DEMODULATED SIGNAL 12940
12939
10384
10386
10392, 10396
10390, 10394,
CONTROL SIGNAL GENERATOR
12981
I/Q MODULATION RECEIVER
10300
DE-SPREAD SIGNAL 12938 (I/Q MODULATED RF INPUT SIGNAL 10382)

FIG. 129S

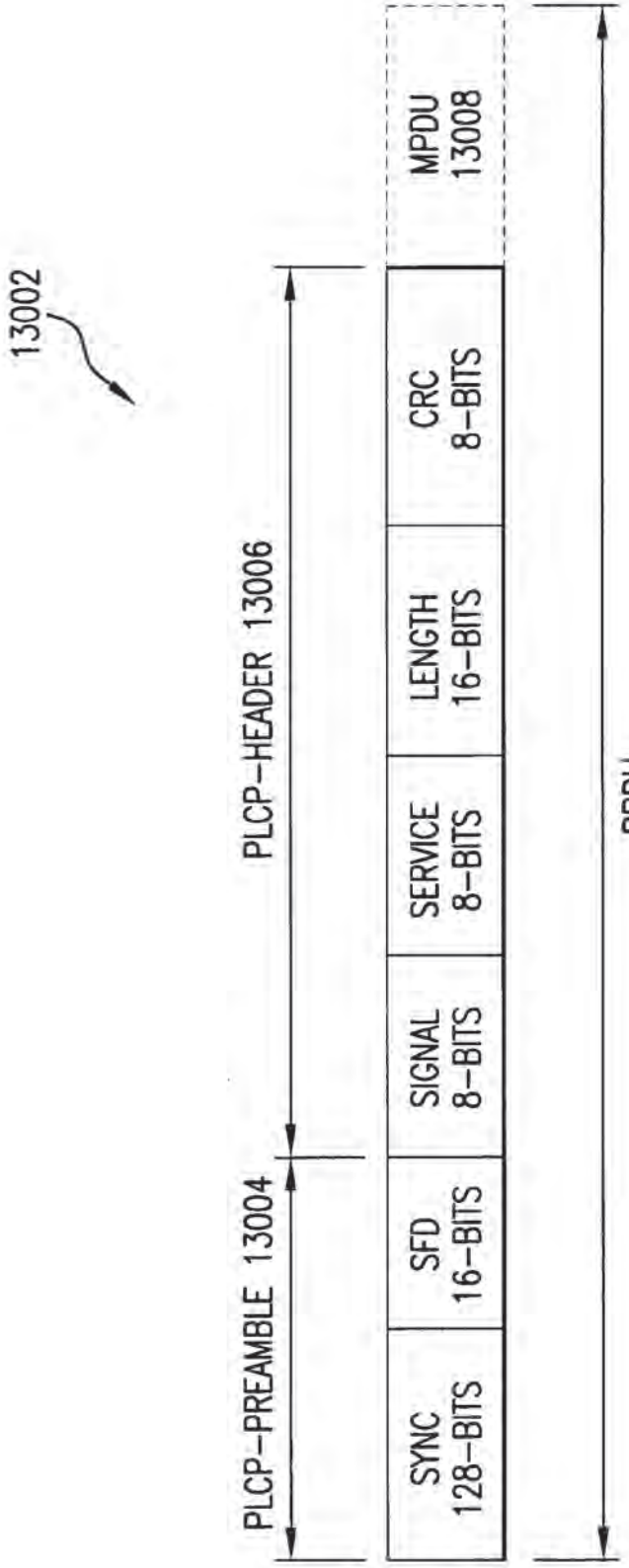

13002
PLCP–PREAMBLE 13004
PLCP–HEADER 13006
PPDU
SYNC 128–BITS
SFD 16–BITS
SIGNAL 8–BITS
SERVICE 8–BITS
LENGTH 16–BITS
CRC 8–BITS
MPDU 13008

FIG.130

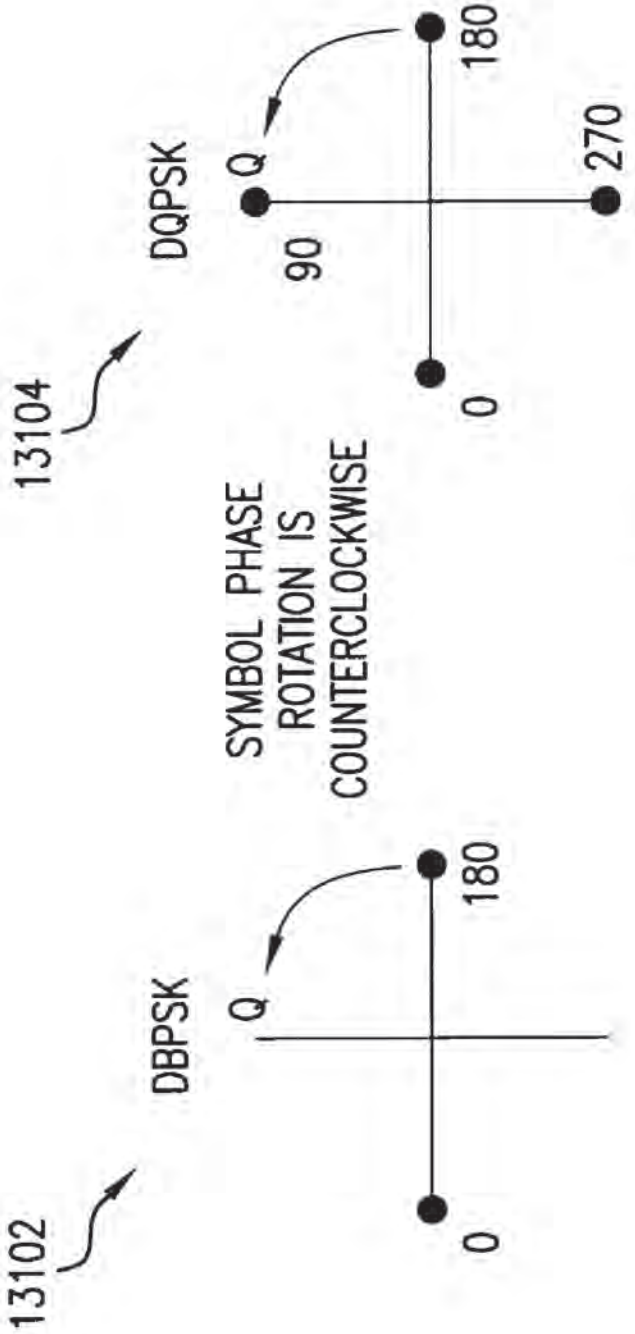

13102
DBPSK
Q
180
0
SYMBOL PHASE
ROTATION IS
COUNTERCLOCKWISE
13104
DQPSK
Q
180
90
270
0

FIG. 131

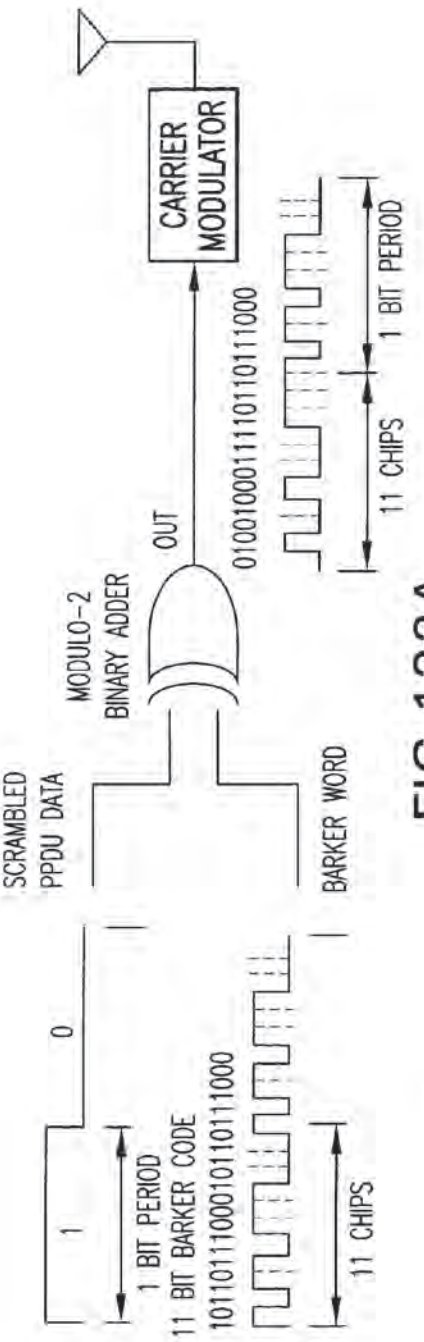
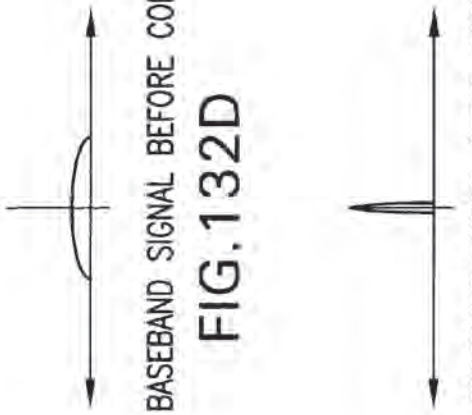


FIG.132A



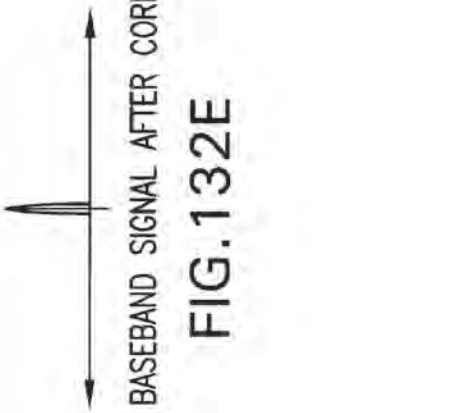
TRANSMITTER BASEBAND SIGNAL BEFORE SPREADING

FIG.132B



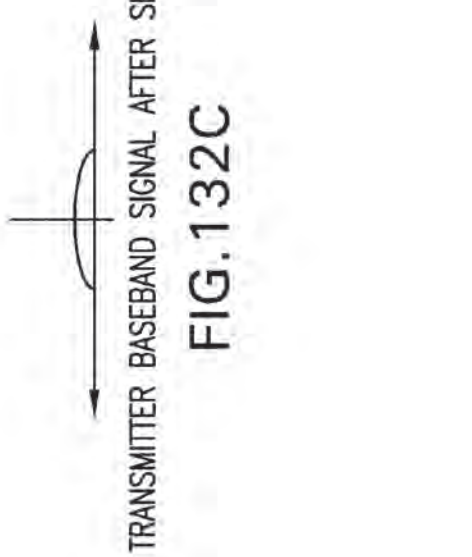
RECEIVER BASEBAND SIGNAL BEFORE CORRELATION

FIG.132D



RECEIVER BASEBAND SIGNAL AFTER CORRELATION

FIG.132E



TRANSMITTER BASEBAND SIGNAL AFTER SPREADING

FIG.132C

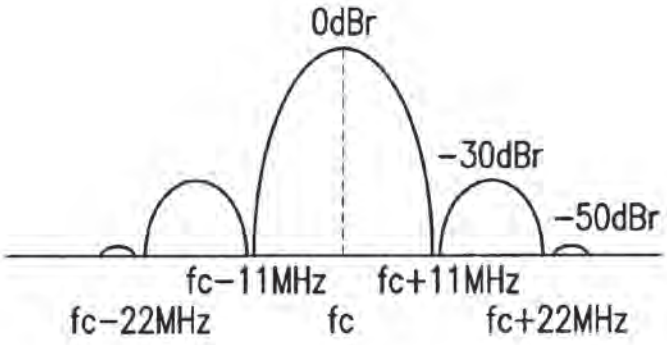


FIG.133

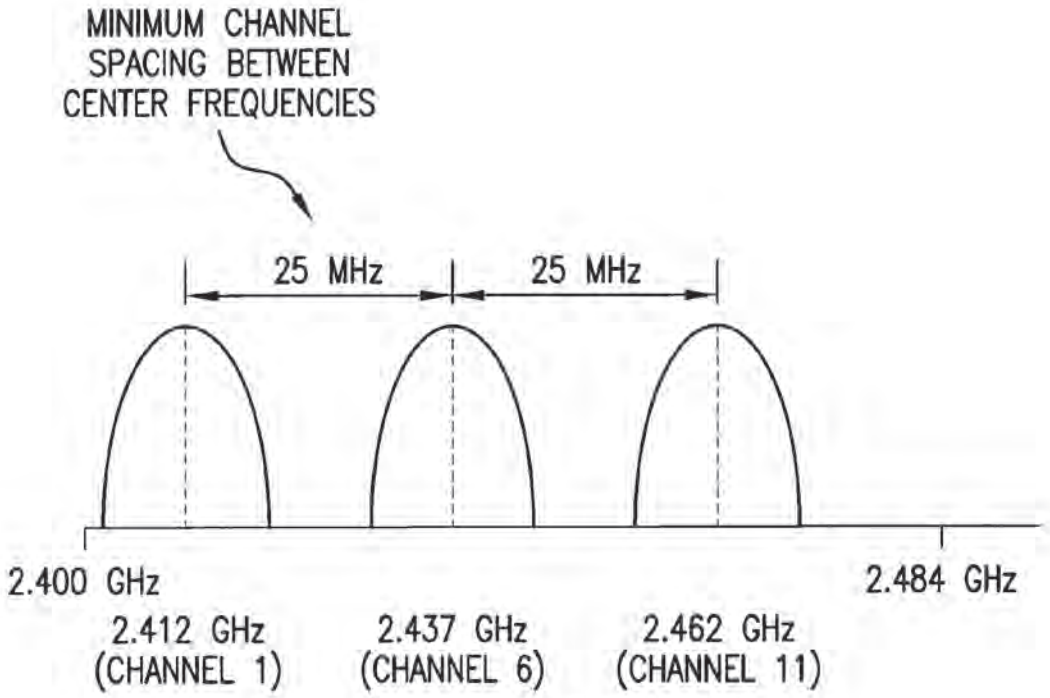


FIG.134

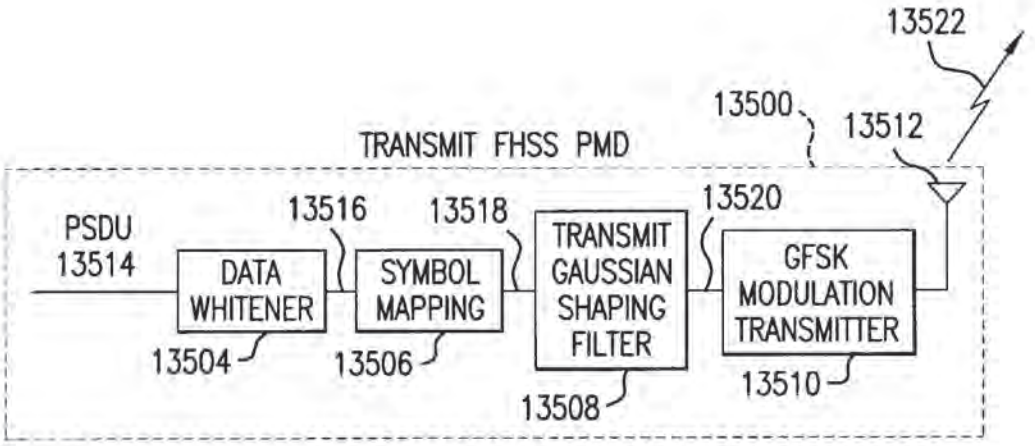


FIG.135A

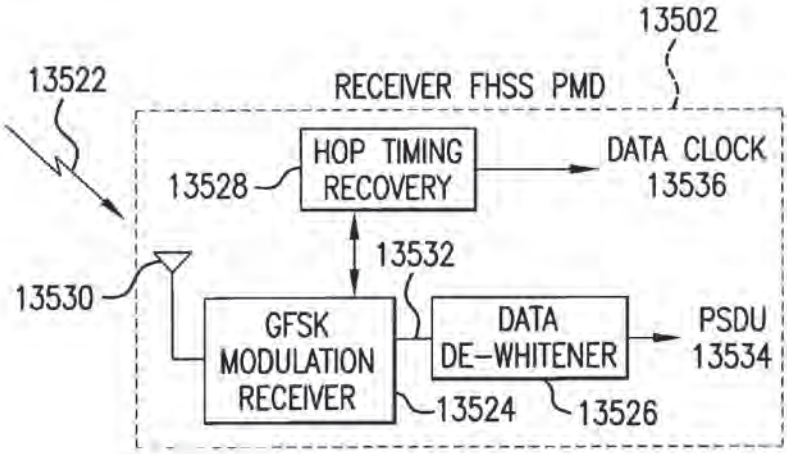


FIG.135B

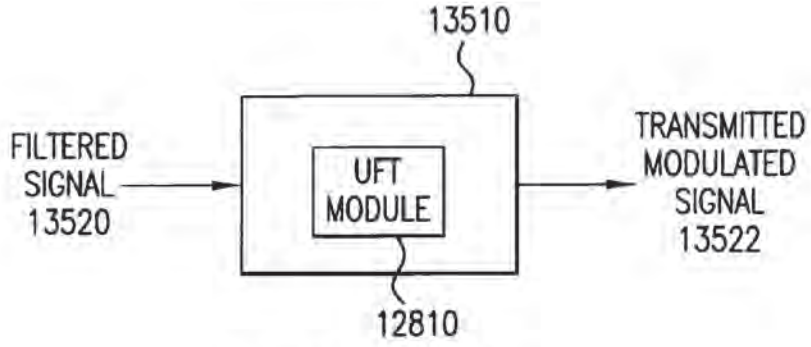


FIG.135C

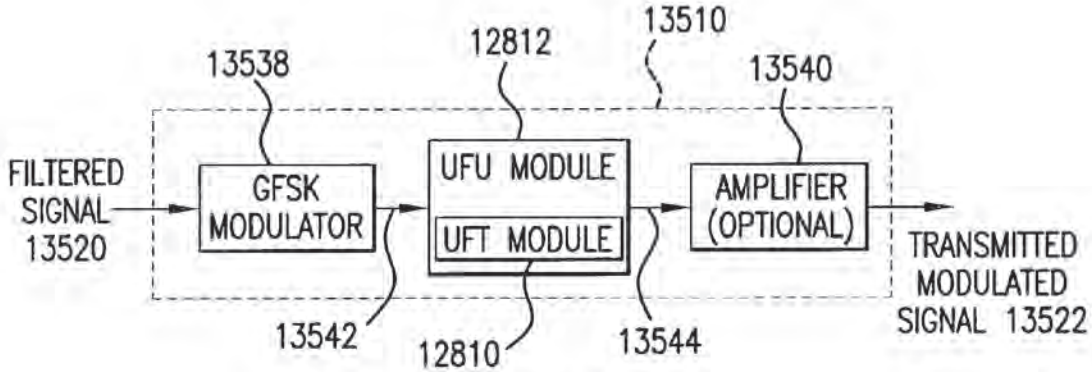


FIG.135D

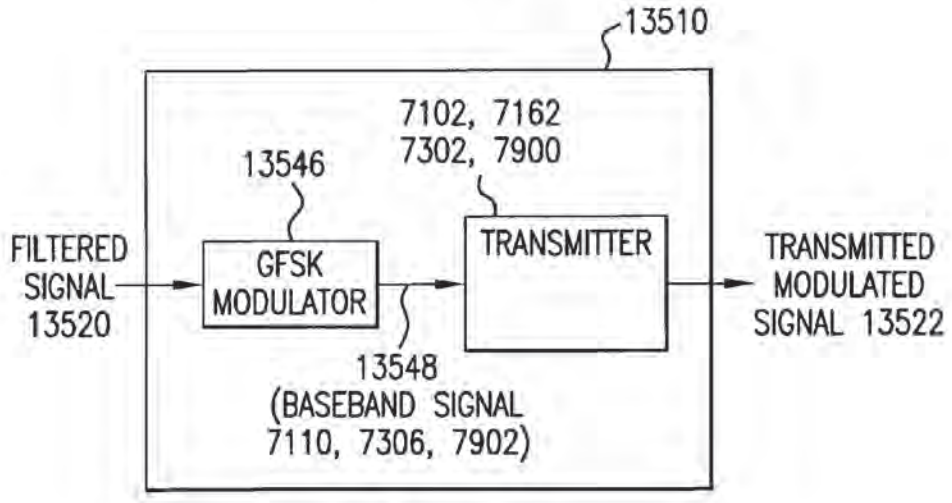


FIG.135E

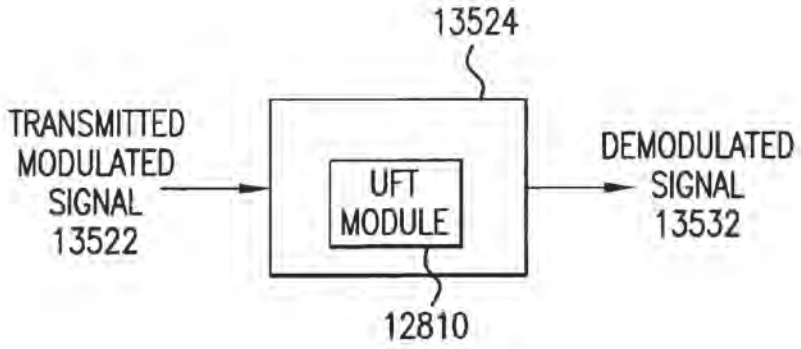


FIG.135F

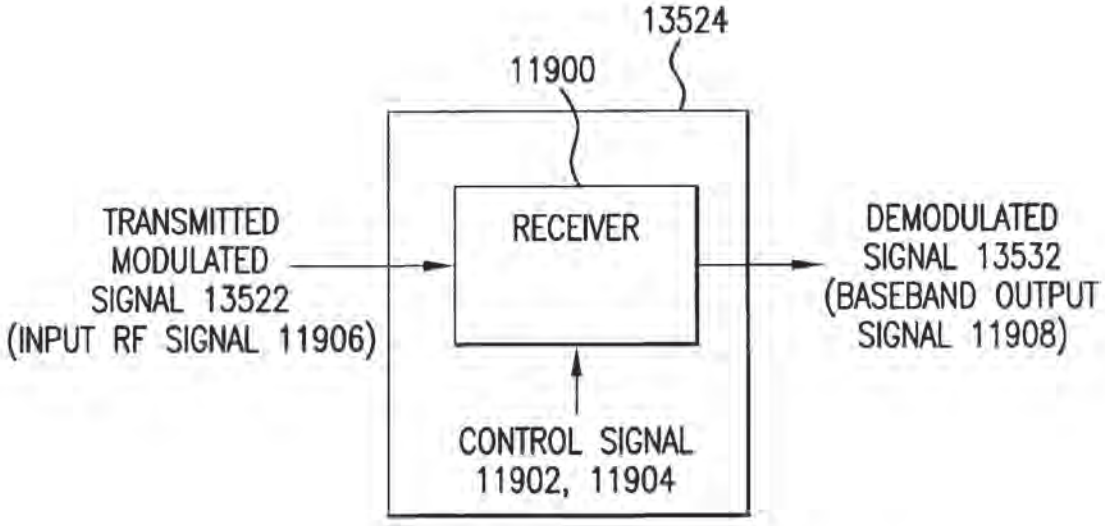


FIG.135G

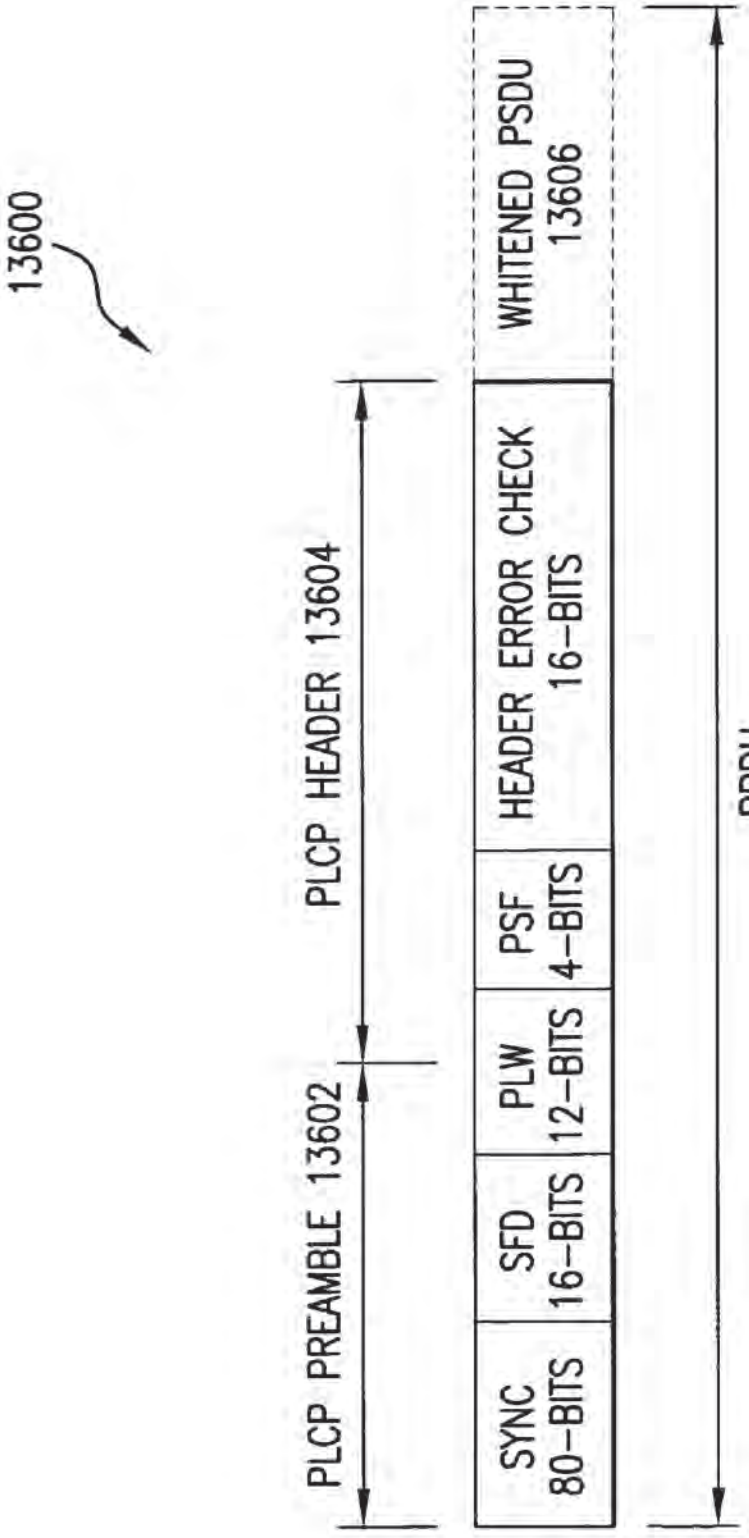

13600
PLCP PREAMBLE 13602
PLCP HEADER 13604
SYNC 80-BITS
SFD 16-BITS
PLW 12-BITS
PSF 4-BITS
HEADER ERROR CHECK 16-BITS
WHITENED PSDU 13606
PPDU

FIG.136

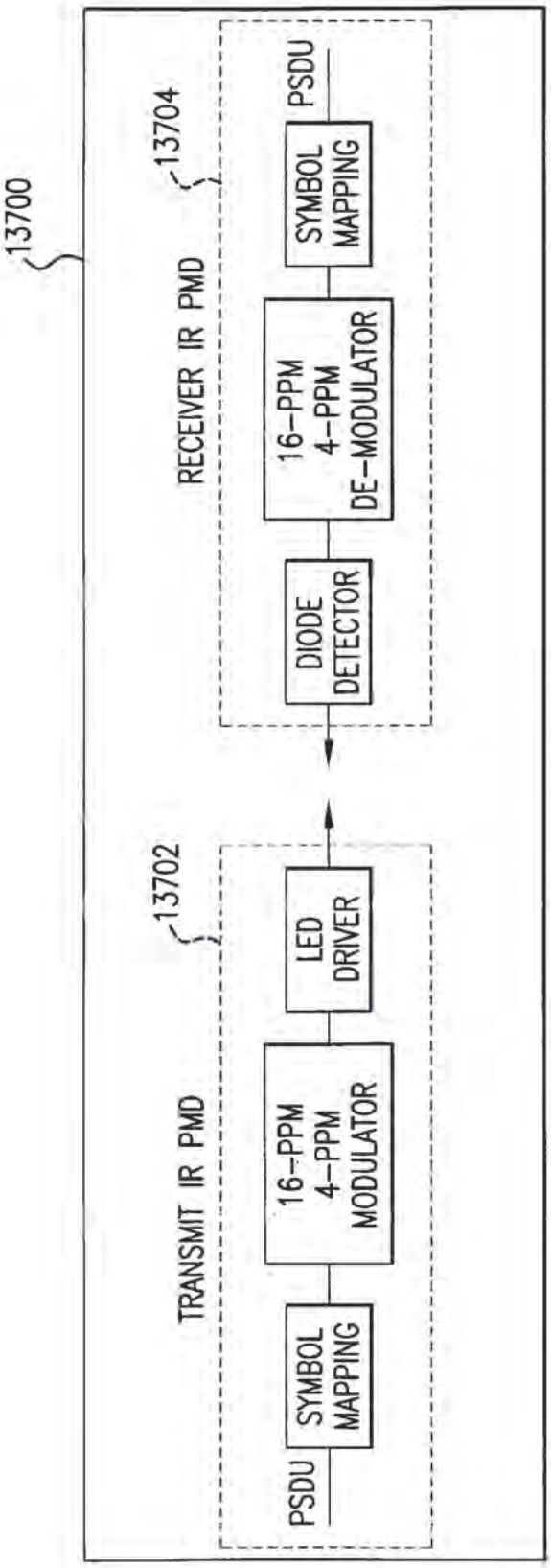

13700
13702
TRANSMIT IR PMD
PSDU
SYMBOL MAPPING
16-PPM 4-PPM MODULATOR
LED DRIVER
13704
RECEIVER IR PMD
DIODE DETECTOR
16-PPM 4-PPM DE-MODULATOR
SYMBOL MAPPING
PSDU

FIG. 137

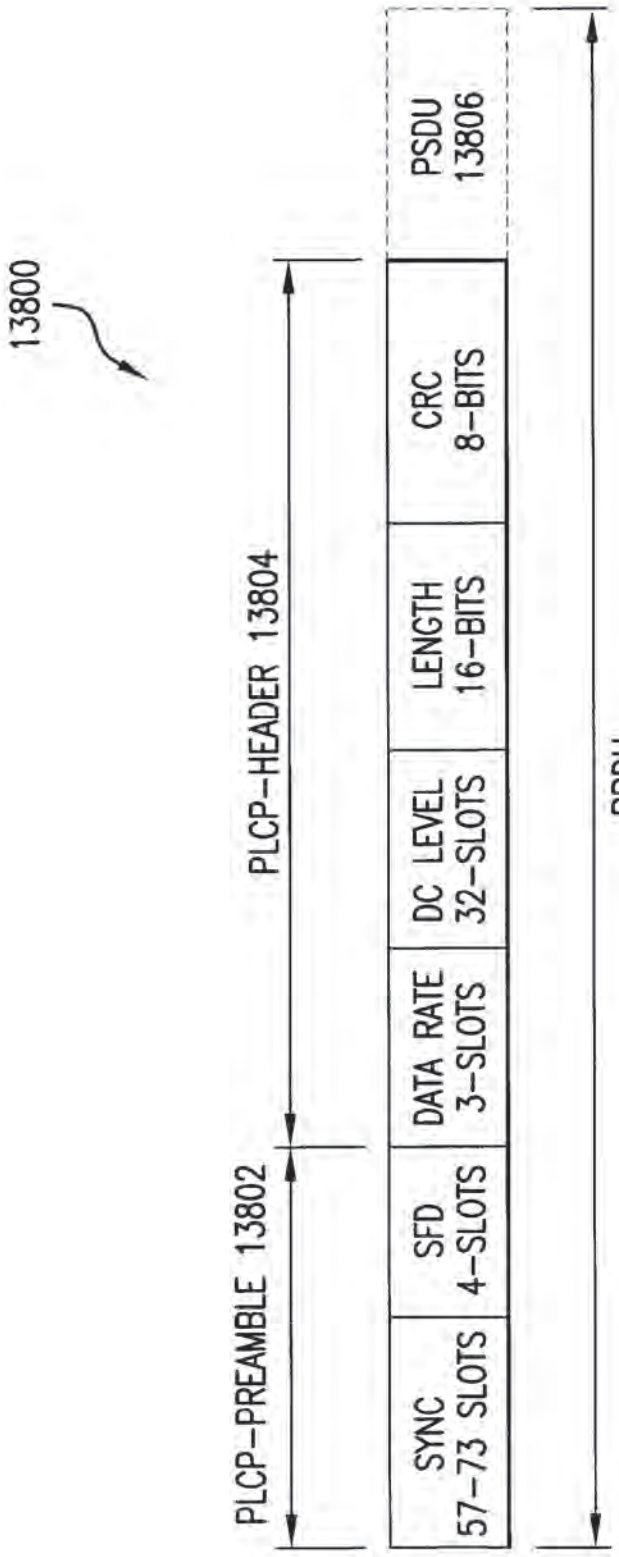

13800
PLCP-PREAMBLE 13802
PLCP-HEADER 13804
PPDU
SYNC
57-73 SLOTS
SFD
4-SLOTS
DATA RATE
3-SLOTS
DC LEVEL
32-SLOTS
LENGTH
16-BITS
CRC
8-BITS
PSDU
13806

FIG.138

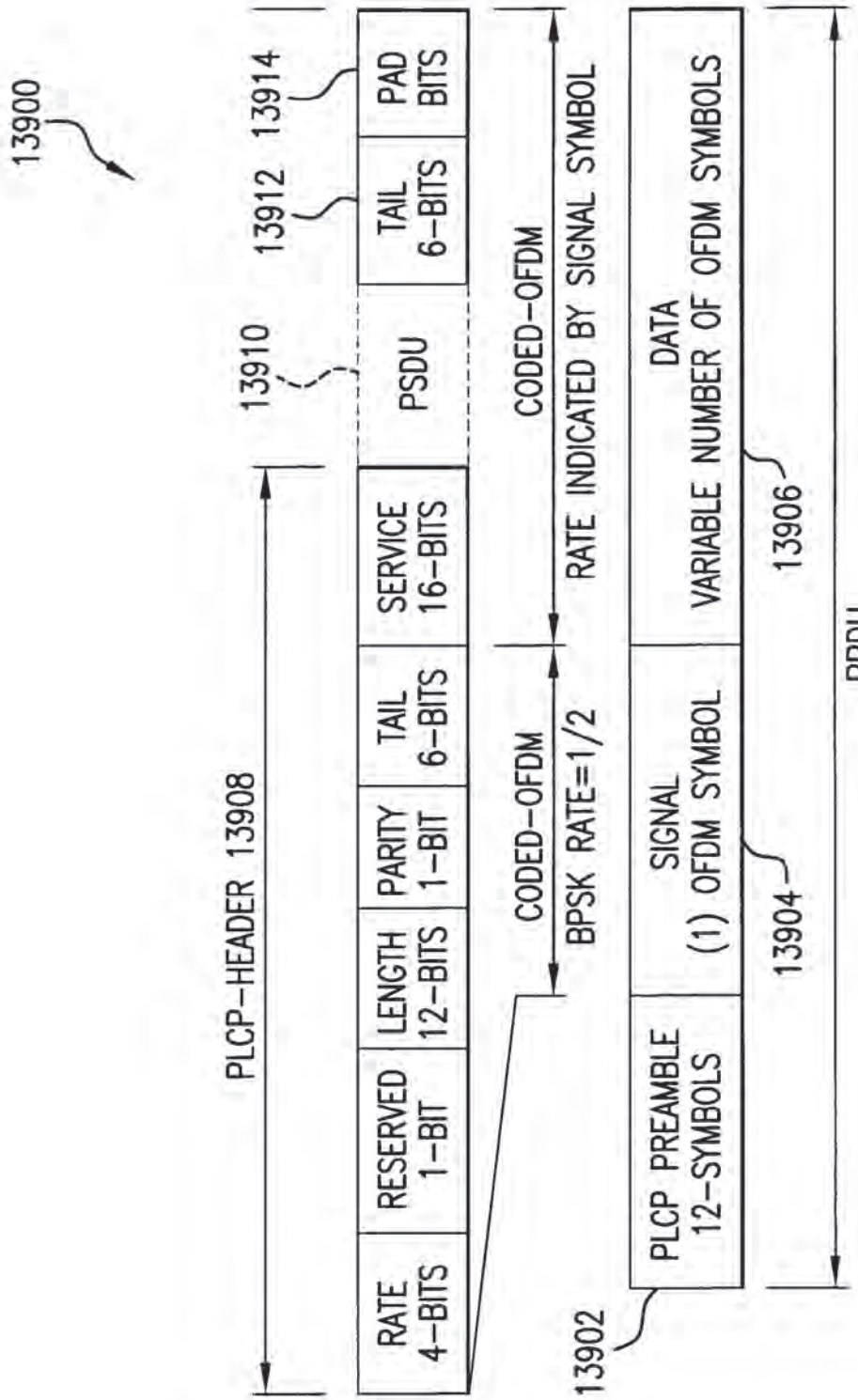

13900
PLCP-HEADER 13908
RATE 4-BITS
RESERVED 1-BIT
LENGTH 12-BITS
PARITY 1-BIT
TAIL 6-BITS
SERVICE 16-BITS
13910
PSDU
13912
TAIL 6-BITS
13914
PAD BITS
CODED-OFDM
BPSK RATE=1/2
CODED-OFDM
RATE INDICATED BY SIGNAL SYMBOL
13902
PLCP PREAMBLE 12-SYMBOLS
SIGNAL (1) OFDM SYMBOL
13904
DATA VARIABLE NUMBER OF OFDM SYMBOLS
13906
PPDU

FIG.139

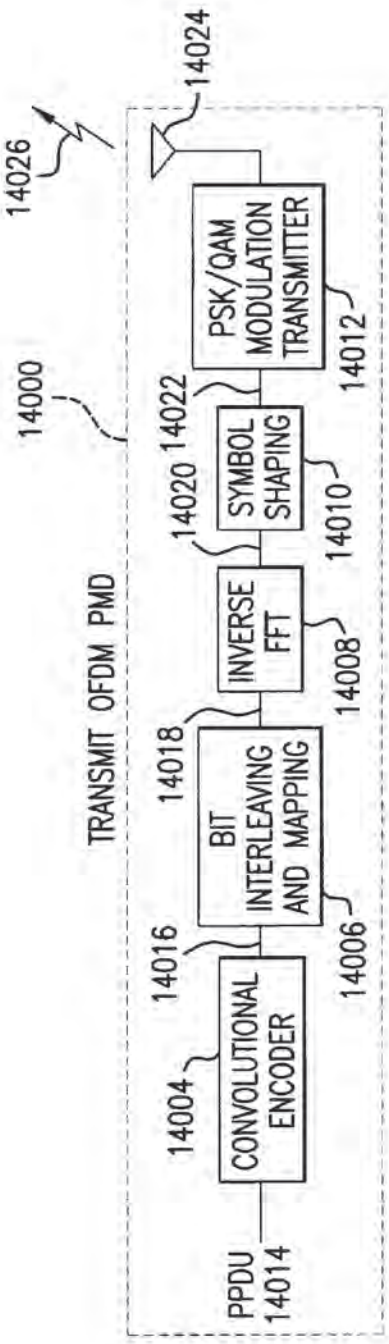


FIG.140A

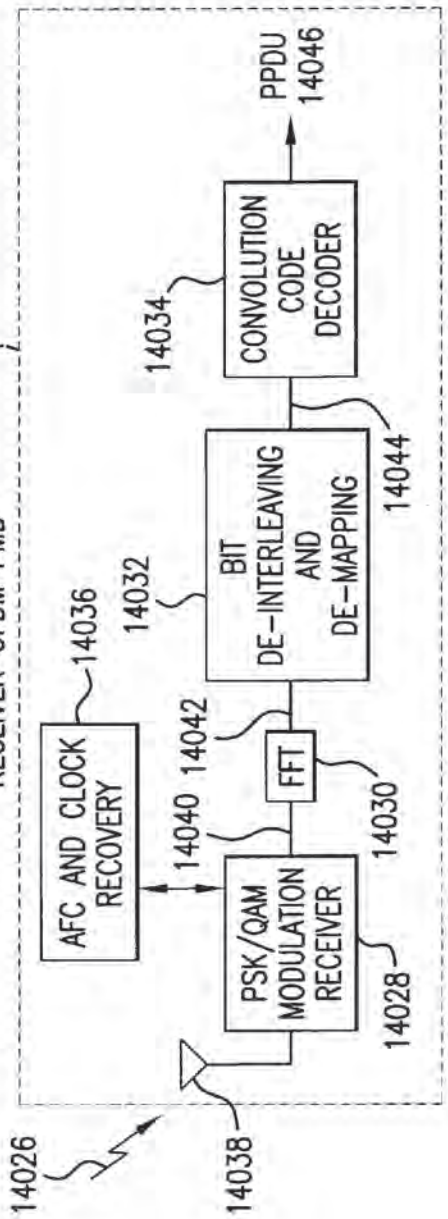


FIG.140B

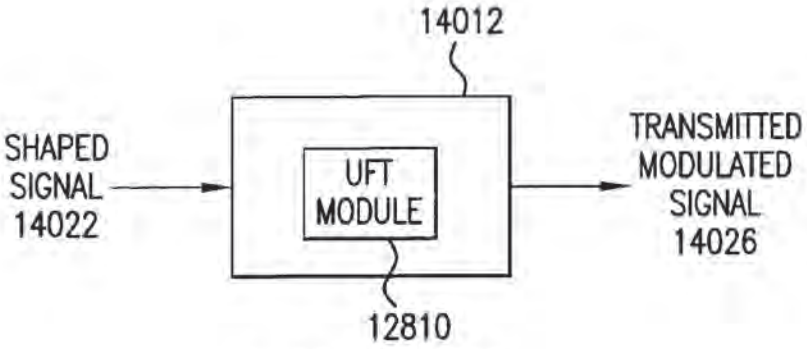


FIG.140C

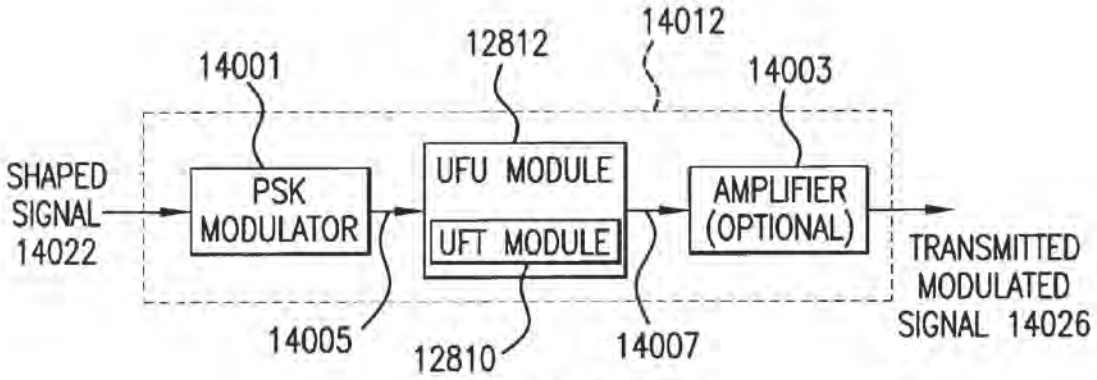


FIG.140D

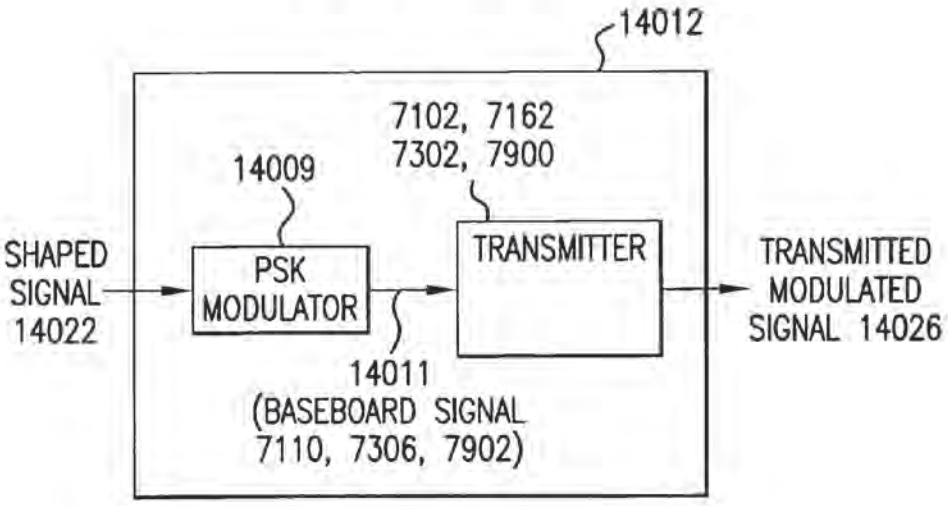


FIG.140E

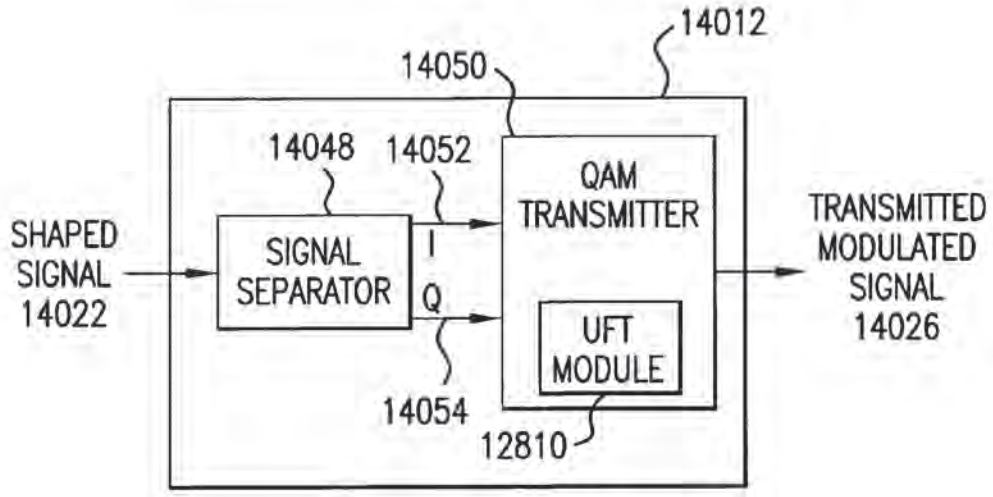

14012
14050
14048
14052
QAM
TRANSMITTER
SHAPED
SIGNAL
14022
SIGNAL
SEPARATOR
I
Q
UFT
MODULE
TRANSMITTED
MODULATED
SIGNAL
14026
14054
12810

FIG. 140F

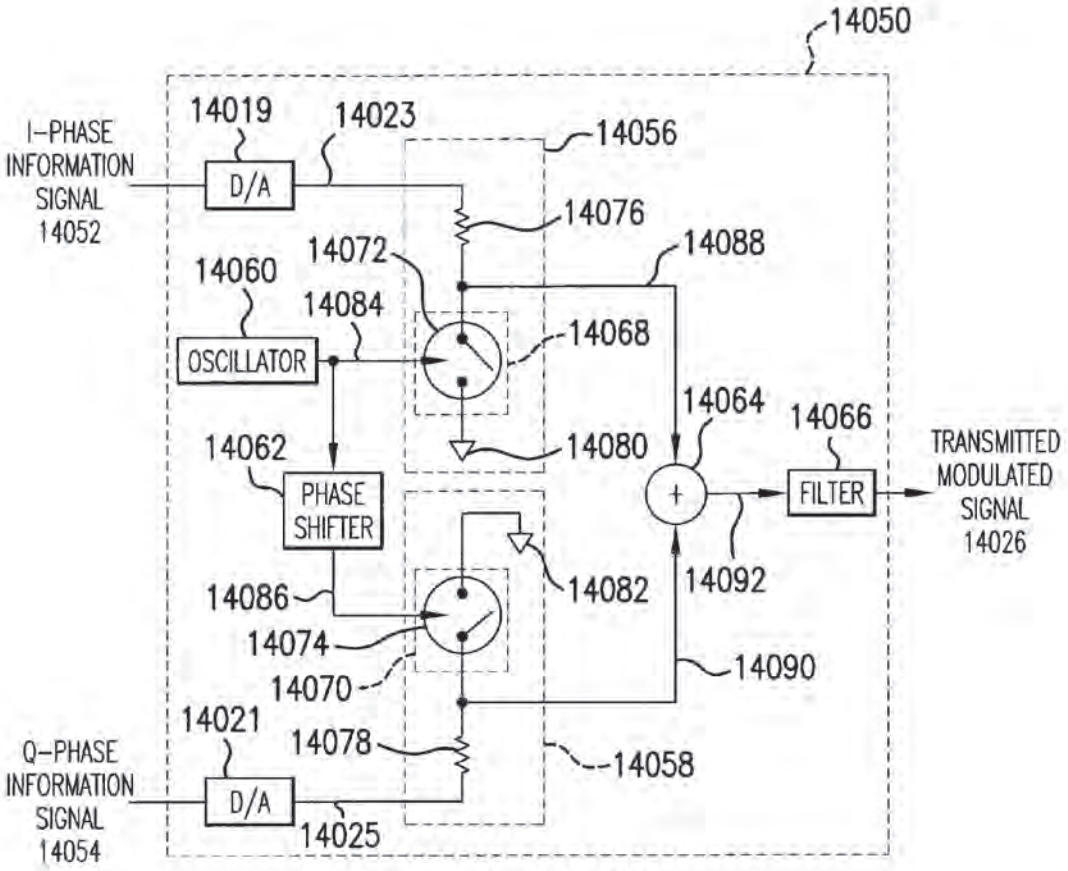


FIG. 140G

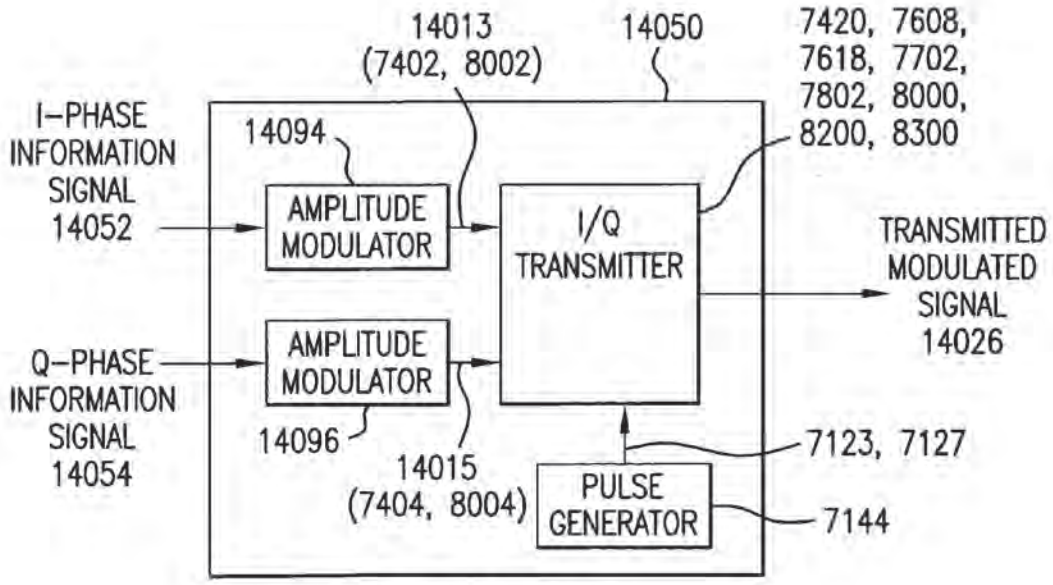


FIG. 140H

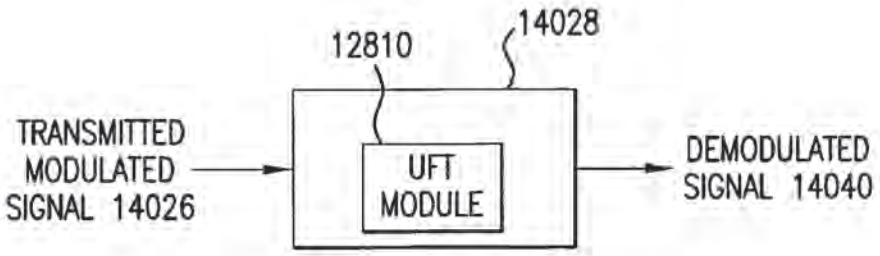


FIG.140I

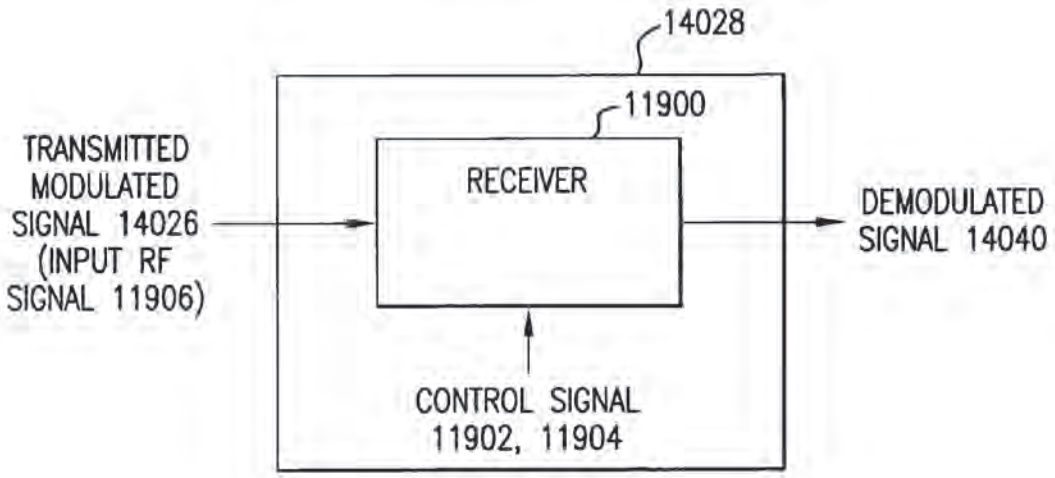


FIG.140J

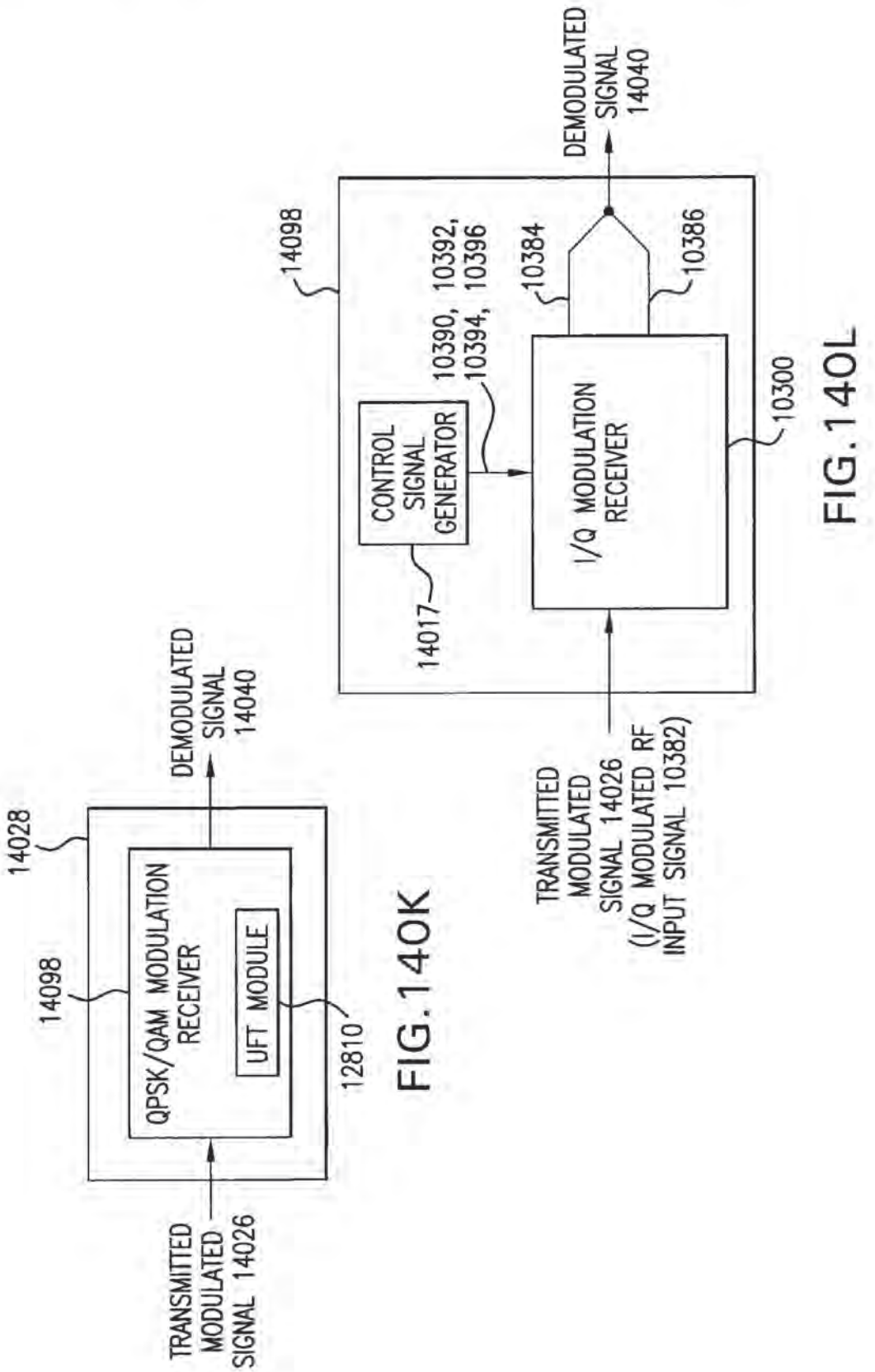


FIG. 140K

FIG. 140L

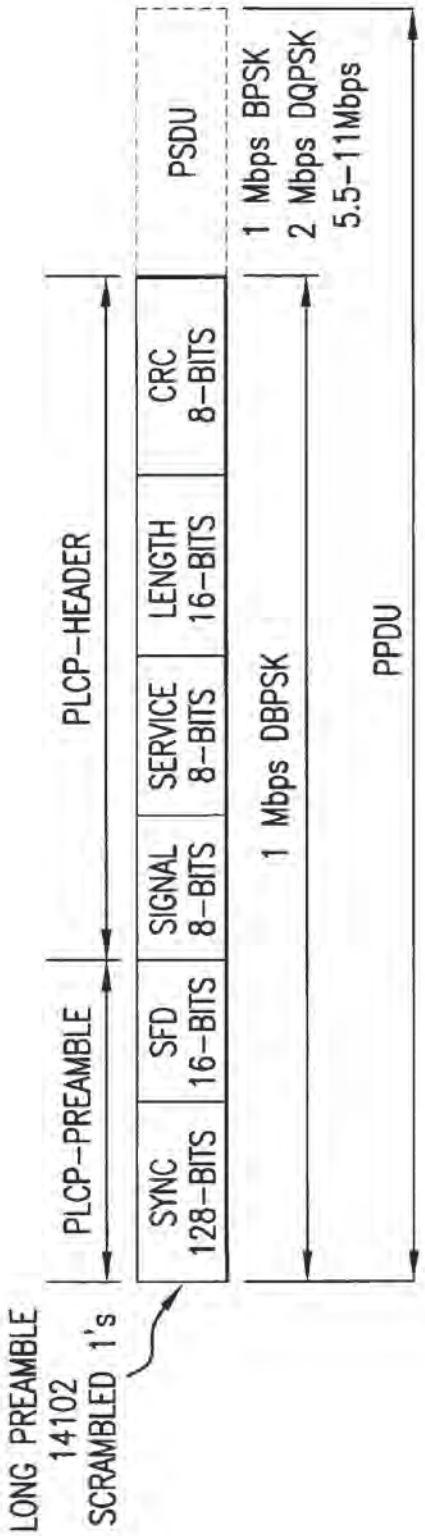


FIG.141A

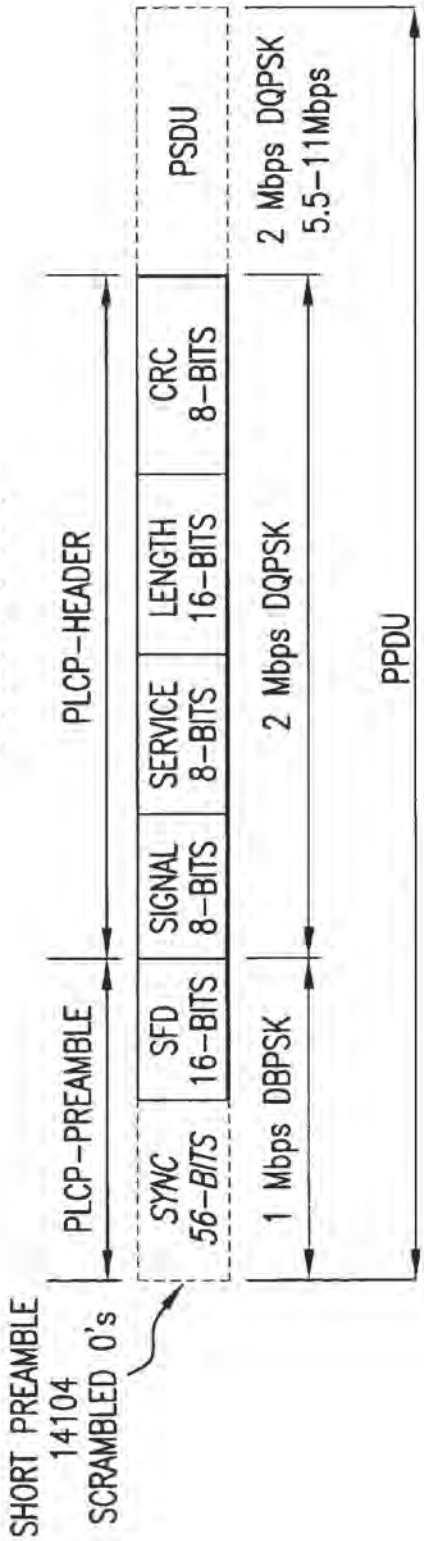


FIG.141B

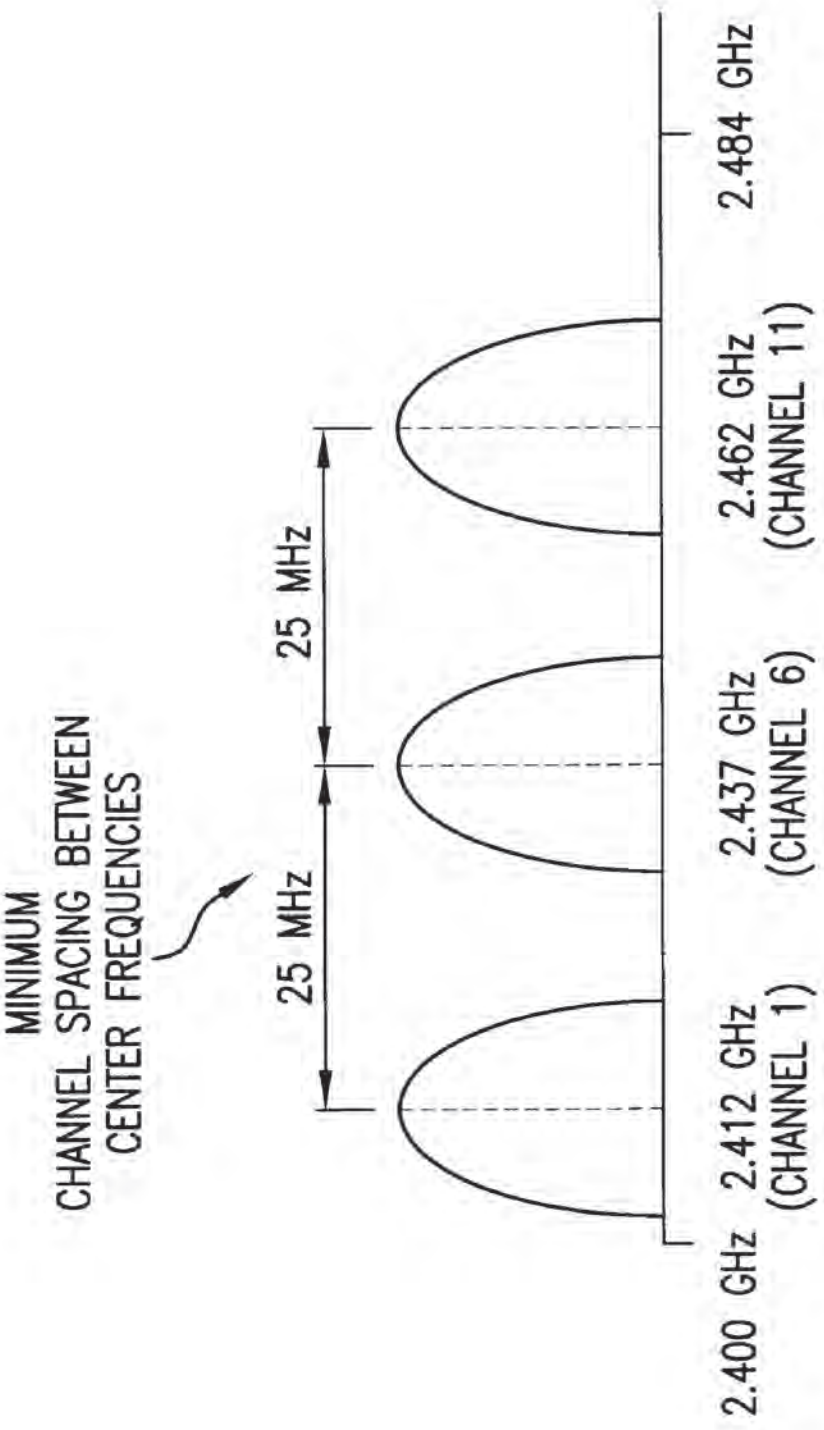

MINIMUM
CHANNEL SPACING BETWEEN
CENTER FREQUENCIES
25 MHz
25 MHz
2.400 GHz
2.412 GHz
(CHANNEL 1)
2.437 GHz
(CHANNEL 6)
2.462 GHz
(CHANNEL 11)
2.484 GHz

FIG.142

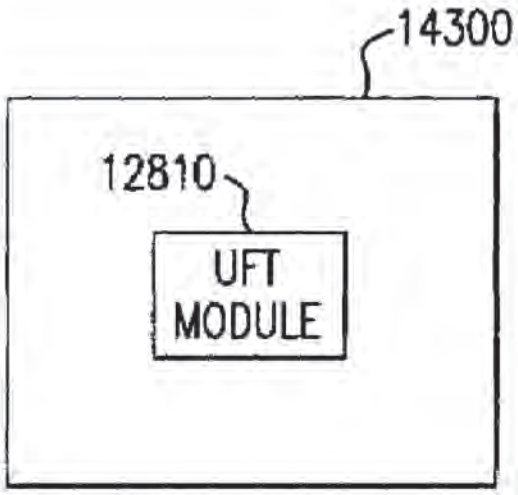


FIG. 143A

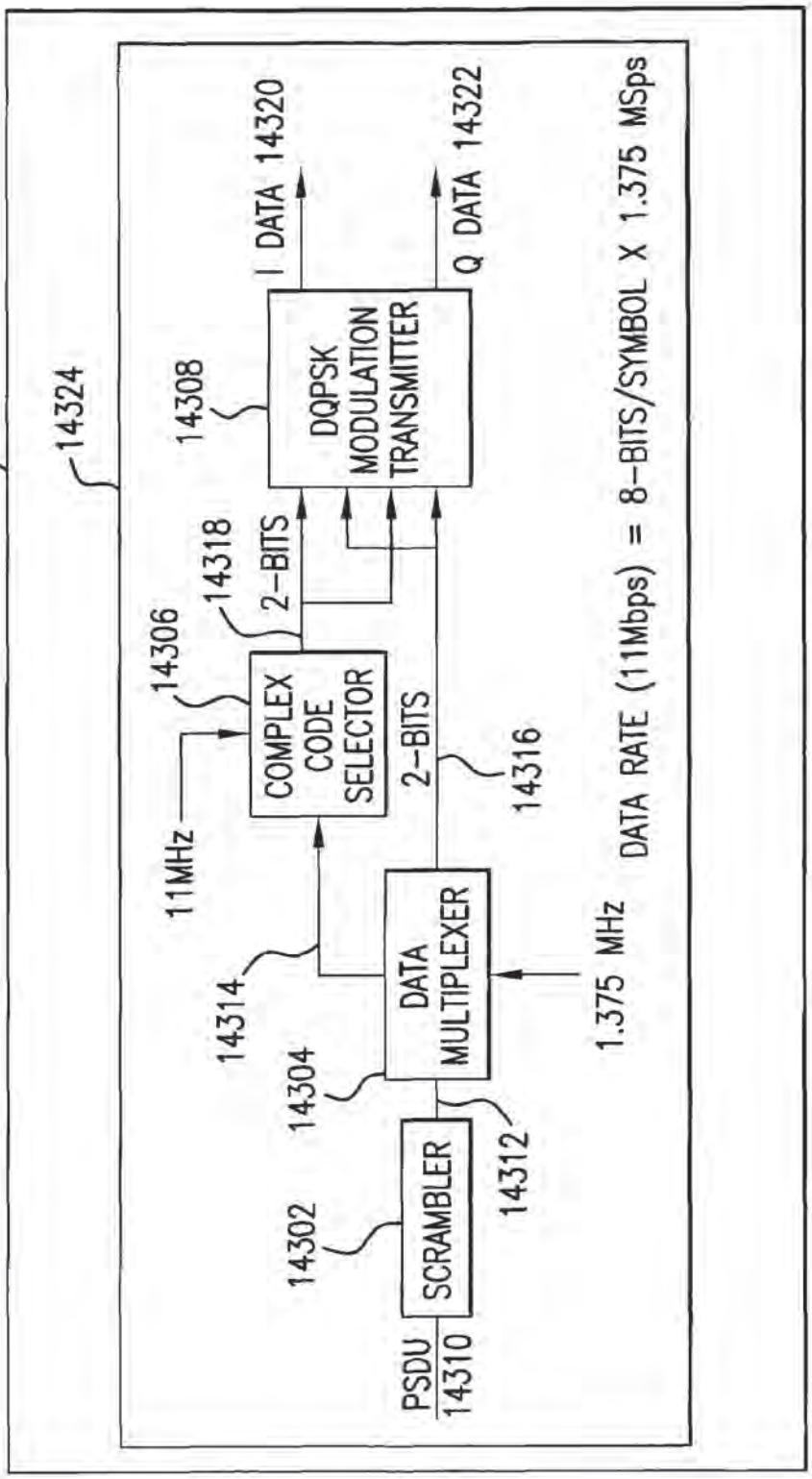

14300
14324
14308
DQPSK MODULATION TRANSMITTER
I DATA 14320
Q DATA 14322
14318
2-BITS
14306
COMPLEX CODE SELECTOR
11MHz
14314
2-BITS
14316
DATA MULTIPLEXER
14304
1.375 MHz
DATA RATE (11Mbps) = 8-BITS/SYMBOL X 1.375 MSps
14302
SCRAMBLER
14312
PSDU
14310

FIG.143B

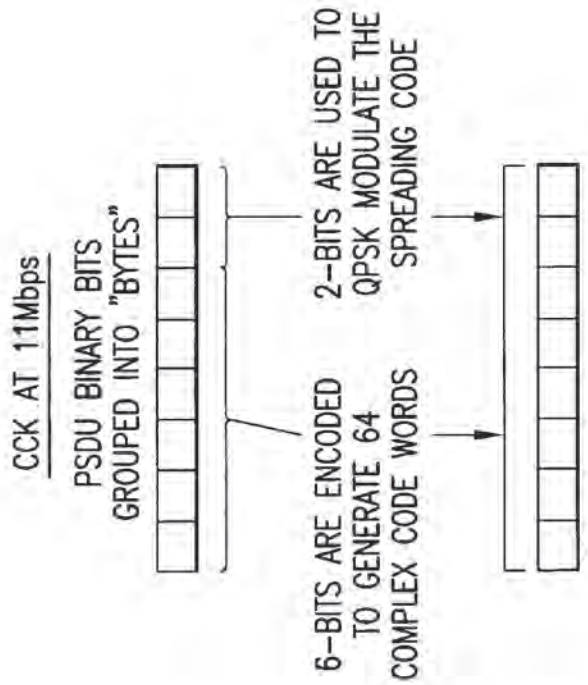


FIG.144B

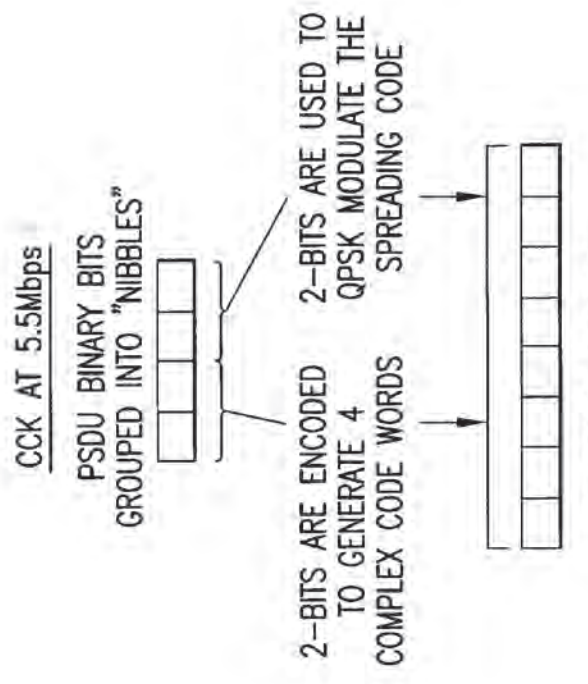


FIG.144A

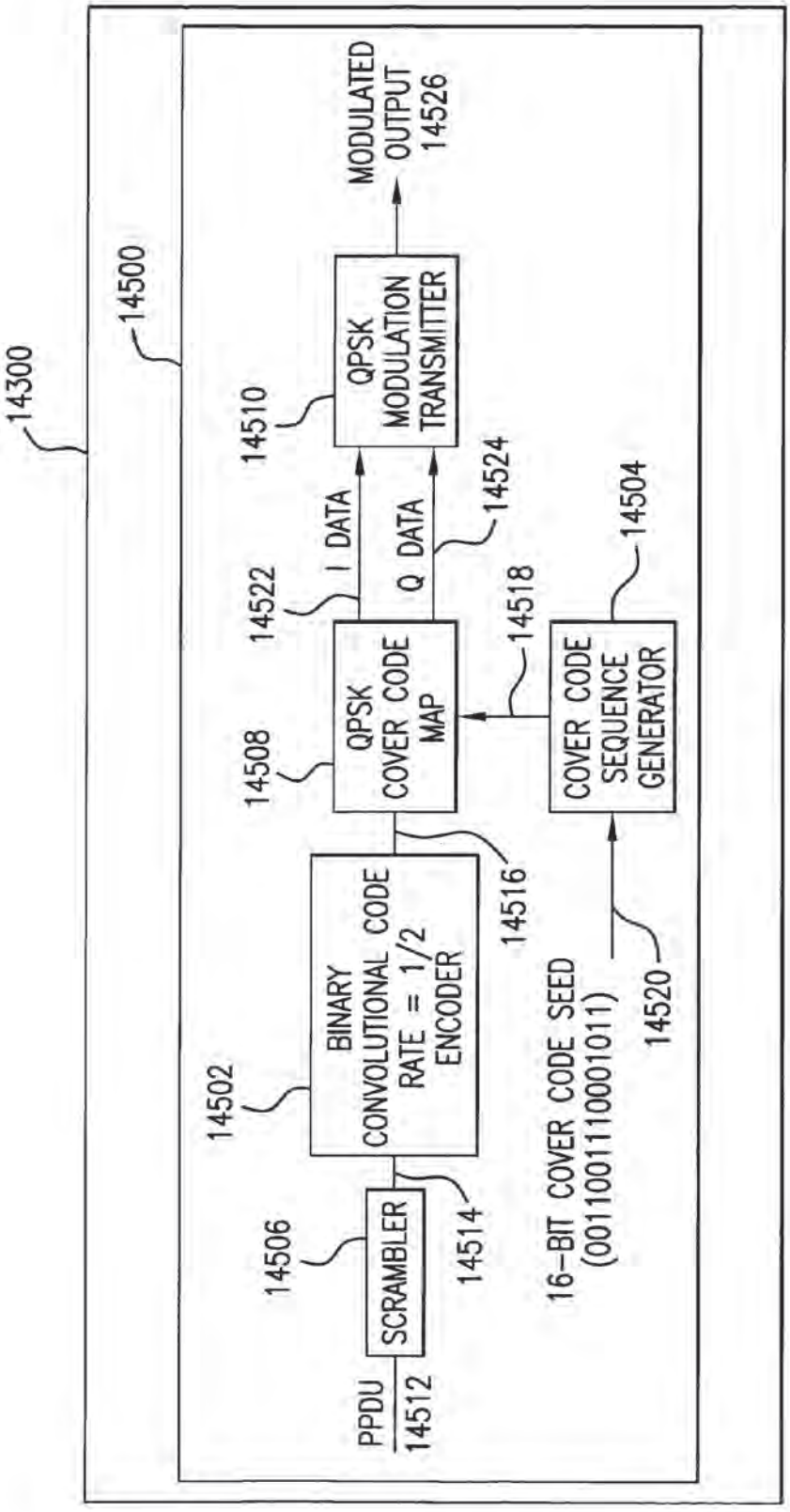

14300
14500
MODULATED OUTPUT 14526
QPSK MODULATION TRANSMITTER
14510
I DATA
Q DATA
14524
14522
14518
14504
QPSK COVER CODE MAP
COVER CODE SEQUENCE GENERATOR
14508
BINARY CONVOLUTIONAL CODE RATE = 1/2 ENCODER
14502
14516
16-BIT COVER CODE SEED (0011001110001011)
14520
SCRAMBLER
14506
14514
PPDU 14512

FIG.145A

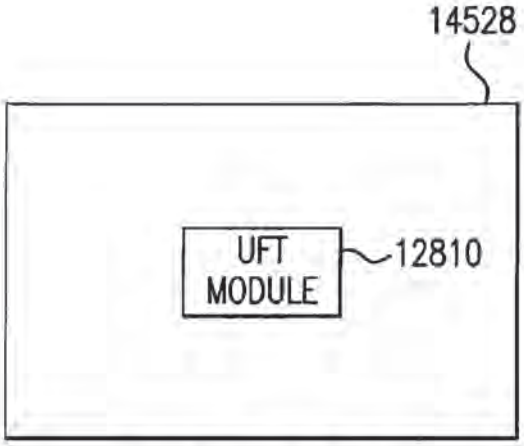


FIG.145B

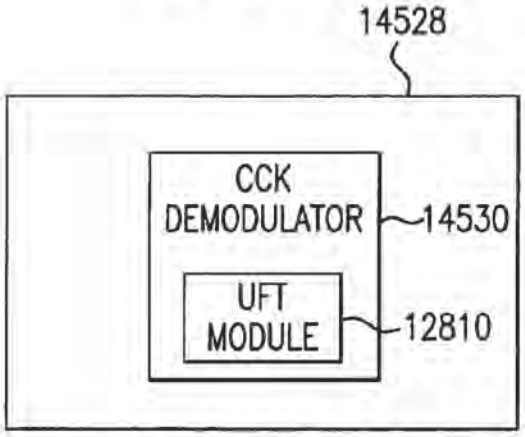


FIG.145C

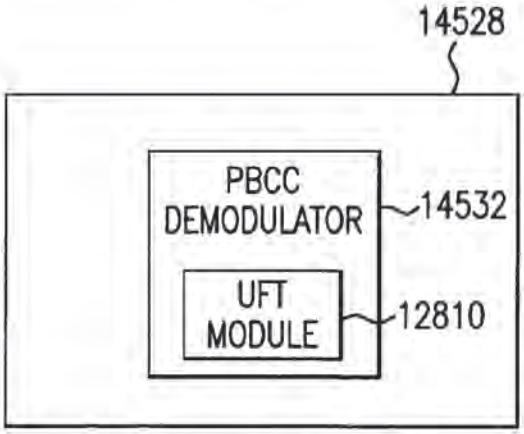


FIG.145D

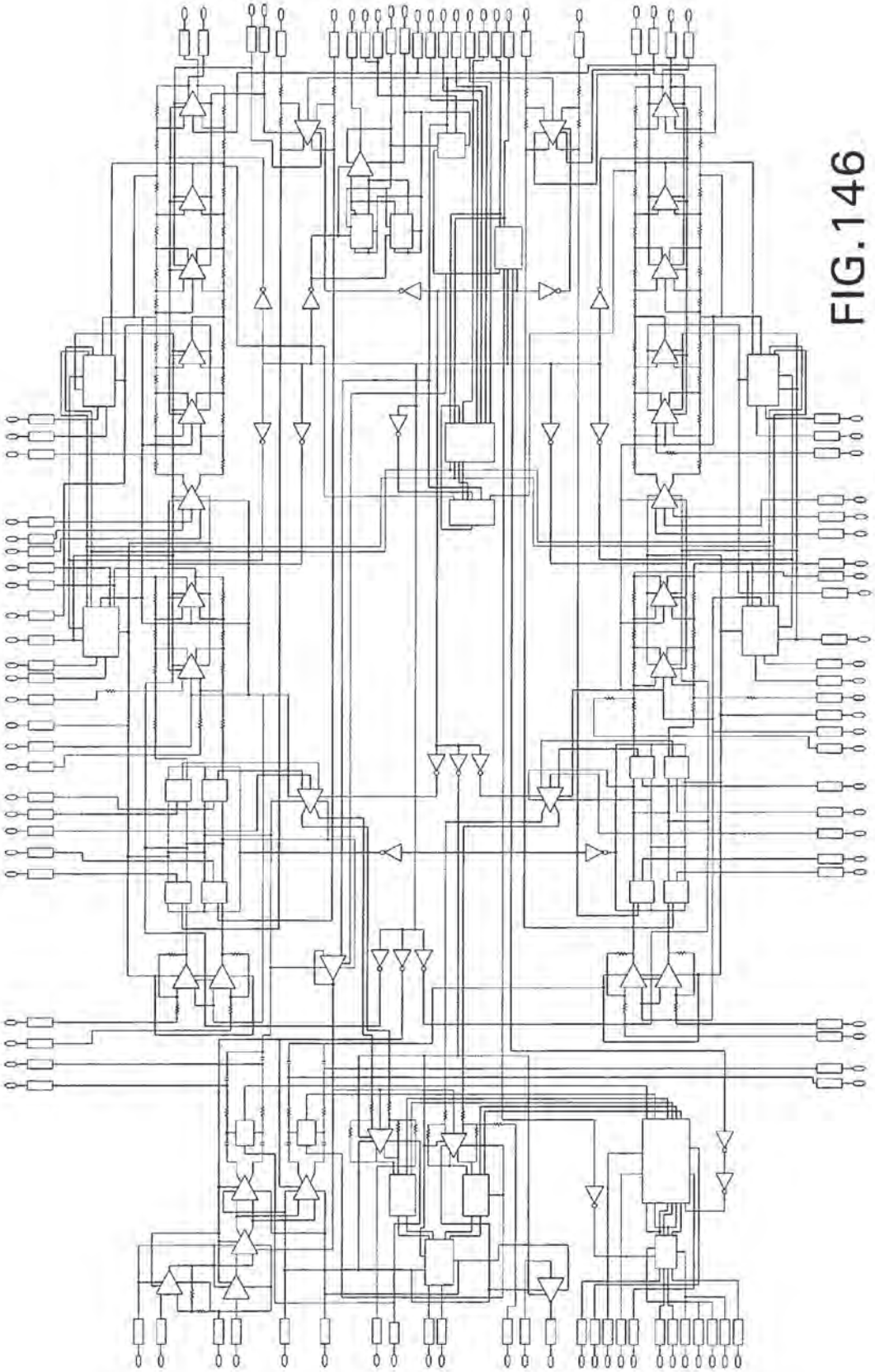


FIG. 146

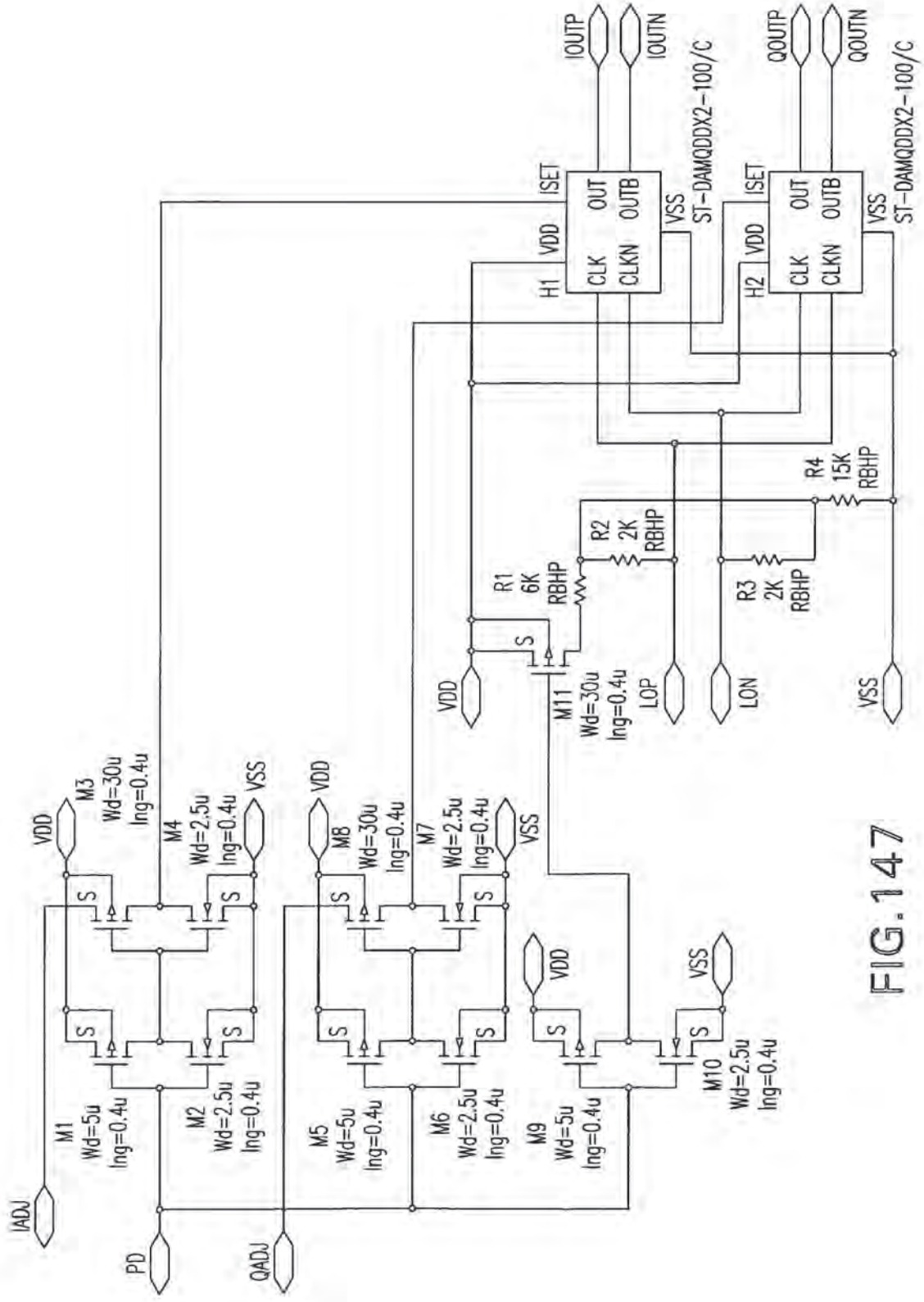

IOUTP
IOUTN
QOUTP
QOUTN
ST-DAMQDDX2-100/C
ST-DAMQDDX2-100/C
ISET
VDD
CLK
CLKN
OUT
OUTB
VSS
H1
H2
R1 6K RBHP
R2 2K RBHP
R3 2K RBHP
R4 15K RBHP
M11 Wd=30u lng=0.4u
LOP
LON
M1 Wd=5u lng=0.4u
M2 Wd=2.5u lng=0.4u
M3 Wd=30u lng=0.4u
M4 Wd=2.5u lng=0.4u
M5 Wd=5u lng=0.4u
M6 Wd=2.5u lng=0.4u
M7 Wd=2.5u lng=0.4u
M8 Wd=30u lng=0.4u
M9 Wd=5u lng=0.4u
M10 Wd=2.5u lng=0.4u
IADJ
QADJ
PD
S

FIG. 147

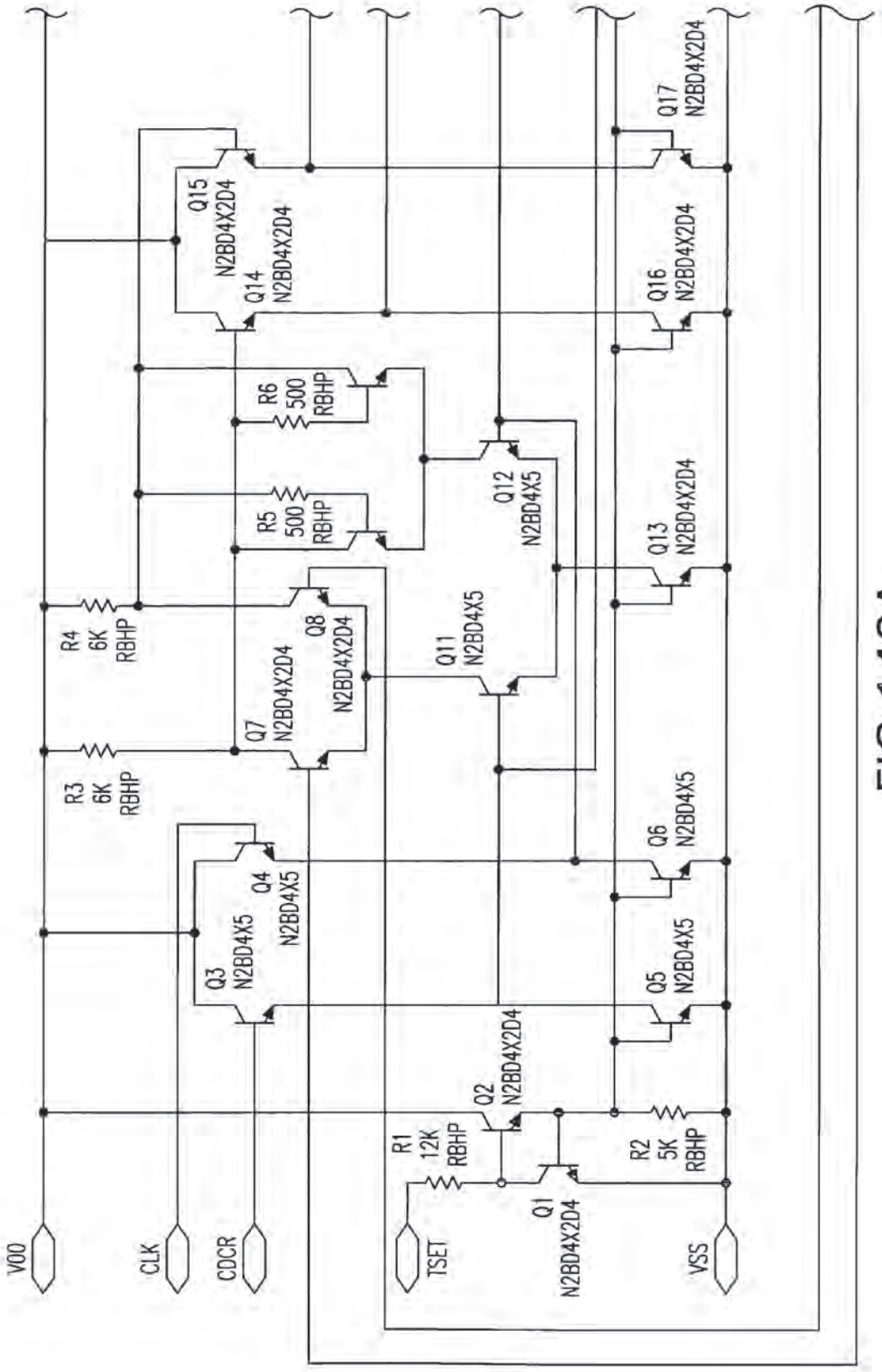

VDD
CLK
CDCR
TSET
VSS
R1 12K RBHP
R2 5K RBHP
R3 6K RBHP
R4 6K RBHP
R5 500 RBHP
R6 500 RBHP
Q1 N2BD4X2D4
Q2 N2BD4X2D4
Q3 N2BD4X5
Q4 N2BD4X5
Q5 N2BD4X5
Q6 N2BD4X5
Q7 N2BD4X2D4
Q8 N2BD4X2D4
Q11 N2BD4X5
Q12 N2BD4X5
Q13 N2BD4X2D4
Q14 N2BD4X2D4
Q15 N2BD4X2D4
Q16 N2BD4X2D4
Q17 N2BD4X2D4

FIG. 148A

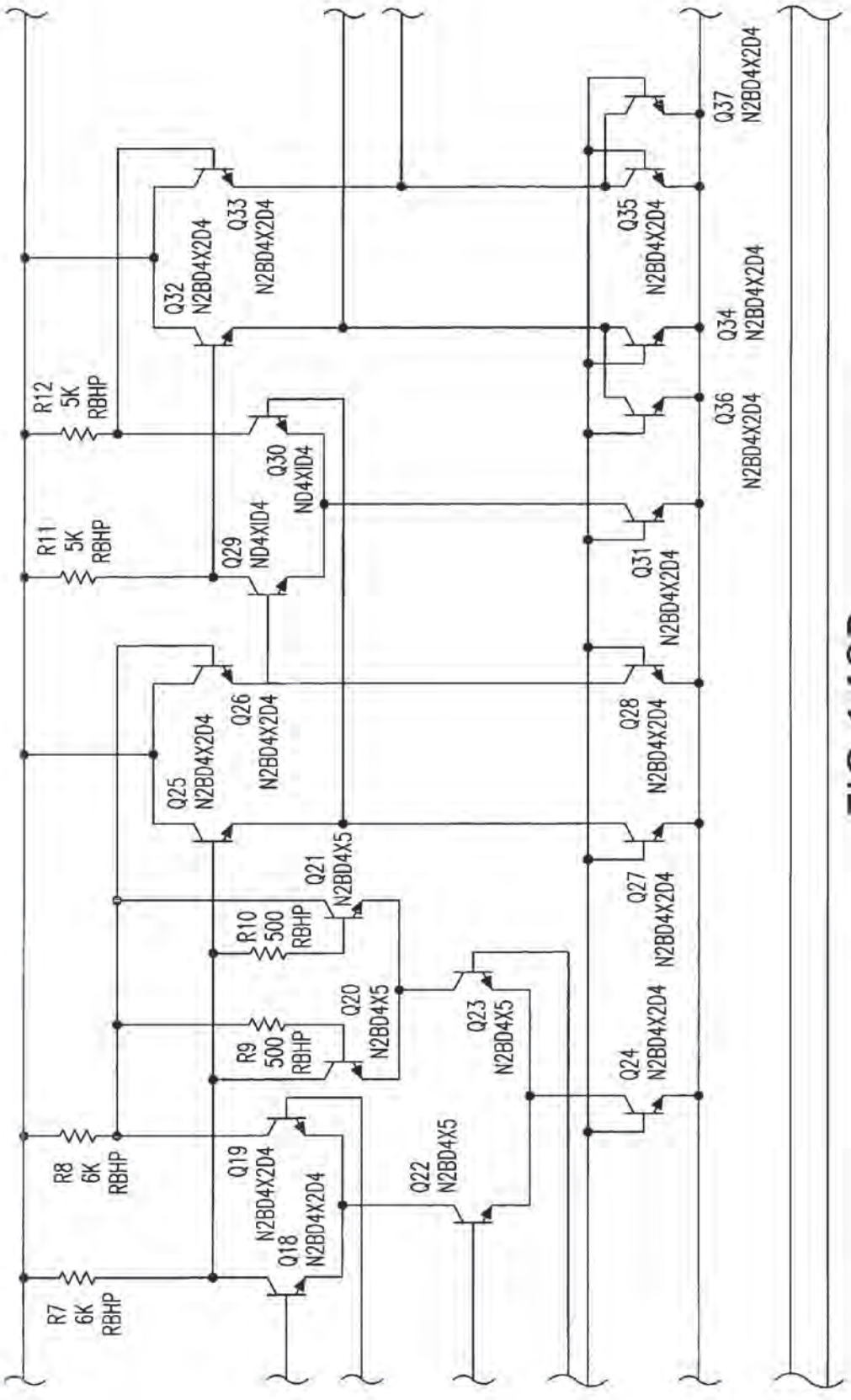

R12 5K RBHP
R11 5K RBHP
R8 6K RBHP
R7 6K RBHP
R10 500 RBHP
R9 500 RBHP
Q32 N2BD4X2D4
Q33 N2BD4X2D4
Q30 ND4XID4
Q29 ND4XID4
Q25 N2BD4X2D4
Q26 N2BD4X2D4
Q21 N2BD4X5
Q20 N2BD4X5
Q19 N2BD4X2D4
Q18 N2BD4X2D4
Q23 N2BD4X5
Q22 N2BD4X5
Q35 N2BD4X2D4
Q37 N2BD4X2D4
Q34 N2BD4X2D4
Q36 N2BD4X2D4
Q31 N2BD4X2D4
Q28 N2BD4X2D4
Q27 N2BD4X2D4
Q24 N2BD4X2D4

FIG.148B

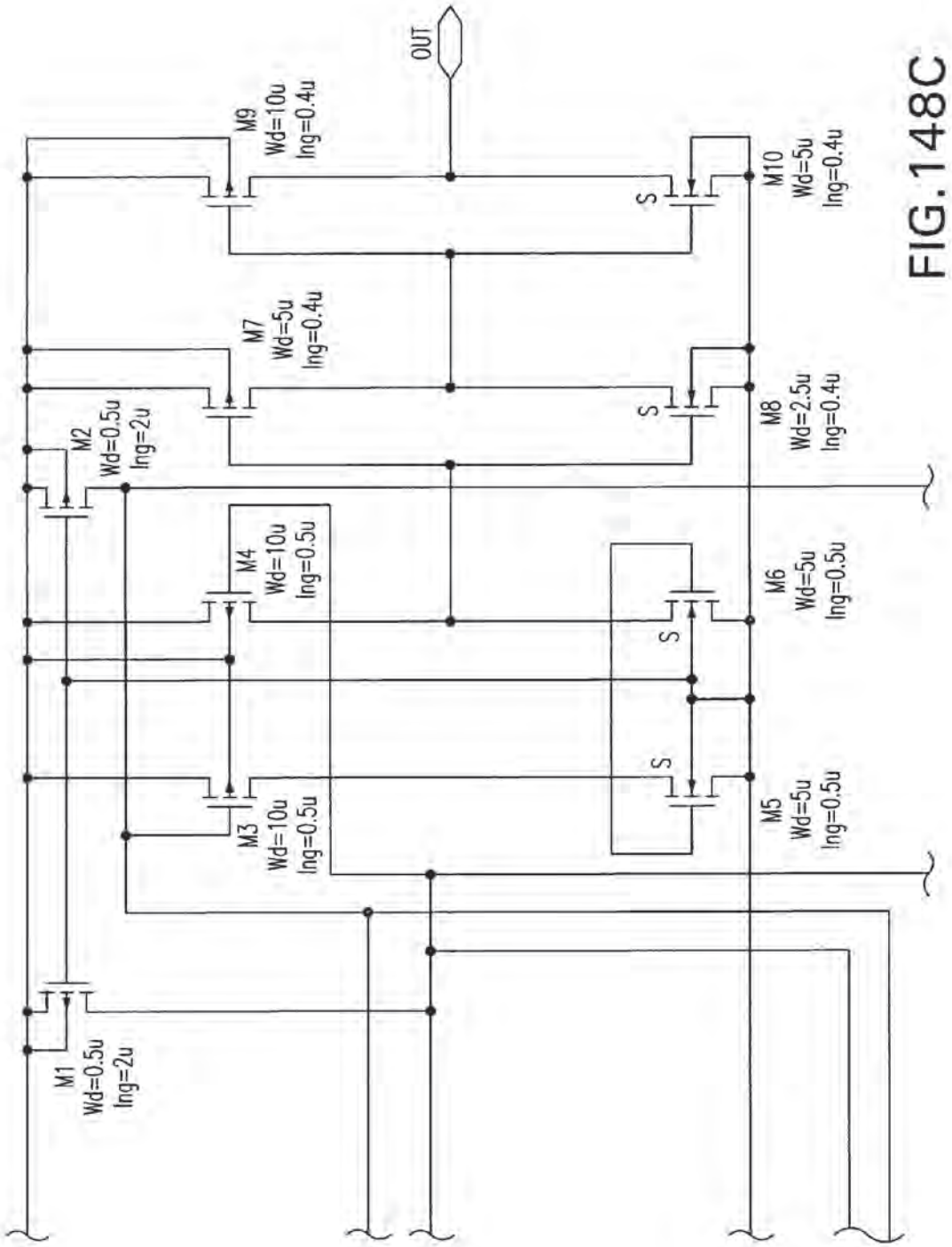

OUT
M9
Wd=10u
lng=0.4u
M10
Wd=5u
lng=0.4u
M7
Wd=5u
lng=0.4u
M8
Wd=2.5u
lng=0.4u
M2
Wd=0.5u
lng=2u
M4
Wd=10u
lng=0.5u
M6
Wd=5u
lng=0.5u
M3
Wd=10u
lng=0.5u
M5
Wd=5u
lng=0.5u
M1
Wd=0.5u
lng=2u
S

FIG. 148C

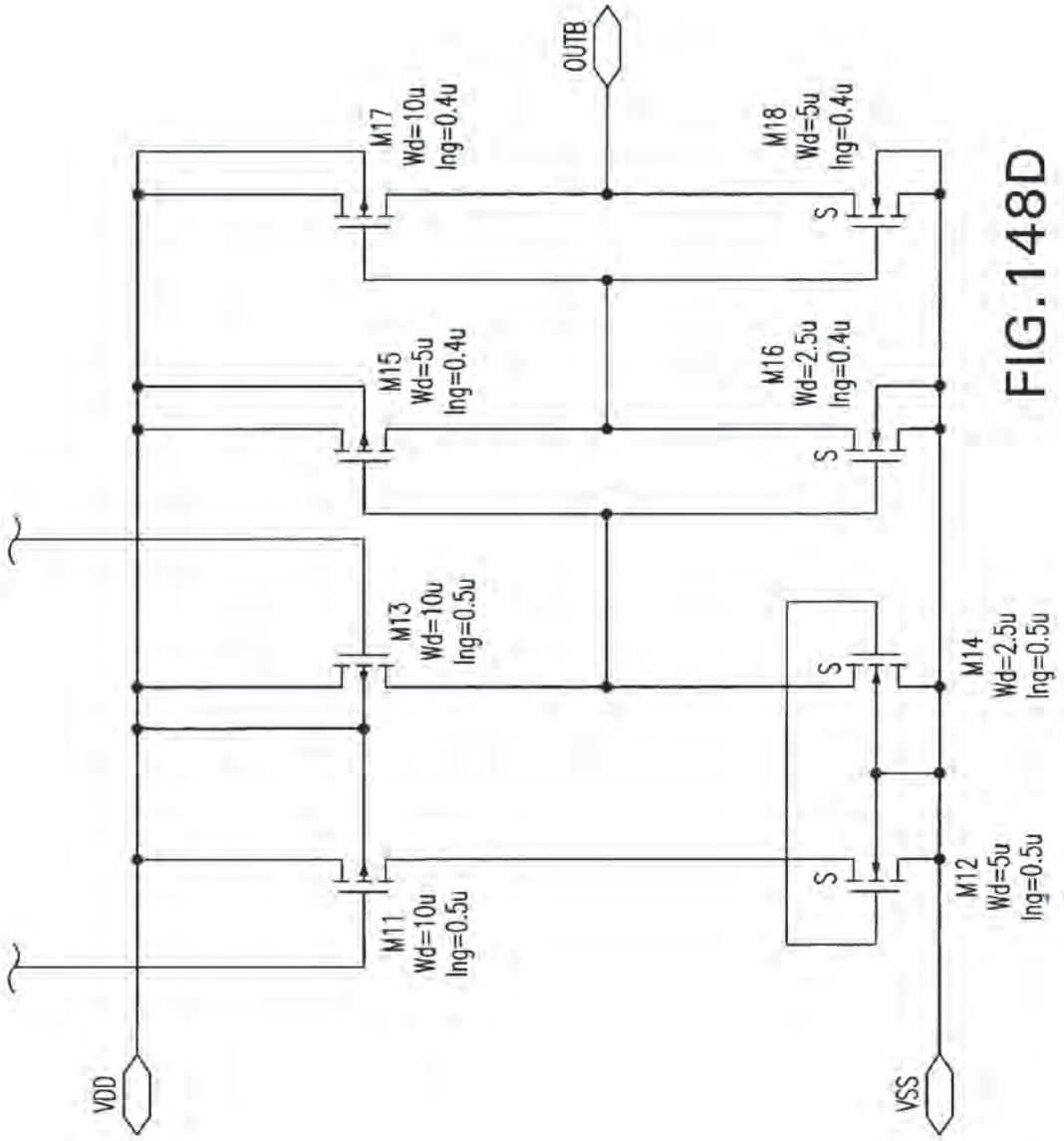

OUTB
M17
Wd=10u
lng=0.4u
M18
Wd=5u
lng=0.4u
M15
Wd=5u
lng=0.4u
M16
Wd=2.5u
lng=0.4u
M13
Wd=10u
lng=0.5u
M14
Wd=2.5u
lng=0.5u
M11
Wd=10u
lng=0.5u
M12
Wd=5u
lng=0.5u
VDD
VSS

FIG.148D

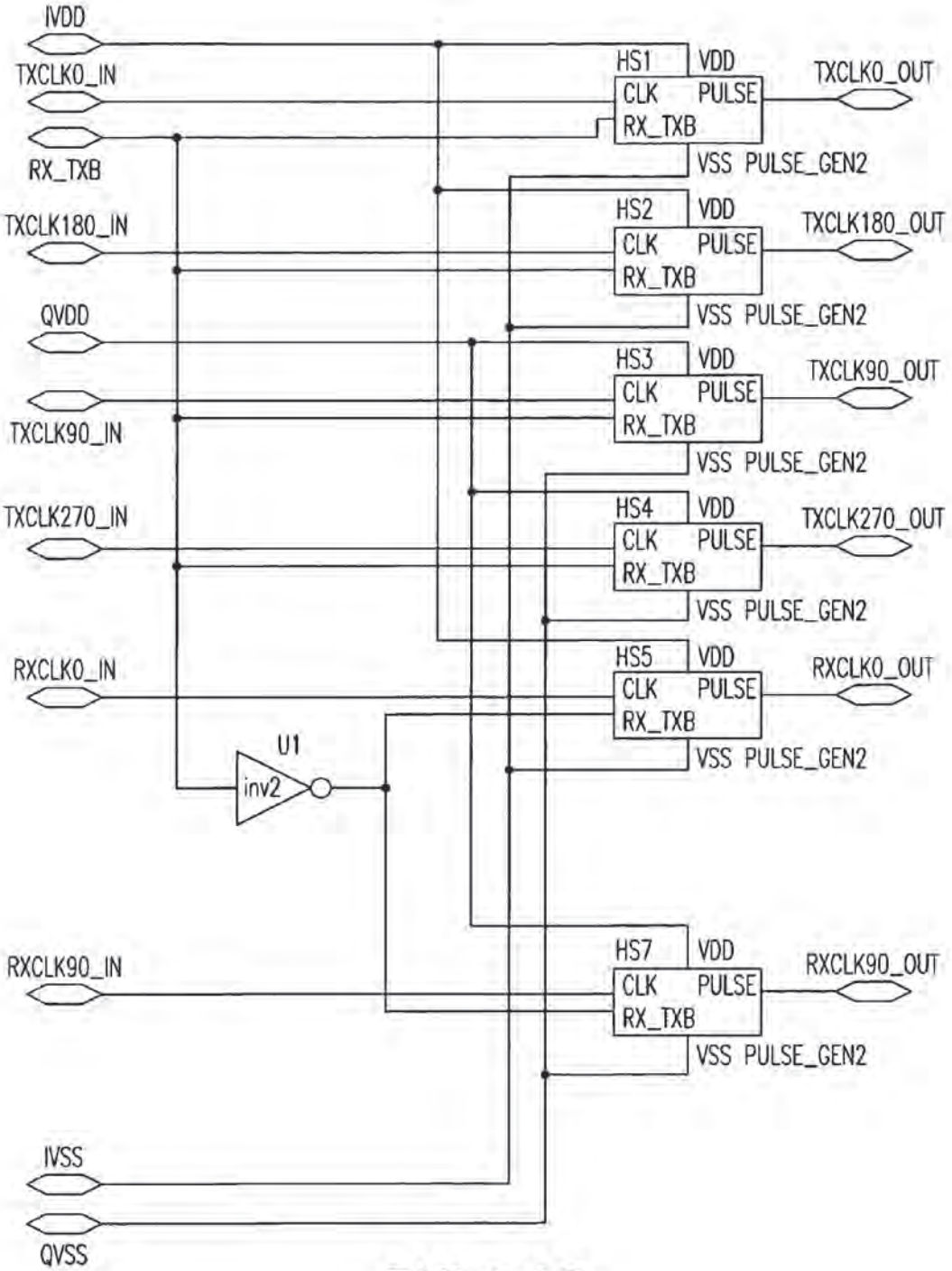

IVDD
TXCLK0_IN
RX_TXB
TXCLK180_IN
QVDD
TXCLK90_IN
TXCLK270_IN
RXCLK0_IN
RXCLK90_IN
IVSS
QVSS
U1
inv2
HS1
HS2
HS3
HS4
HS5
HS7
VDD
CLK
PULSE
RX_TXB
VSS
PULSE_GEN2
TXCLK0_OUT
TXCLK180_OUT
TXCLK90_OUT
TXCLK270_OUT
RXCLK0_OUT
RXCLK90_OUT

FIG.149

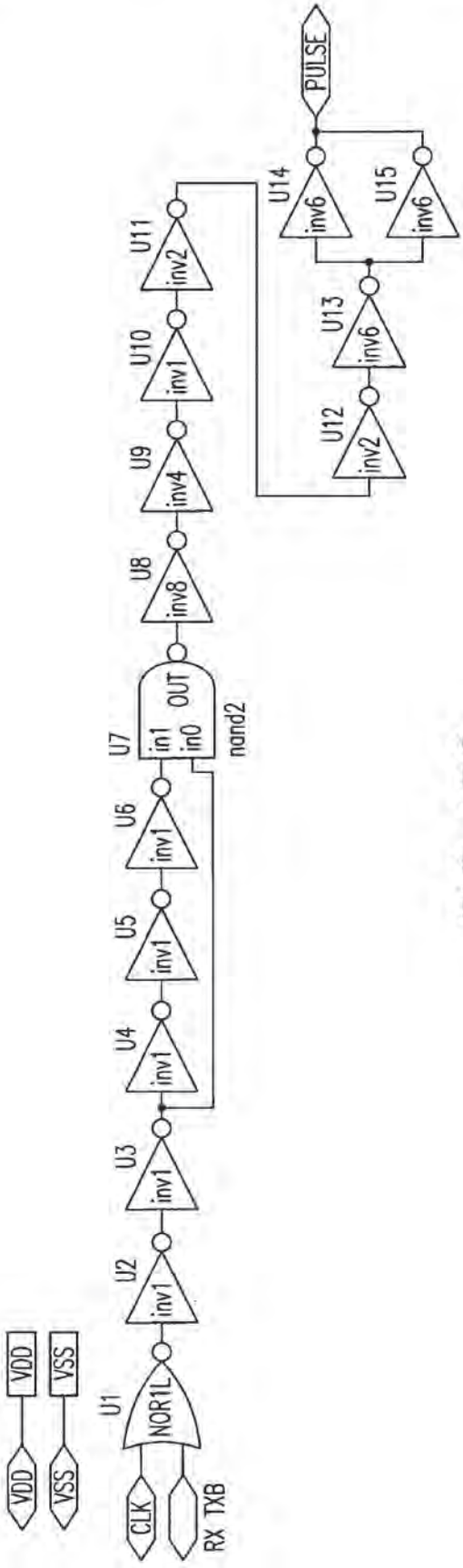

VDD
VSS
VDD
VSS
U1
NOR1L
CLK
RX TXB
U2
inv1
U3
inv1
U4
inv1
U5
inv1
U6
inv1
U7
in1
in0
OUT
nand2
U8
inv8
U9
inv4
U10
inv1
U11
inv2
U12
inv2
U13
inv6
U14
inv6
U15
inv6
PULSE

FIG. 150

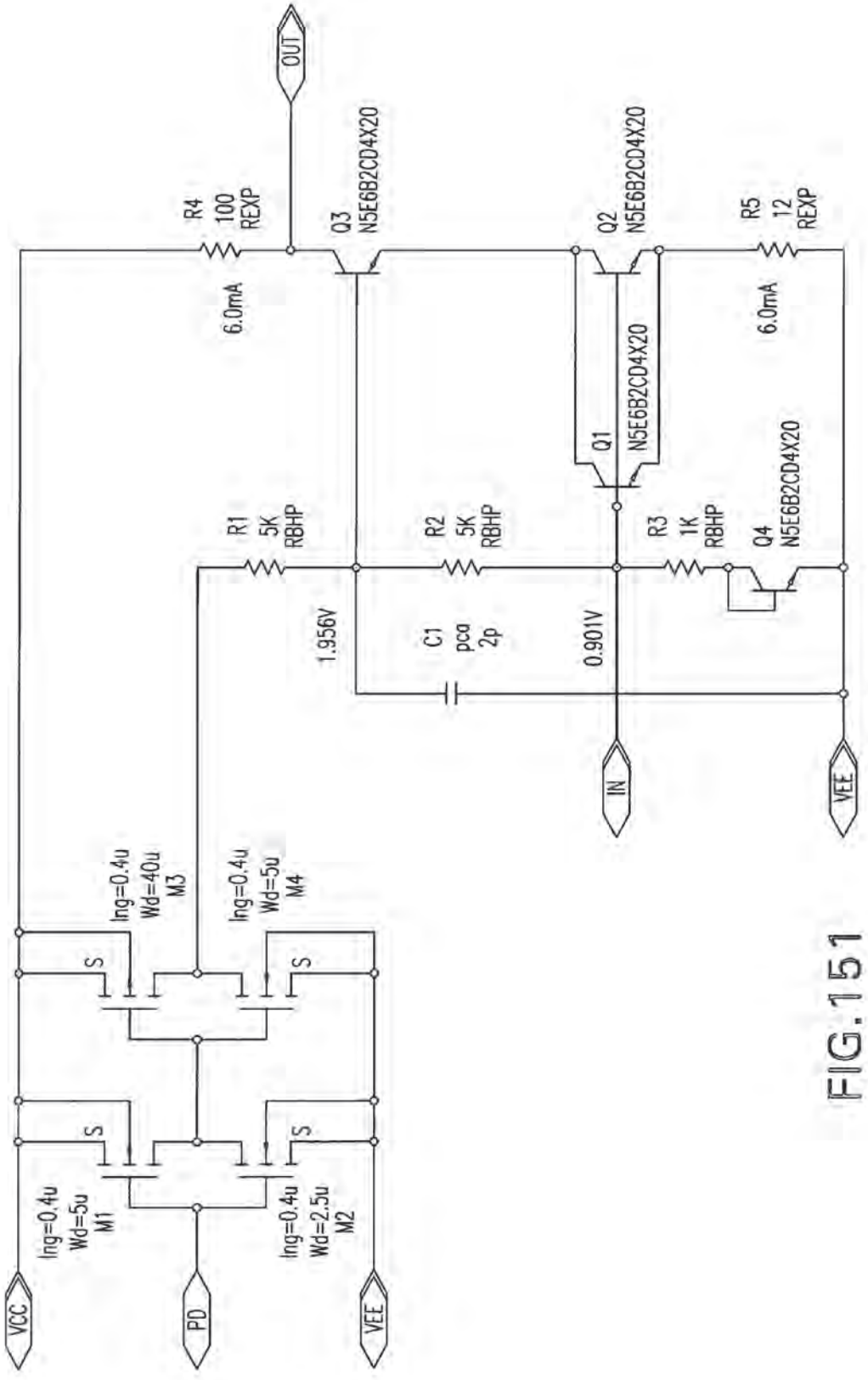

OUT
R4
100
REXP
6.0mA
Q3
N5E6B2CD4X20
Q2
N5E6B2CD4X20
R5
12
REXP
6.0mA
Q1
N5E6B2CD4X20
Q4
N5E6B2CD4X20
R1
5K
RBHP
R2
5K
RBHP
R3
1K
RBHP
1.956V
C1
pca
2p
0.901V
IN
VEE
lng=0.4u
Wd=40u
M3
lng=0.4u
Wd=5u
M4
S
lng=0.4u
Wd=5u
M1
lng=0.4u
Wd=2.5u
M2
VCC
PD
VEE

FIG. 151

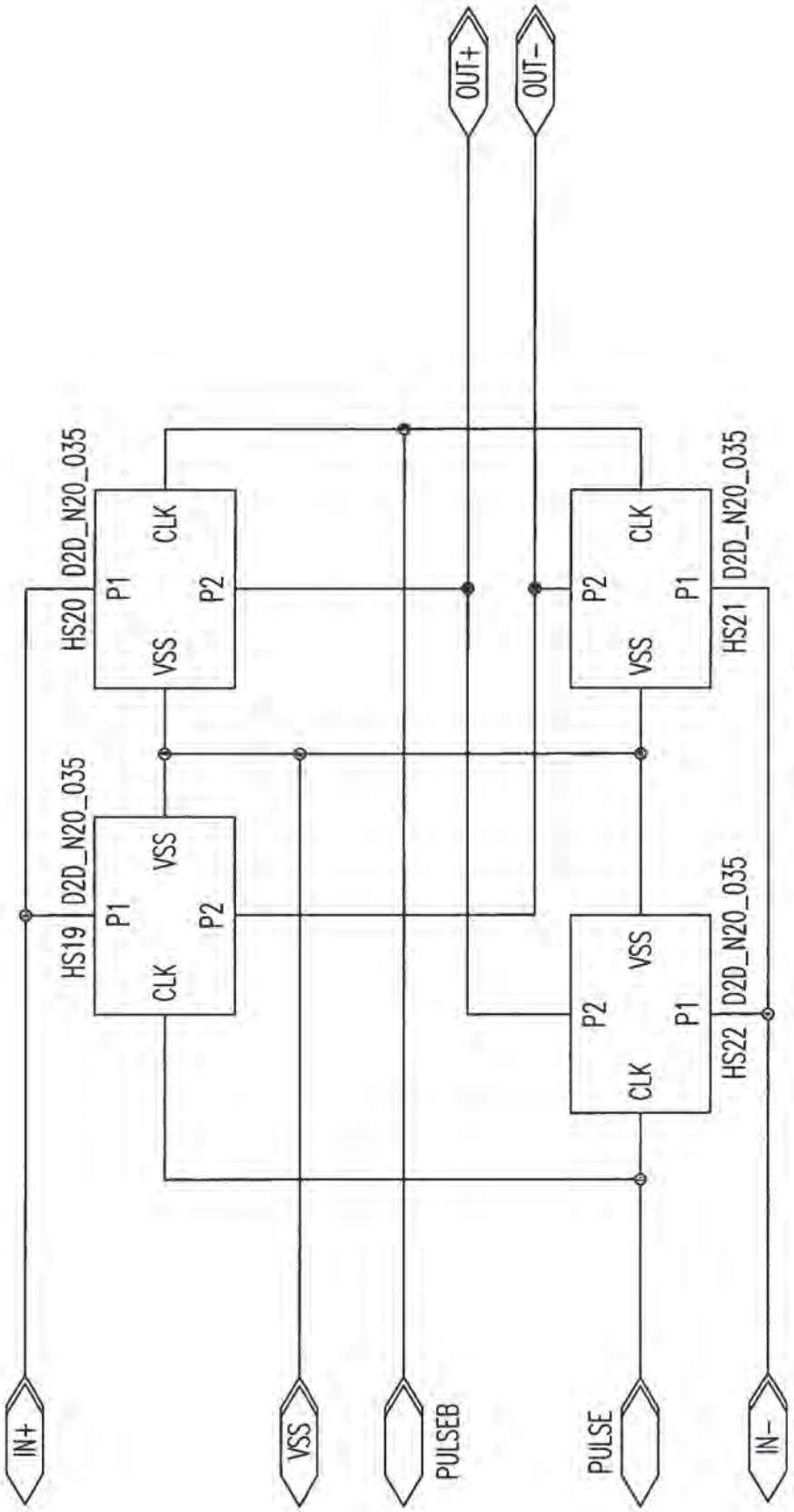

OUT+
OUT-
D2D_N20_035
HS20
P1
CLK
P2
VSS
D2D_N20_035
HS21
P2
CLK
P1
VSS
D2D_N20_035
HS19
P1
VSS
P2
CLK
D2D_N20_035
HS22
P2
VSS
P1
CLK
IN+
VSS
PULSEB
PULSE
IN-

FIG. 152

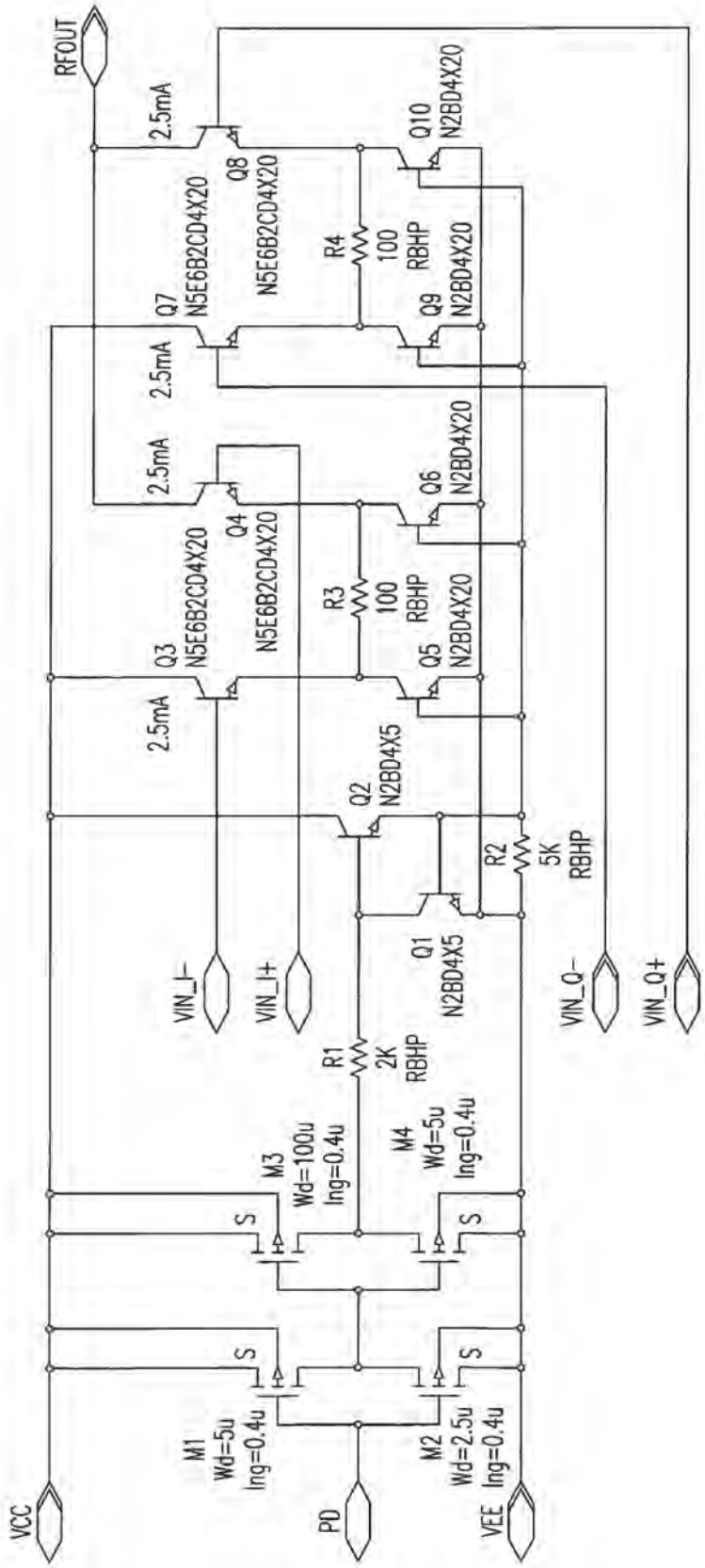

RFOUT
2.5mA
Q8
N5E6B2CD4X20
Q10
N2BD4X20
R4
100
RBHP
Q7
N5E6B2CD4X20
Q9
N2BD4X20
2.5mA
2.5mA
Q6
N2BD4X20
Q4
N5E6B2CD4X20
R3
100
RBHP
Q3
N5E6B2CD4X20
Q5
N2BD4X20
2.5mA
Q2
N2BD4X5
R2
5K
RBHP
Q1
N2BD4X5
VIN_I-
VIN_I+
VIN_Q-
VIN_Q+
R1
2K
RBHP
M3
Wd=100u
lng=0.4u
M4
Wd=5u
lng=0.4u
S
S
S
S
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
VCC
PD
VEE

FIG. 153

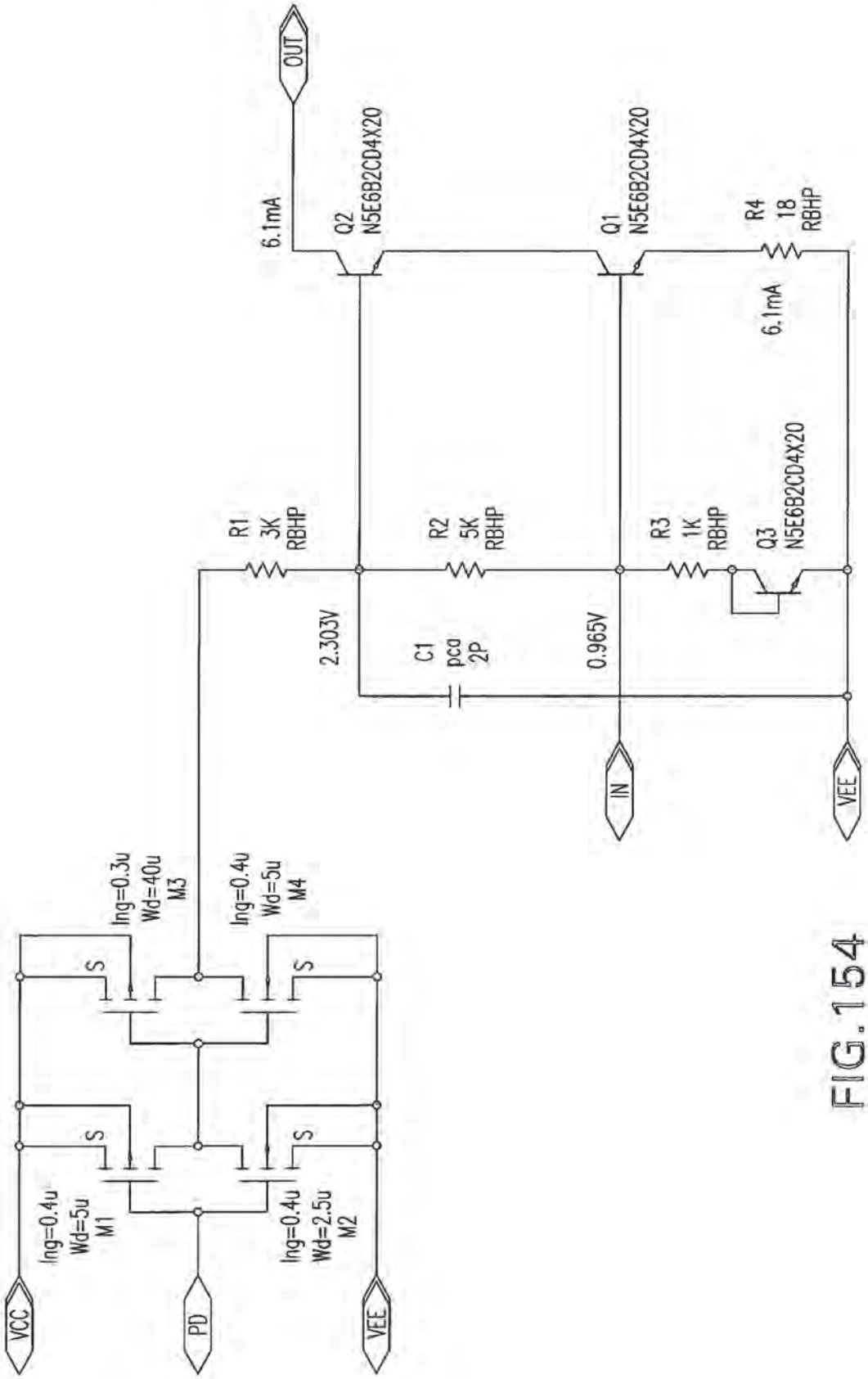

OUT
6.1mA
Q2
N5E6B2CD4X20
Q1
N5E6B2CD4X20
R4
18
RBHP
6.1mA
R1
3K
RBHP
R2
5K
RBHP
R3
1K
RBHP
Q3
N5E6B2CD4X20
2.303V
C1
pca
2P
0.965V
IN
VEE
lng=0.3u
Wd=40u
M3
lng=0.4u
Wd=5u
M4
S
S
S
S
lng=0.4u
Wd=5u
M1
lng=0.4u
Wd=2.5u
M2
VCC
PD
VEE

FIG. 154

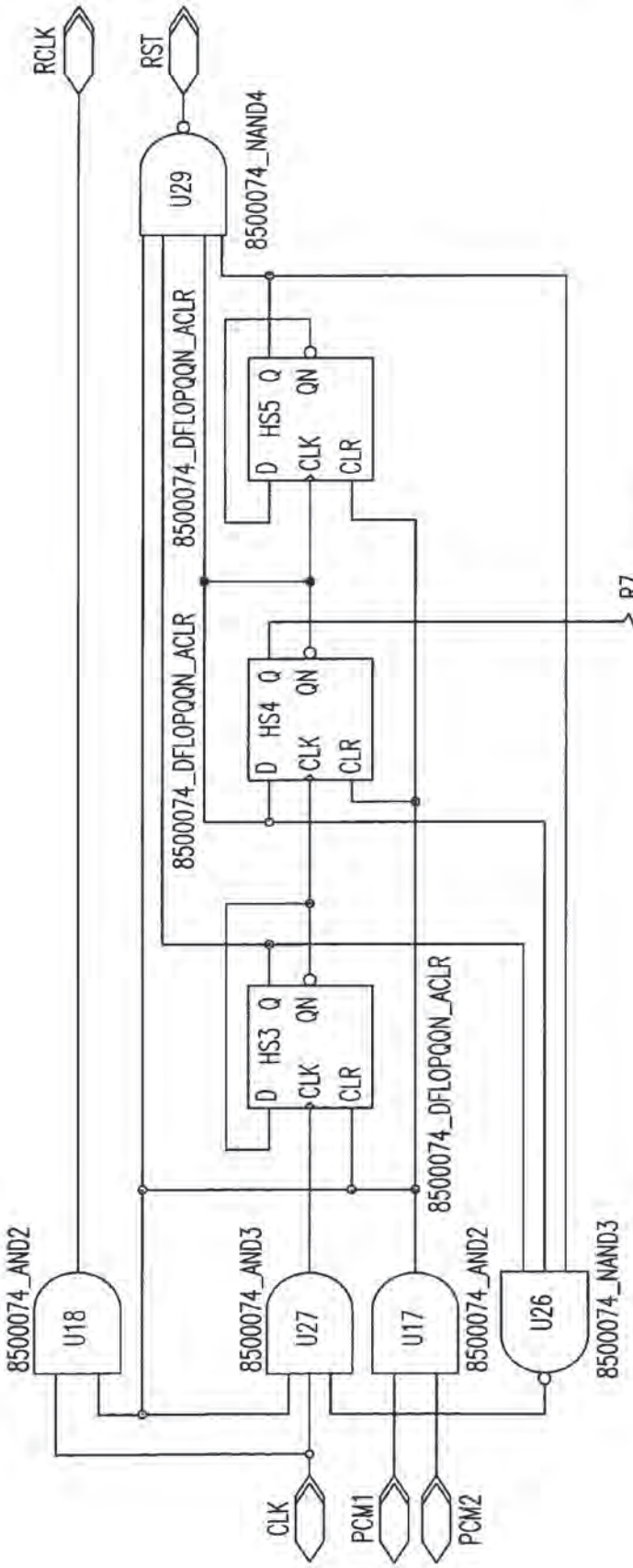

RCLK
RST
U29
8500074_NAND4
8500074_DFLOPQQN_ACLR
HS5
HS4
HS3
D
Q
QN
CLK
CLR
R7
1E6
VSS
RESISTOR FOR SIMULATION
8500074_AND2
U18
8500074_AND3
U27
U17
8500074_AND2
U26
8500074_NAND3
CLK
PCM1
PCM2

FIG. 155

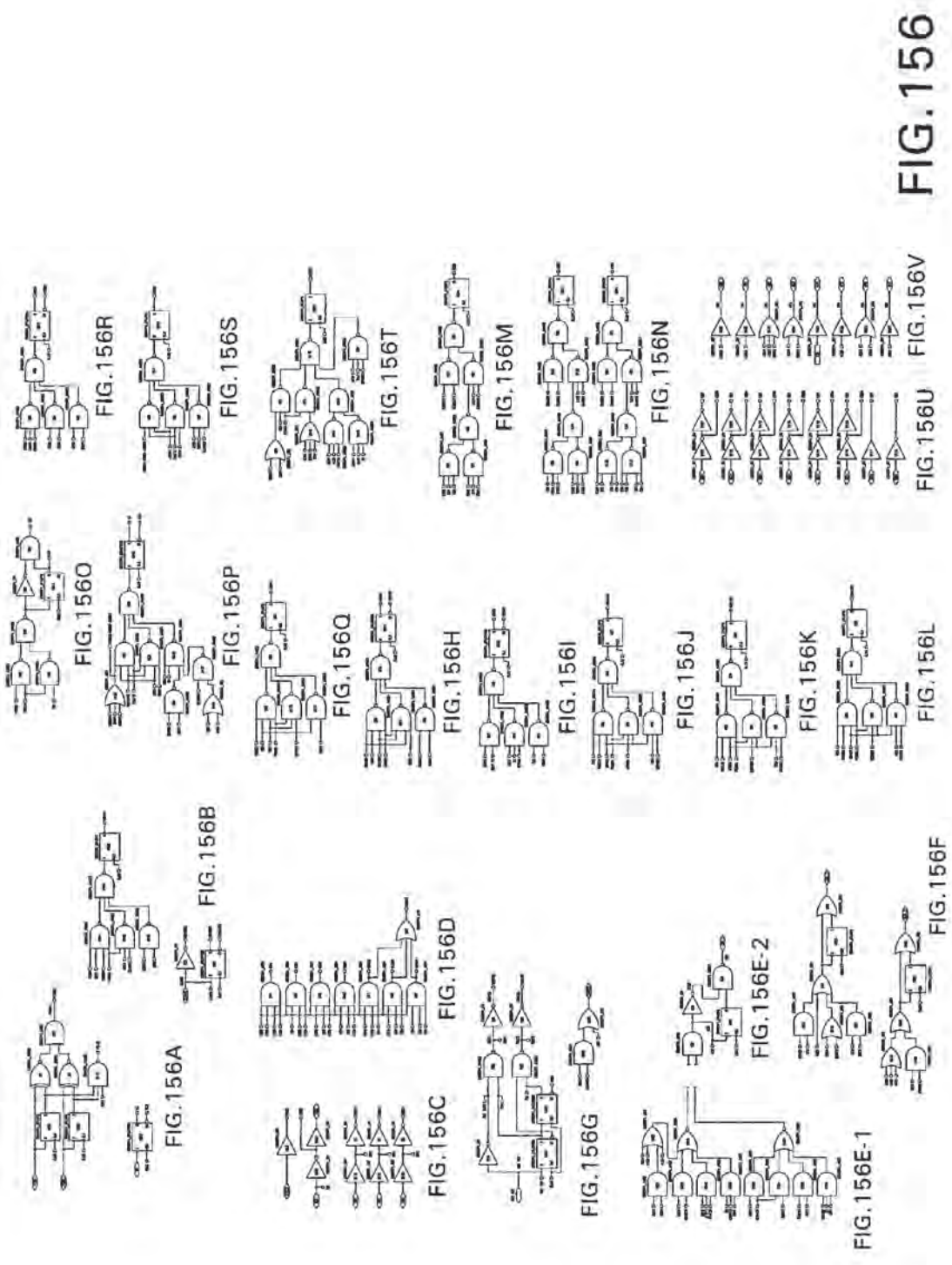
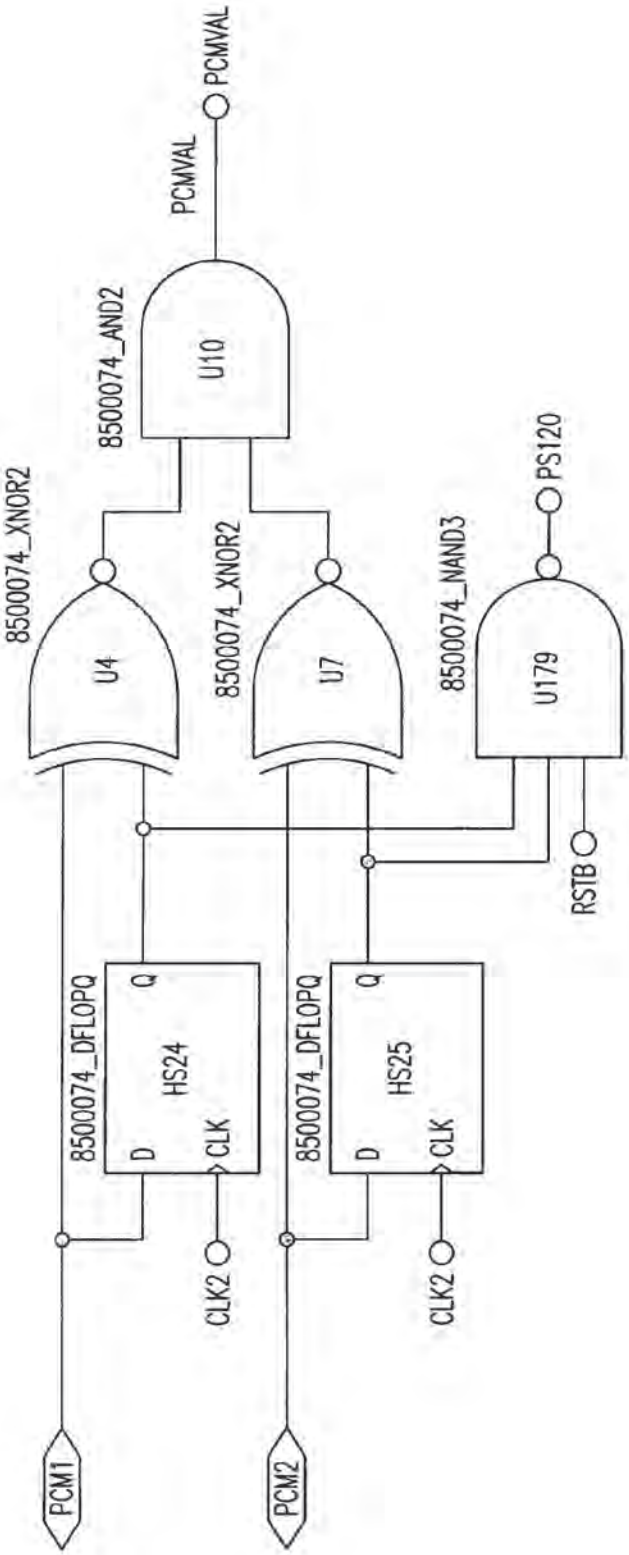

FIG.156A
FIG.156B
FIG.156C
FIG.156D
FIG.156E-1
FIG.156E-2
FIG.156F
FIG.156G
FIG.156H
FIG.156I
FIG.156J
FIG.156K
FIG.156L
FIG.156M
FIG.156N
FIG.156O
FIG.156P
FIG.156Q
FIG.156R
FIG.156S
FIG.156T
FIG.156U
FIG.156V

FIG.156


PCMVAL
PCMVAL
8500074_AND2
U10
8500074_XNOR2
U4
8500074_XNOR2
U7
8500074_NAND3
U179
PS120
RSTB
8500074_DFLOPQ
HS24
D
Q
CLK
8500074_DFLOPQ
HS25
D
Q
CLK
CLK2
CLK2
PCM1
PCM2

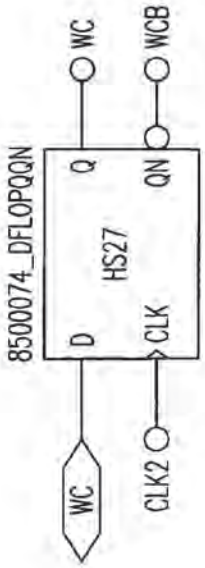

WC
WCB
8500074_DFLOPQQN
HS27
D
Q
QN
CLK
WC
CLK2

FIG. 156A

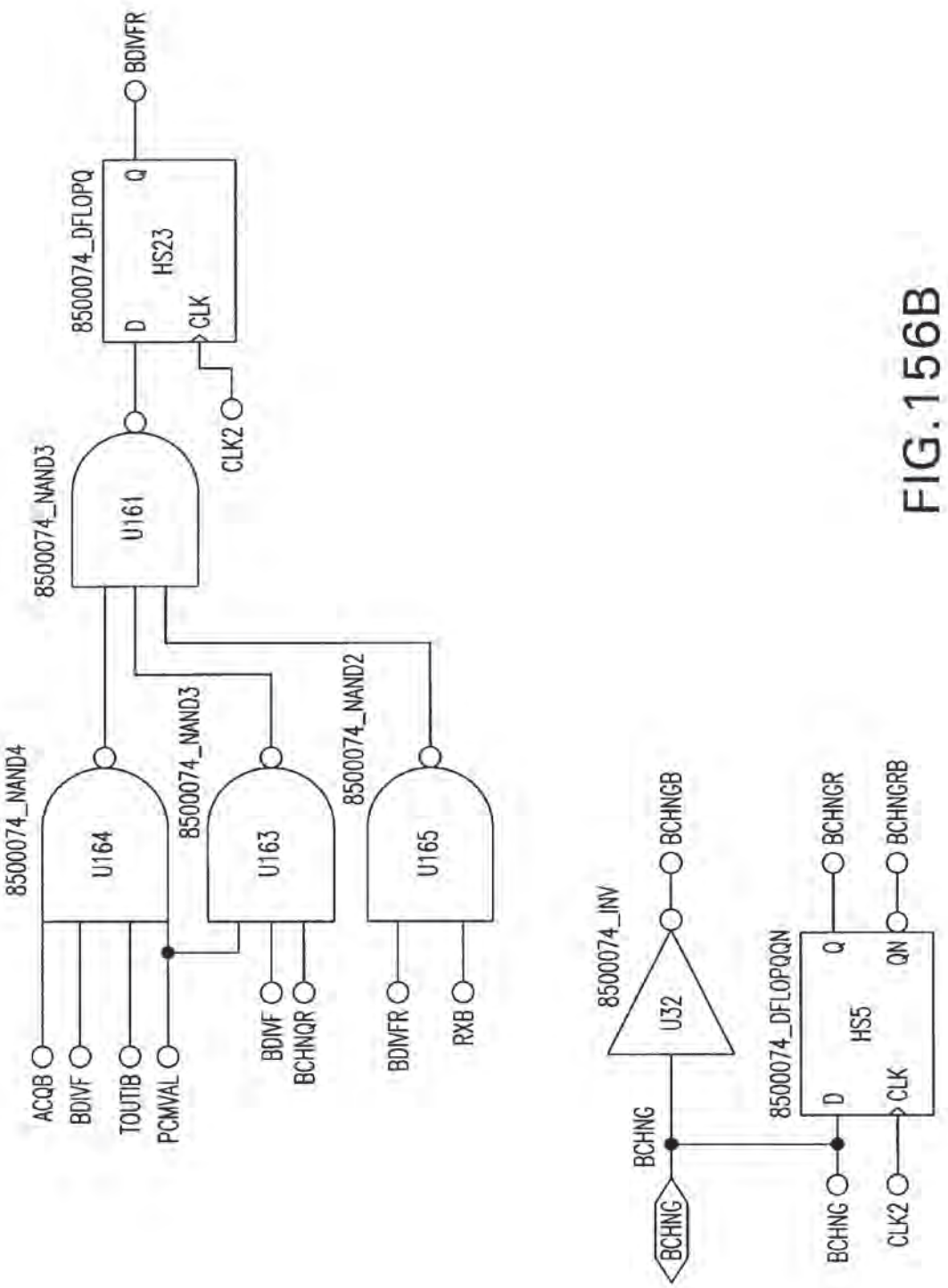

BDIVFR
8500074_DFLOPQ
HS23
D
Q
CLK
CLK2
8500074_NAND3
U161
8500074_NAND4
U164
8500074_NAND3
U163
8500074_NAND2
U165
ACQB
BDIVF
TOUTIB
PCMVAL
BDIVF
BCHNQR
BDIVFR
RXB
8500074_INV
U32
BCHNGB
BCHNG
BCHNG
8500074_DFLOPQQN
HS5
D
Q
QN
CLK
BCHNGR
BCHNGRB
CLK2

FIG. 156B

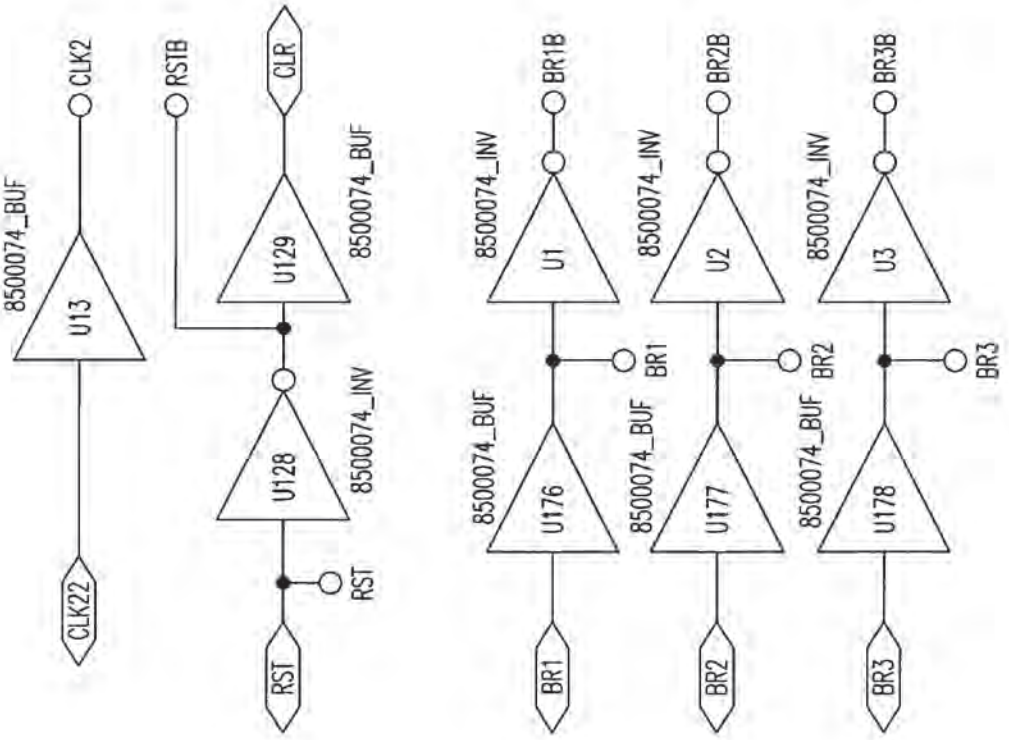

CLK2
8500074_BUF
U13
CLK22
RSTB
CLR
U129
8500074_BUF
U128
8500074_INV
RST
RST
BR1B
8500074_INV
U1
BR1
8500074_BUF
U176
BR1
BR2B
8500074_INV
U2
BR2
8500074_BUF
U177
BR2
BR3B
8500074_INV
U3
BR3
8500074_BUF
U178
BR3

FIG.156C

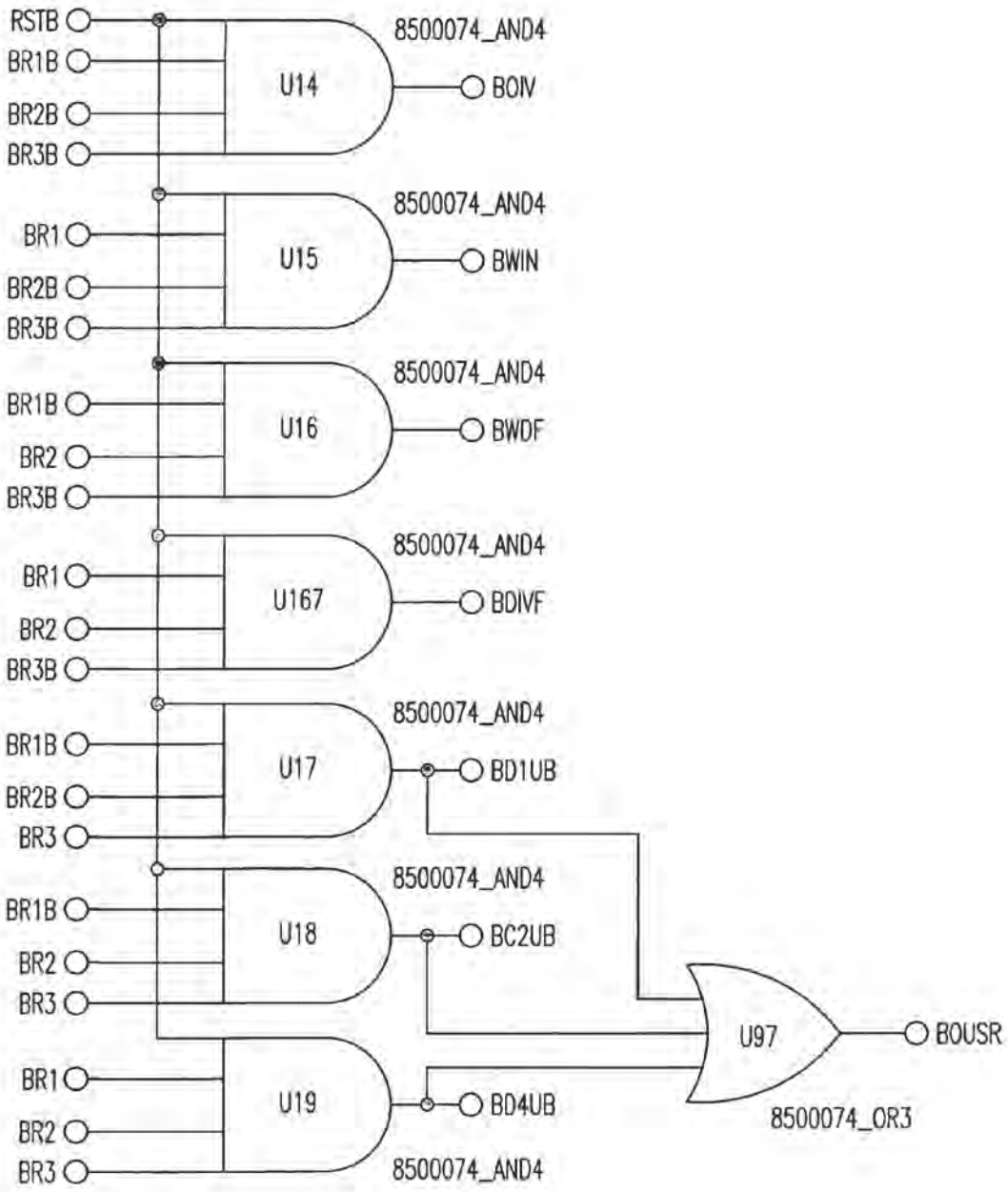

RSTB
BR1B
BR2B
BR3B
U14
8500074_AND4
BOIV
BR1
BR2B
BR3B
U15
8500074_AND4
BWIN
BR1B
BR2
BR3B
U16
8500074_AND4
BWDF
BR1
BR2
BR3B
U167
8500074_AND4
BDIVF
BR1B
BR2B
BR3
U17
8500074_AND4
BD1UB
BR1B
BR2
BR3
U18
8500074_AND4
BC2UB
BR1
BR2
BR3
U19
BD4UB
8500074_AND4
U97
BOUSR
8500074_OR3

FIG. 156D

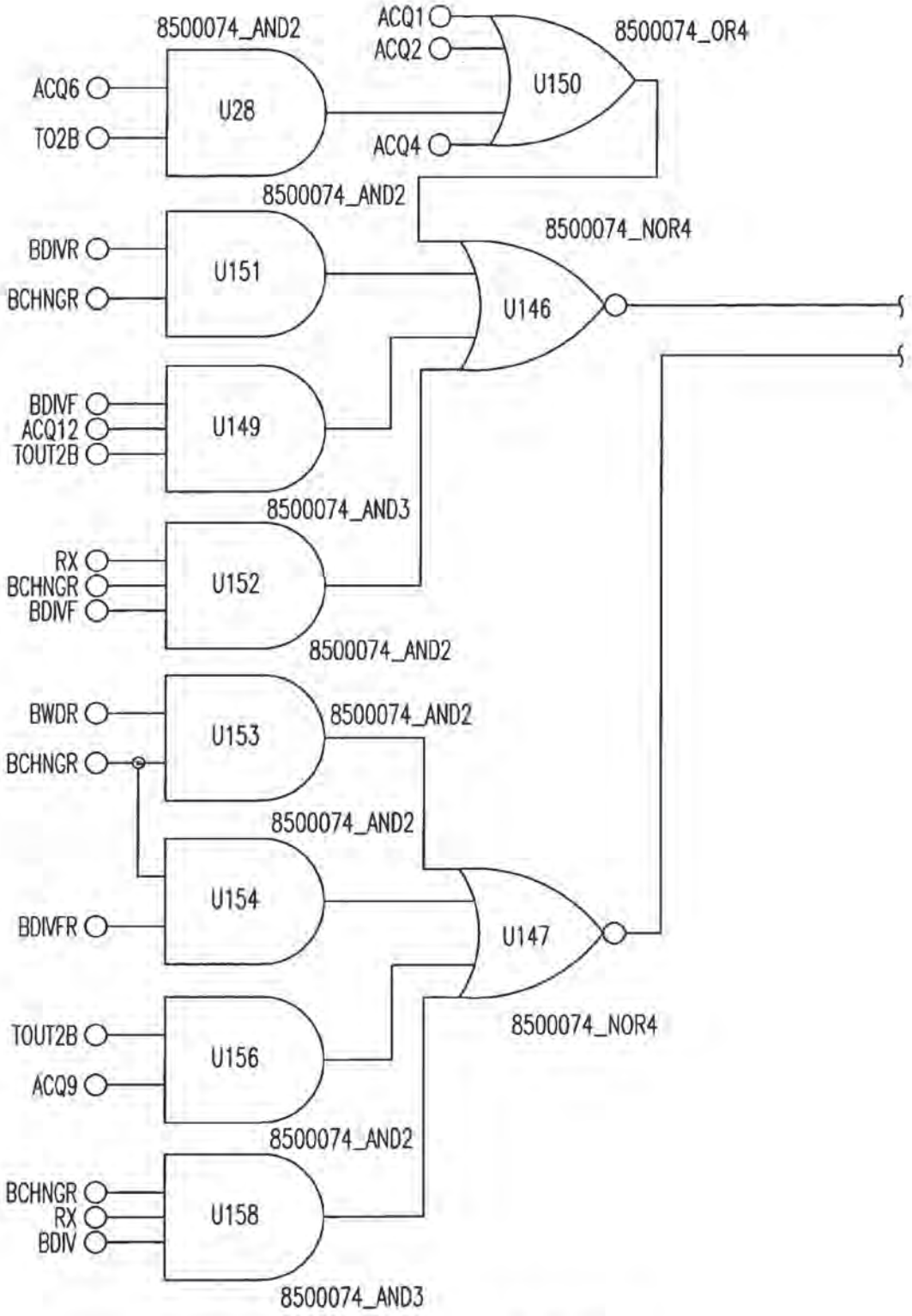

8500074_AND2
U28
ACQ6
TO2B
ACQ1
ACQ2
ACQ4
U150
8500074_OR4
8500074_AND2
U151
BDIVR
BCHNGR
8500074_NOR4
U146
U149
BDIVF
ACQ12
TOUT2B
8500074_AND3
U152
RX
BCHNGR
BDIVF
8500074_AND2
U153
BWDR
BCHNGR
8500074_AND2
8500074_AND2
U154
BDIVFR
U147
8500074_NOR4
U156
TOUT2B
ACQ9
8500074_AND2
U158
BCHNGR
RX
BDIV
8500074_AND3

FIG.156E-1

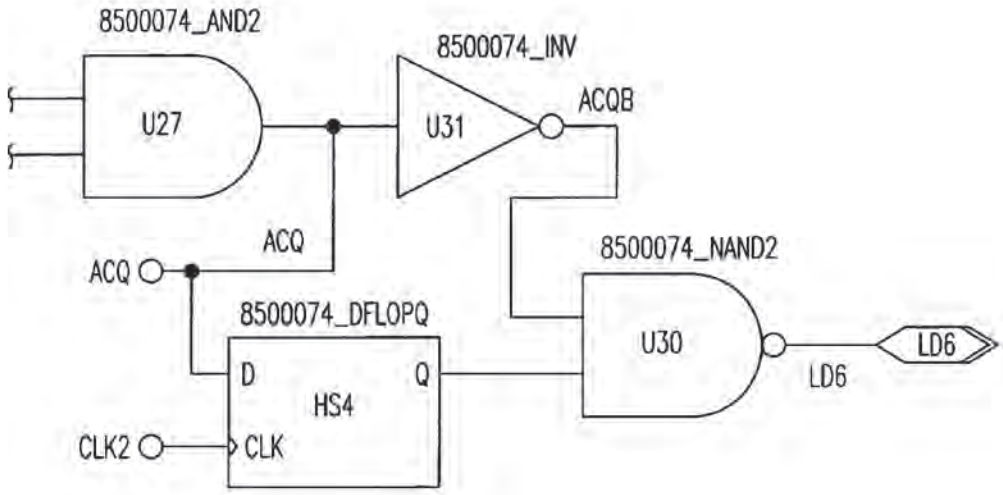

8500074_AND2
U27
8500074_INV
U31
ACQB
ACQ
ACQ
8500074_NAND2
U30
LD6
LD6
8500074_DFLOPQ
D
Q
HS4
CLK2
CLK

FIG.156E-2

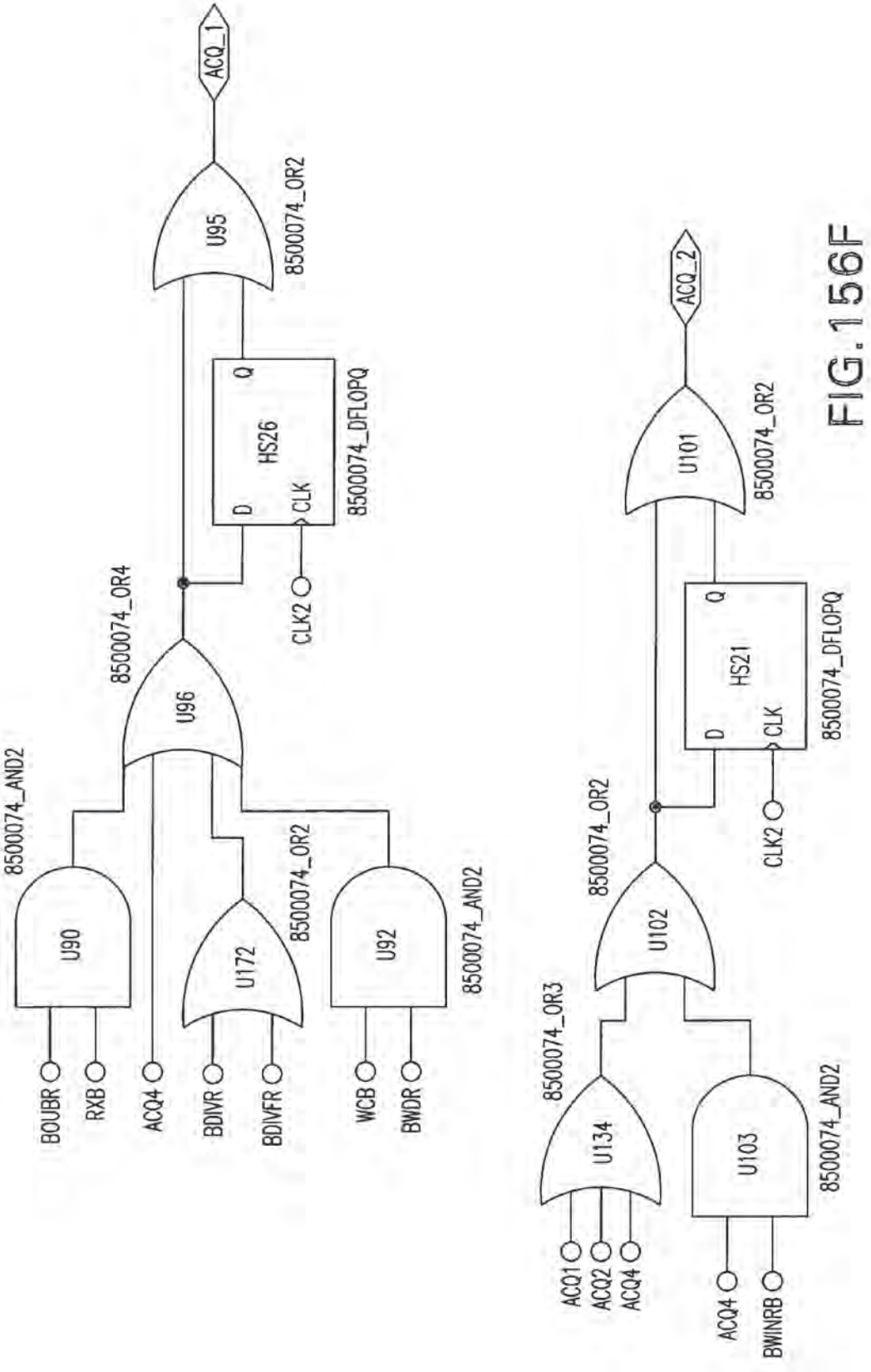
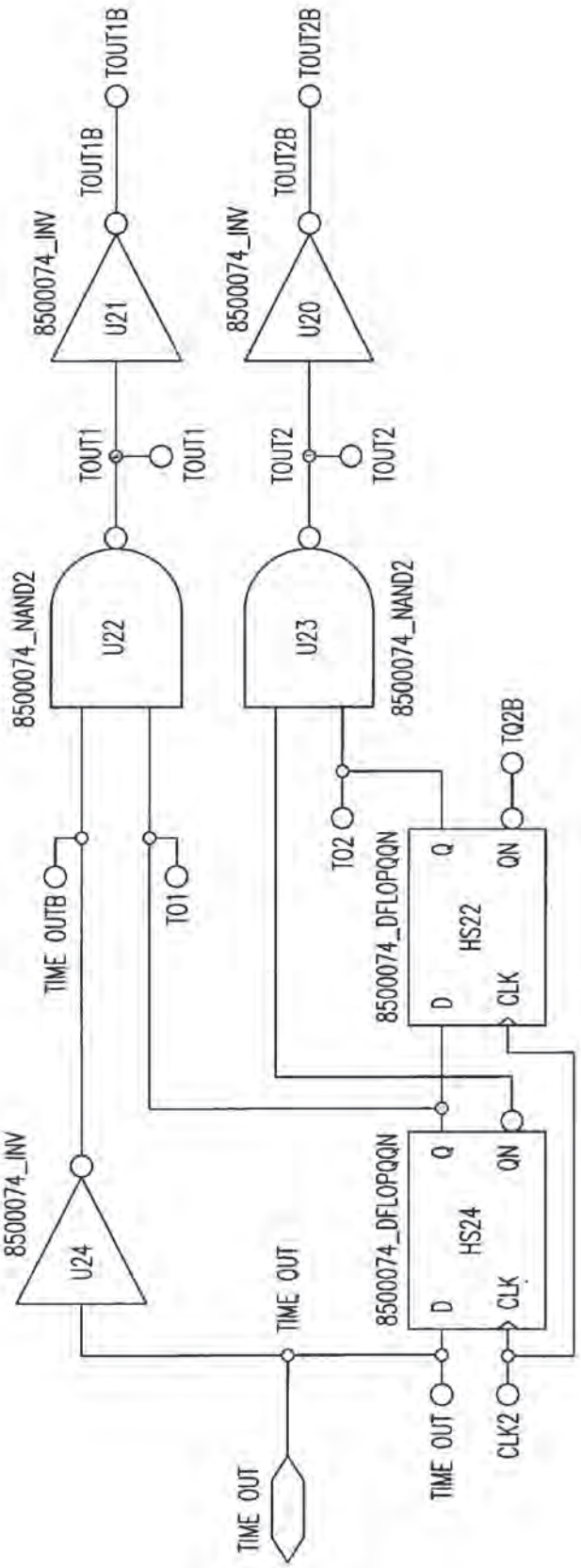

ACQ_1
U95
8500074_OR2
HS26
D
Q
CLK
8500074_DFLOPQ
CLK2
U96
8500074_OR4
8500074_AND2
U90
U172
8500074_OR2
U92
8500074_AND2
BOUBR
RXB
ACQ4
BDIVR
BDIVFR
WCB
BWDR
ACQ_2
U101
8500074_OR2
HS21
D
Q
CLK
8500074_DFLOPQ
CLK2
8500074_OR2
U102
8500074_OR3
U134
U103
8500074_AND2
ACQ1
ACQ2
ACQ4
ACQ4
BWINRB

FIG. 156F


TOUT1B
TOUT1B
8500074_INV
U21
TOUT2B
TOUT2B
8500074_INV
U20
TOUT1
TOUT1
TOUT2
TOUT2
8500074_NAND2
U22
8500074_NAND2
U23
TQ2B
TO2
TIME OUTB
TO1
8500074_DFLOPQQN
HS22
Q
QN
D
CLK
8500074_INV
U24
TIME OUT
8500074_DFLOPQQN
HS24
Q
QN
D
CLK
TIME OUT
TIME OUT
CLK2

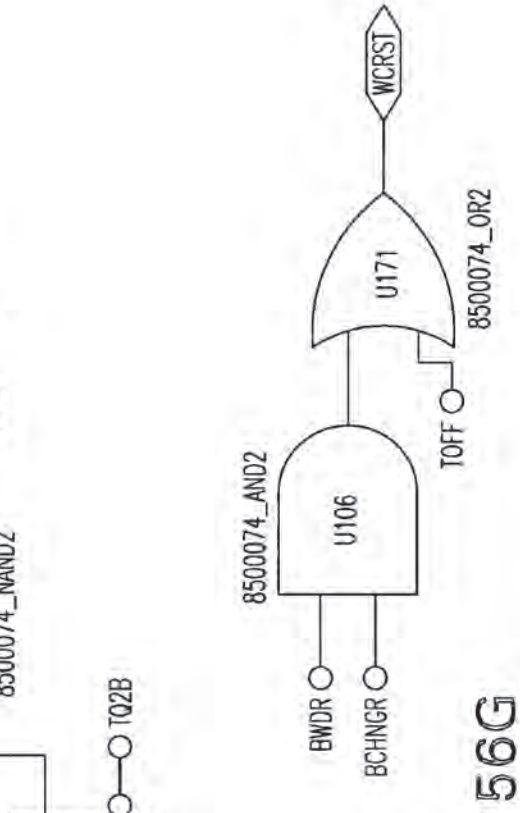

WCRST
8500074_OR2
U171
TOFF
8500074_AND2
U106
BWDR
BCHNGR

FIG. 156G

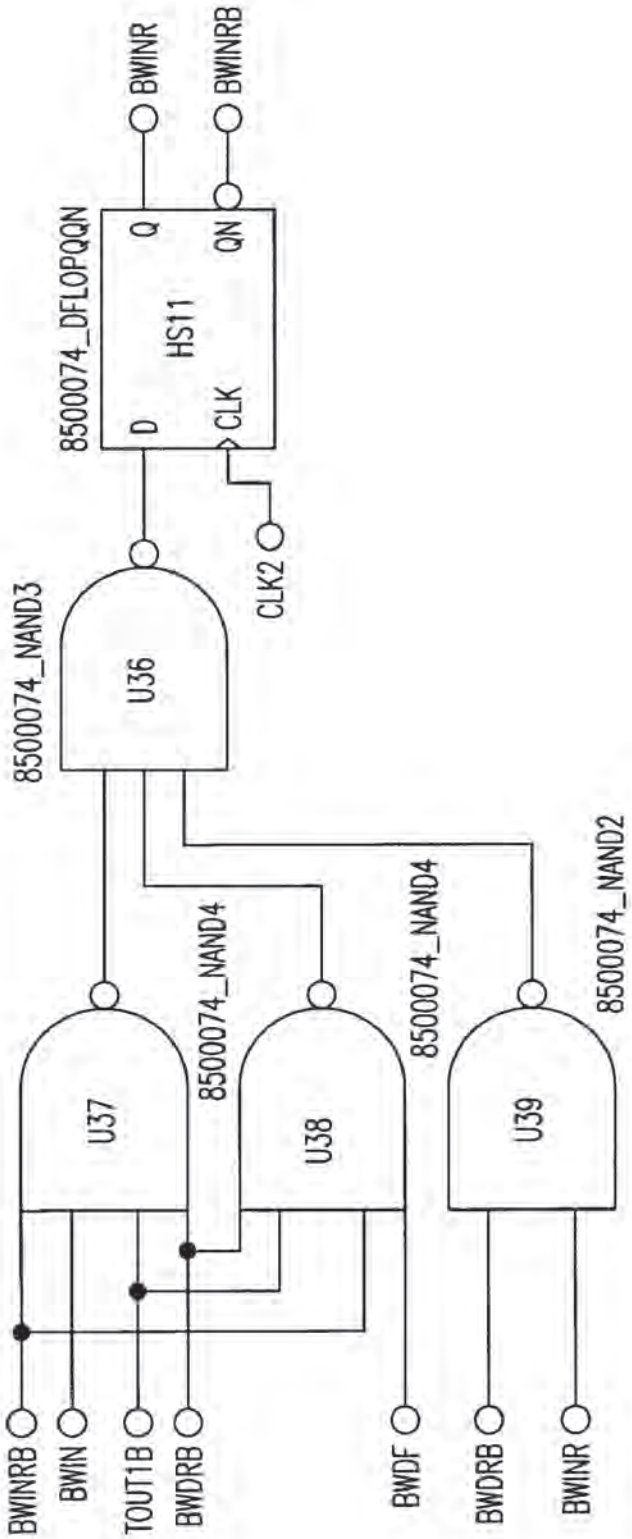

BWINR
BWINRB
8500074_DFLOPQQN
HS11
Q
QN
D
CLK
CLK2
8500074_NAND3
U36
8500074_NAND4
U37
8500074_NAND4
U38
8500074_NAND2
U39
BWINRB
BWIN
TOUT1B
BWDRB
BWDF
BWDRB
BWINR

FIG.156H

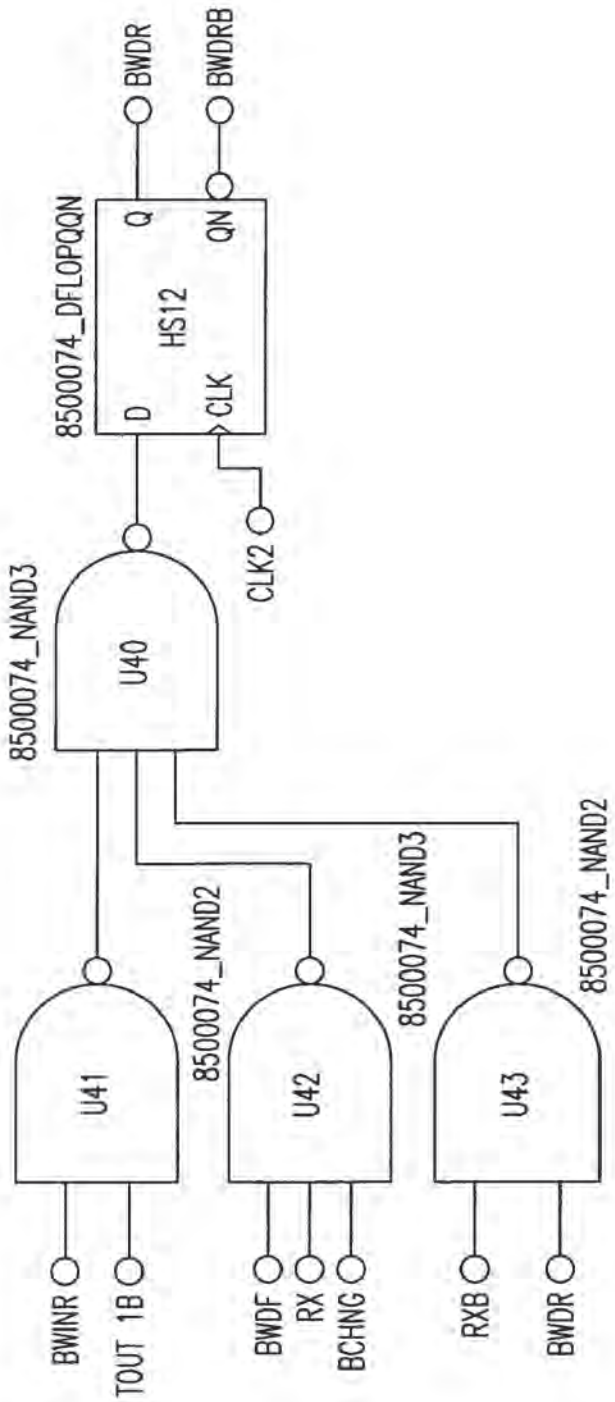

BWDR
BWDRB
8500074_DFLOPQQN
Q
QN
HS12
D
CLK
CLK2
8500074_NAND3
U40
8500074_NAND2
U41
8500074_NAND2
U42
8500074_NAND3
U43
BWINR
TOUT 1B
BWDF
RX
BCHNG
RXB
BWDR

FIG.156I

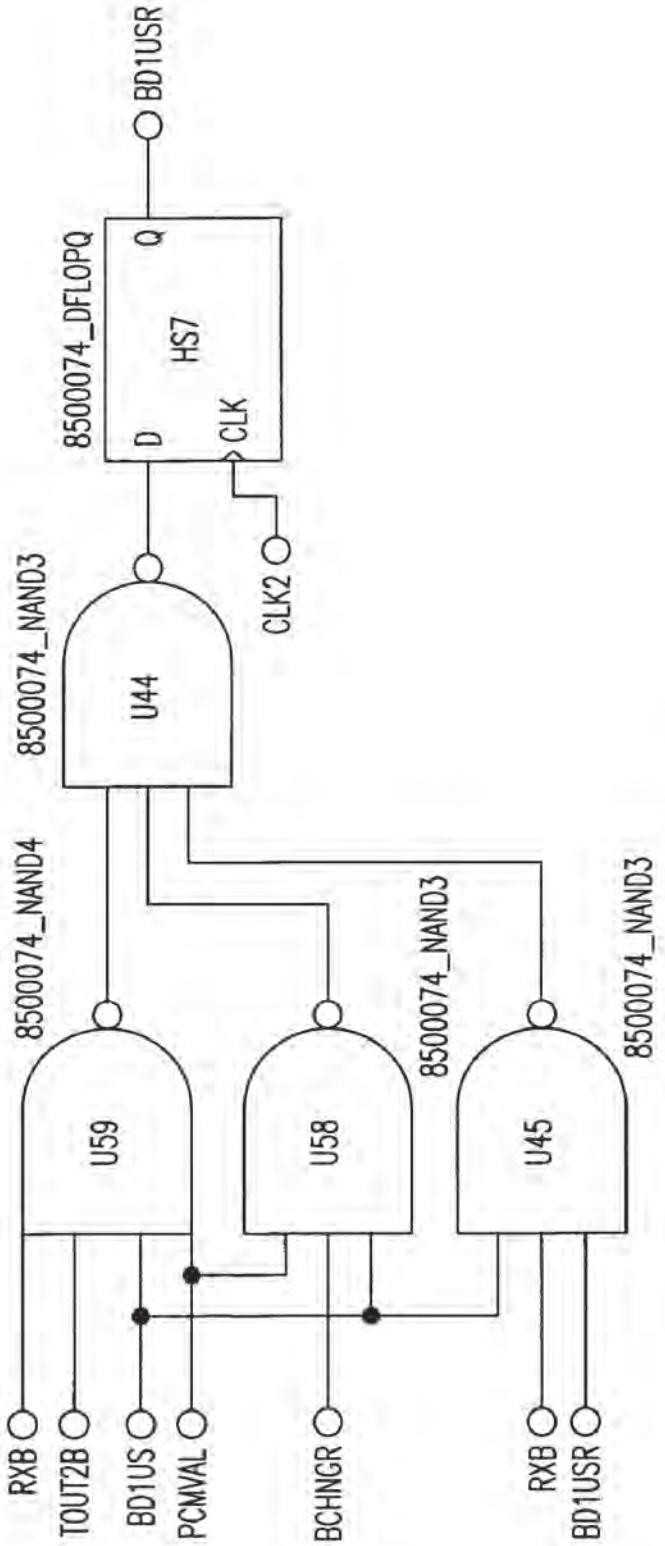

BD1USR
8500074_DFLOPQ
HS7
D
CLK
Q
CLK2
8500074_NAND3
U44
8500074_NAND4
U59
U58
U45
8500074_NAND3
8500074_NAND3
RXB
TOUT2B
BD1US
PCMVAL
BCHNGR
RXB
BD1USR

FIG.156J

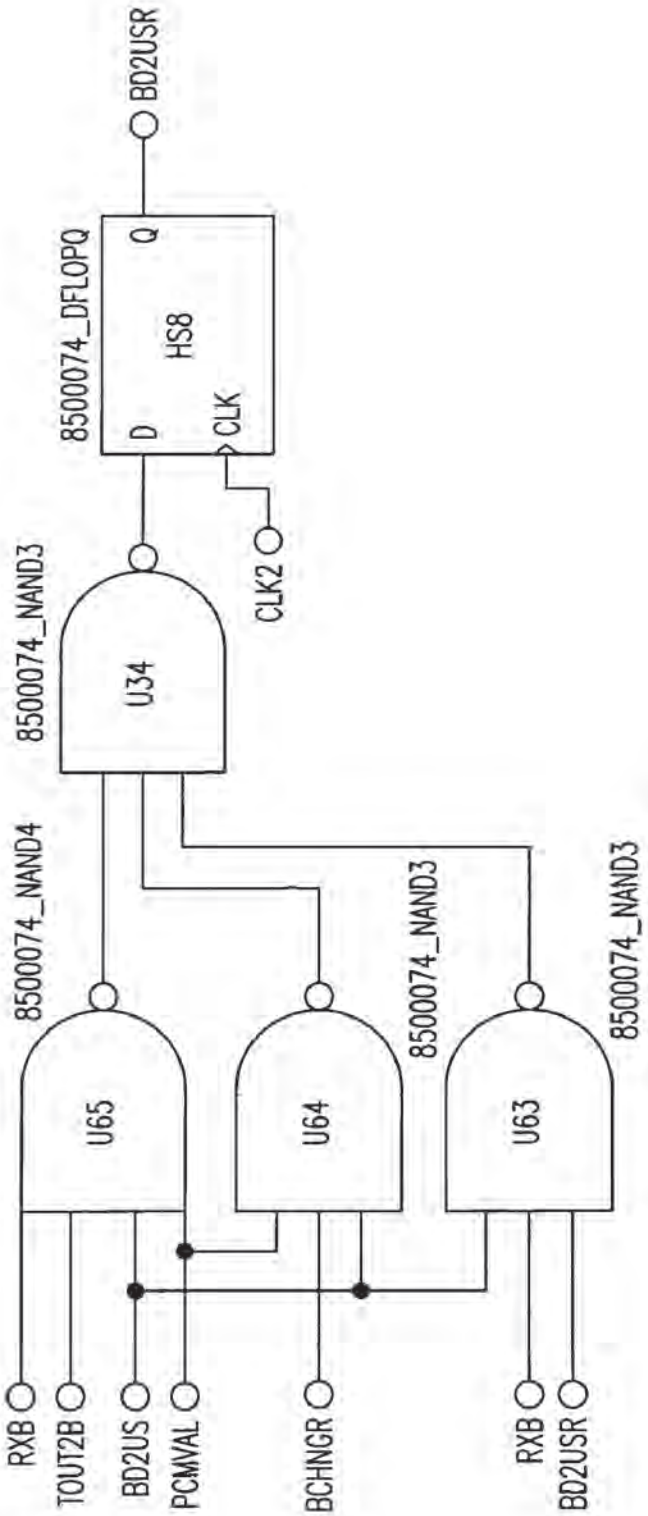

BD2USR
8500074_DFLOPQ
HS8
Q
D
CLK
CLK2
8500074_NAND3
U34
8500074_NAND4
U65
8500074_NAND3
U64
8500074_NAND3
U63
RXB
TOUT2B
BD2US
PCMVAL
BCHNGR
RXB
BD2USR

FIG.156K

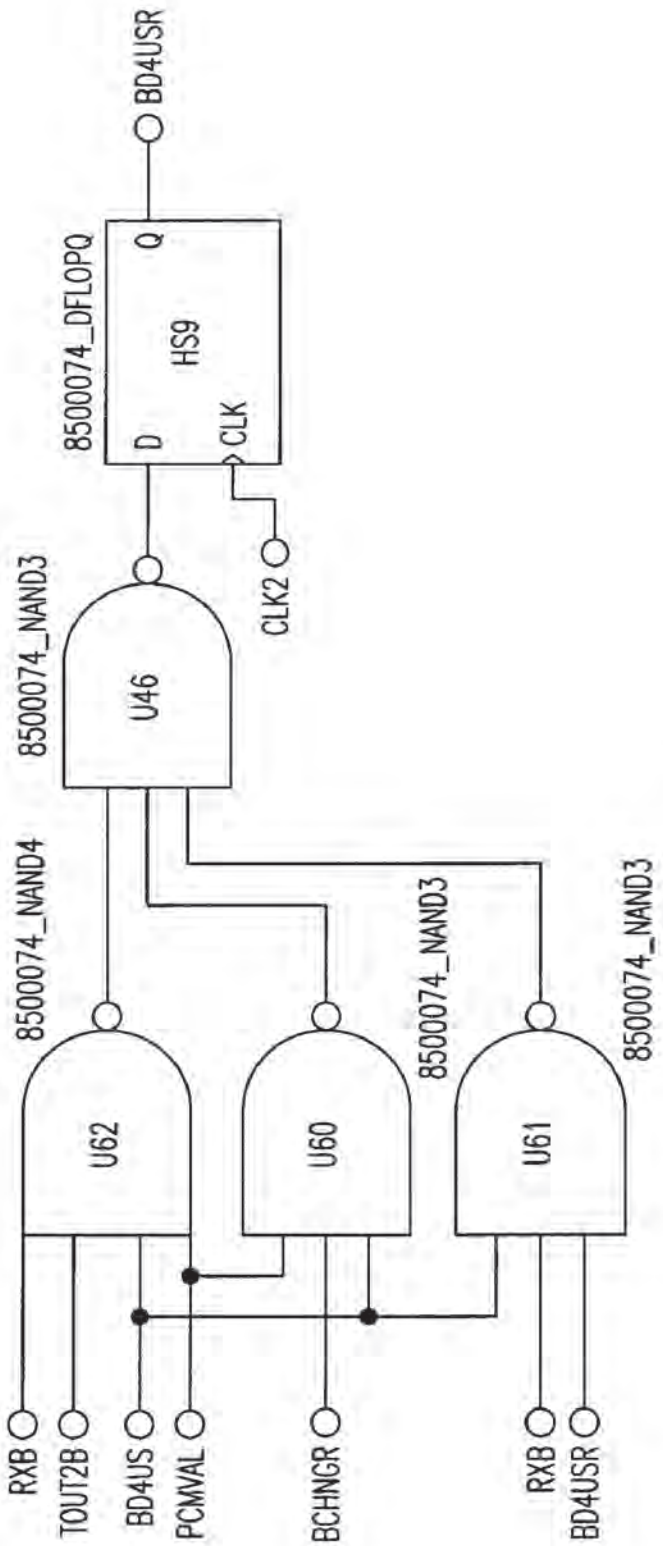

BD4USR
8500074_DFLOPQ
HS9
Q
D
CLK
CLK2
8500074_NAND3
U46
8500074_NAND4
U62
U60
U61
8500074_NAND3
8500074_NAND3
RXB
TOUT2B
BD4US
PCMVAL
BCHNGR
RXB
BD4USR

FIG. 156L

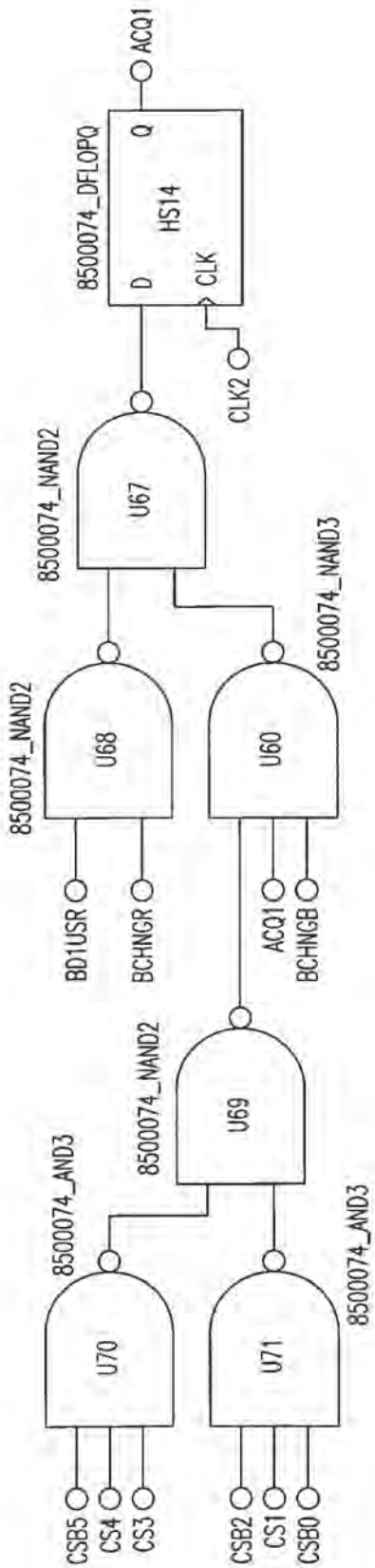

ACQ1
8500074_DFLOPQ
Q
HS14
D
CLK
CLK2
8500074_NAND2
U67
8500074_NAND2
U68
8500074_NAND3
U60
BD1USR
BCHNGR
ACQ1
BCHNGB
8500074_NAND2
U69
8500074_AND3
U70
8500074_AND3
U71
CSB5
CS4
CS3
CSB2
CS1
CSB0

FIG.156M

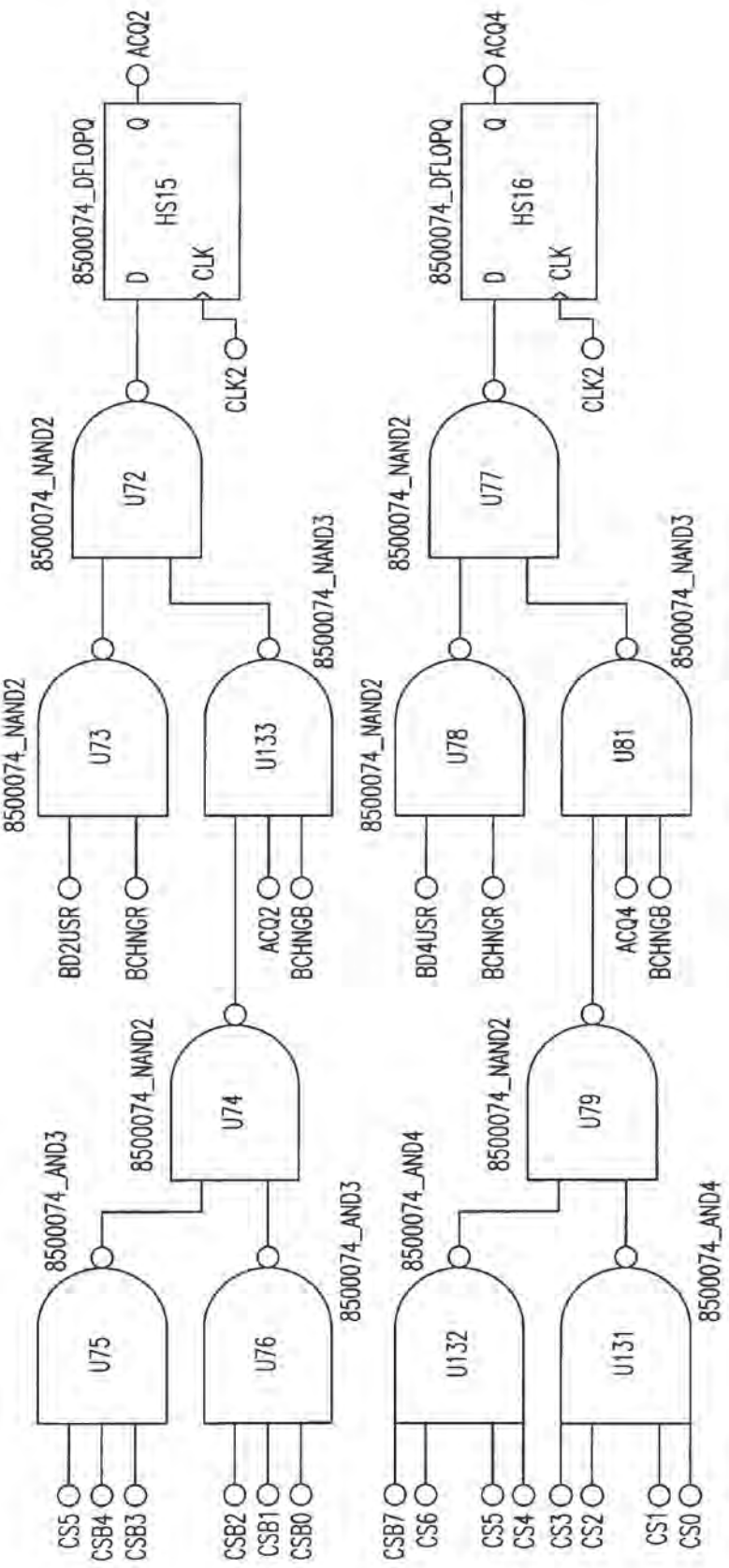

8500074_DFLOPQ
HS15
D
CLK
Q
ACQ2
CLK2
8500074_DFLOPQ
HS16
D
CLK
Q
ACQ4
CLK2
8500074_NAND2
U72
8500074_NAND2
U77
8500074_NAND2
U73
8500074_NAND3
U133
8500074_NAND2
U78
8500074_NAND3
U81
BD2USR
BCHNGR
ACQ2
BCHNGB
BD4USR
BCHNGR
ACQ4
BCHNGB
8500074_NAND2
U74
8500074_NAND2
U79
8500074_AND3
U75
8500074_AND3
U76
8500074_AND4
U132
8500074_AND4
U131
CS5
CSB4
CSB3
CSB2
CSB1
CSB0
CSB7
CS6
CS5
CS4
CS3
CS2
CS1
CS0

FIG. 156N

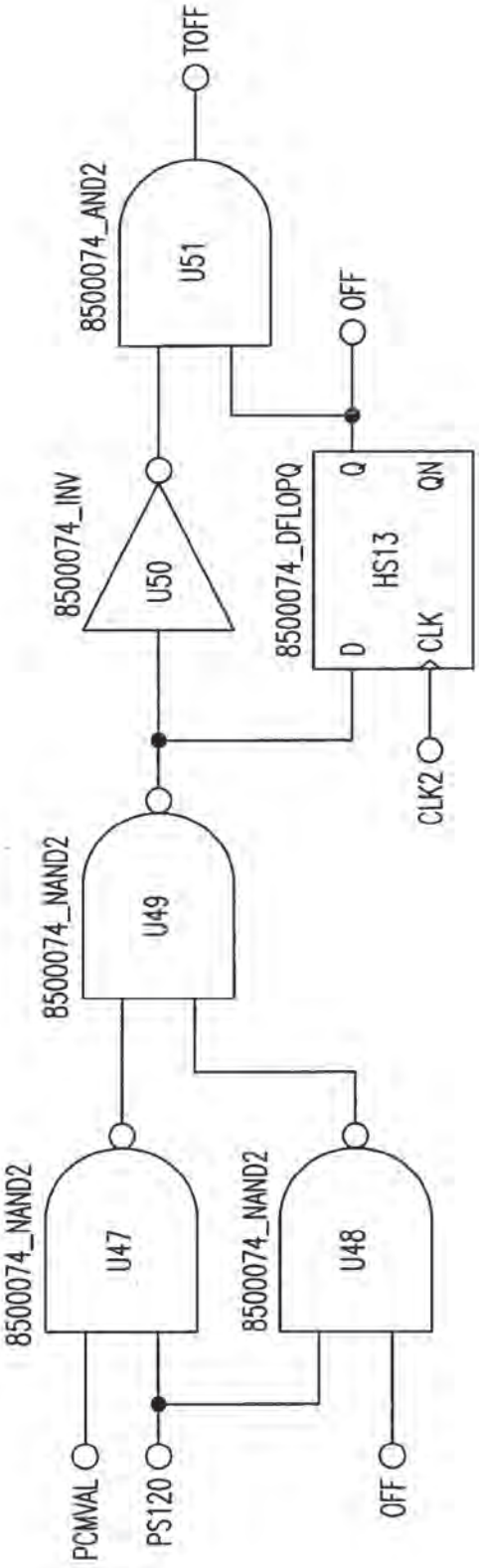

TOFF
8500074_AND2
U51
OFF
8500074_INV
U50
8500074_DFLOPQ
HS13
Q
QN
D
CLK
CLK2
8500074_NAND2
U49
8500074_NAND2
U47
8500074_NAND2
U48
PCMVAL
PS120
OFF

FIG.1560

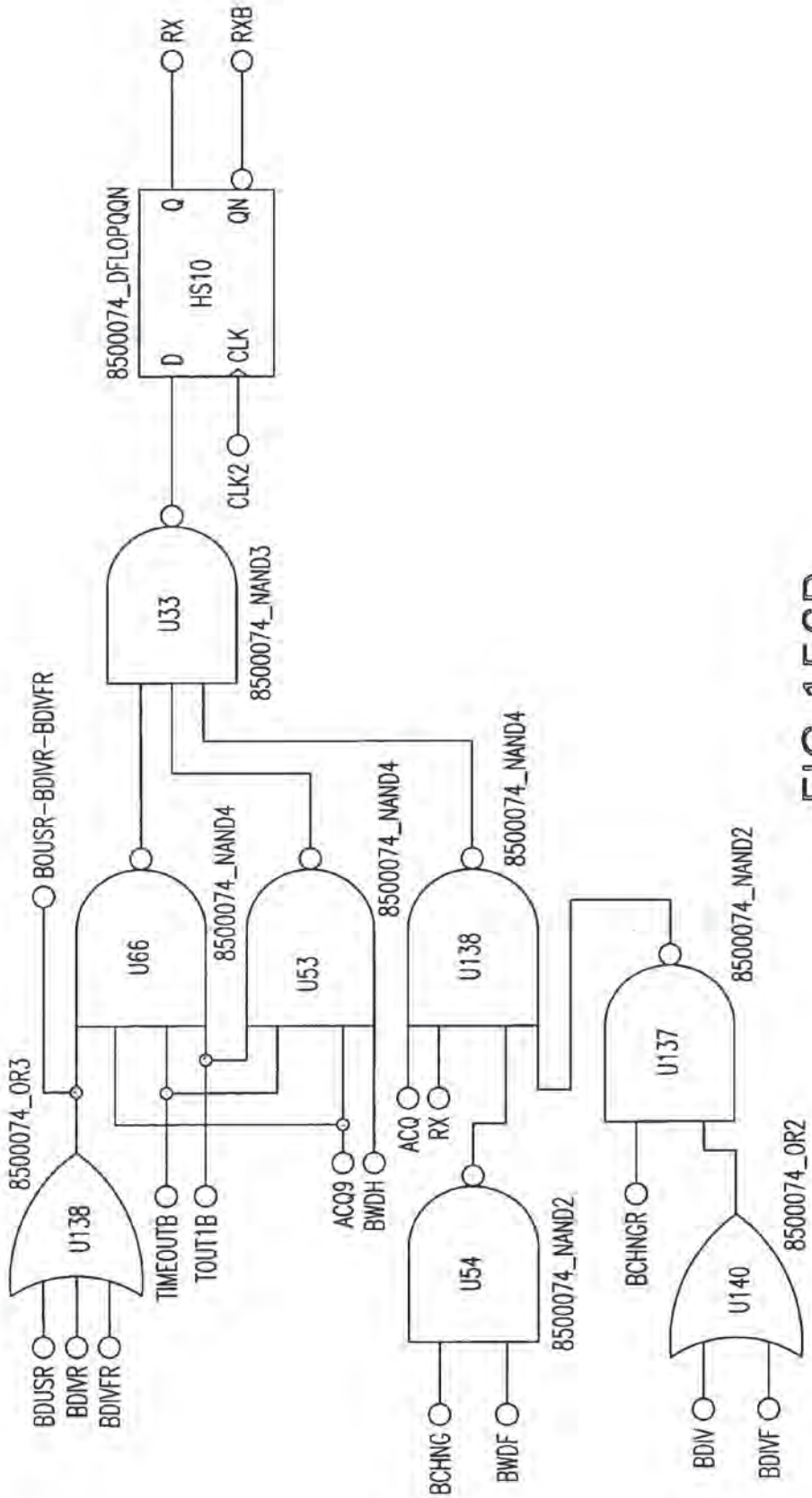

RX
RXB
8500074_DFLOPQQN
HS10
D
CLK
Q
QN
CLK2
U33
8500074_NAND3
BOUSR-BDIVR-BDIVFR
U66
8500074_NAND4
U53
8500074_NAND4
U138
8500074_NAND4
8500074_OR3
U138
TIMEOUTB
TOUT1B
ACQ9
BWDH
ACQ
RX
U54
8500074_NAND2
U137
8500074_NAND2
BCHNGR
U140
8500074_OR2
BDUSR
BDIVR
BDIVFR
BCHNG
BWDF
BDIV
BDIVF

FIG. 156P

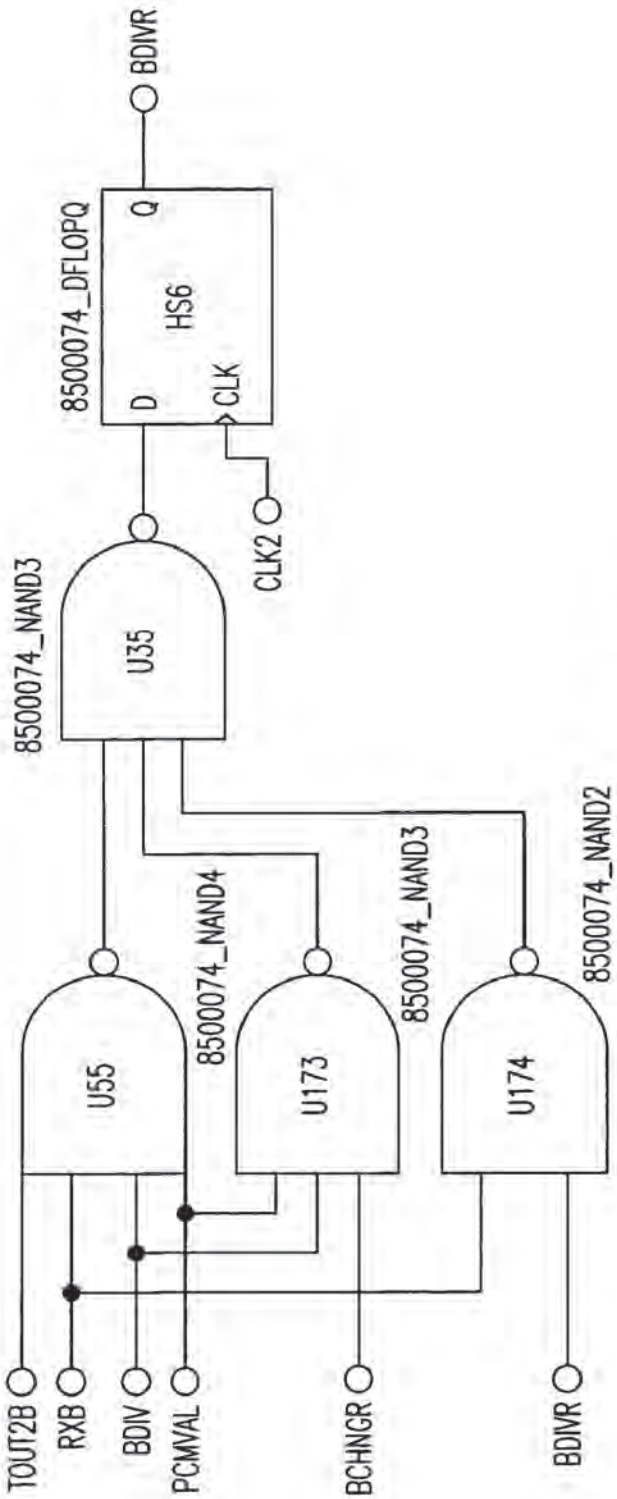

BDIVR
8500074_DFLOPQ
HS6
Q
D
CLK
CLK2
8500074_NAND3
U35
8500074_NAND4
U55
8500074_NAND3
U173
8500074_NAND2
U174
TOUT2B
RXB
BDIV
PCMVAL
BCHNGR
BDIVR

FIG. 156Q

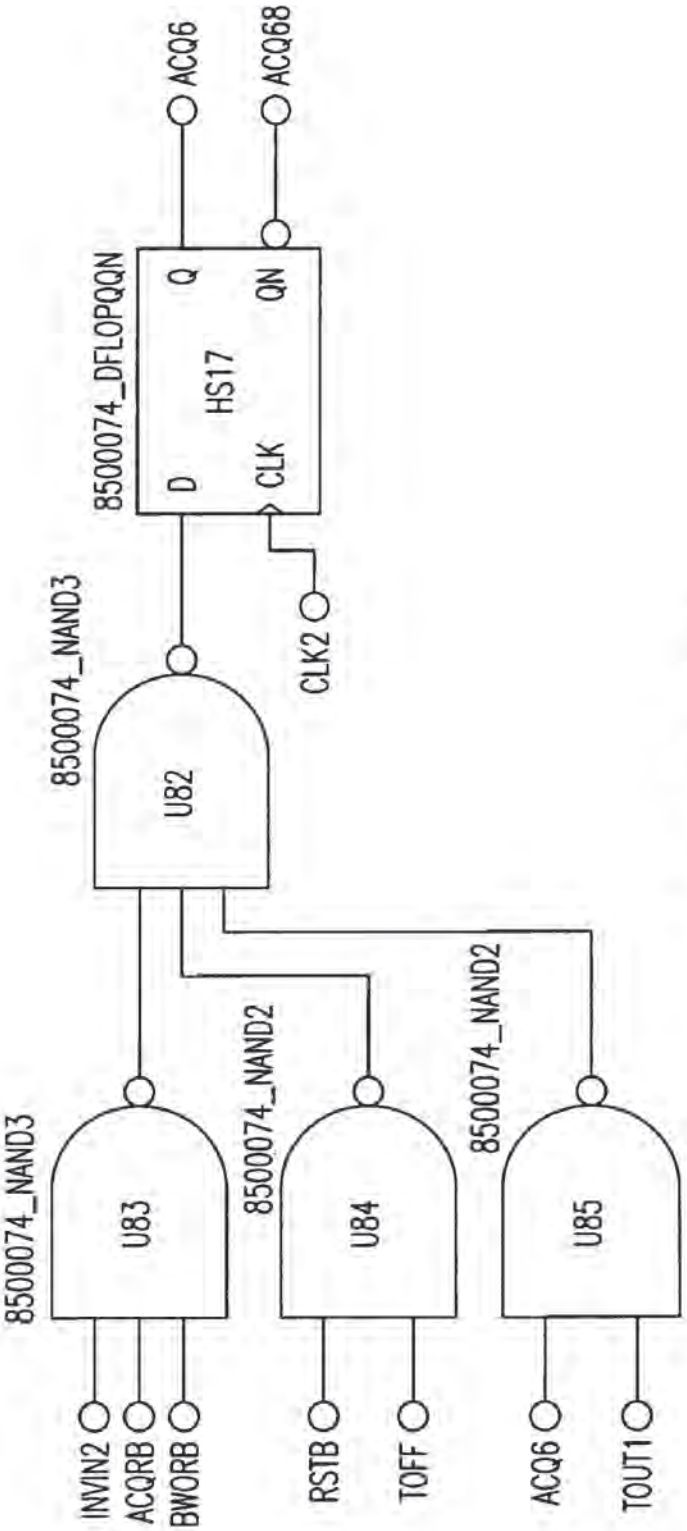

ACQ6
ACQ68
8500074_DFLOPQQN
HS17
D
CLK
Q
QN
CLK2
8500074_NAND3
U82
8500074_NAND3
U83
8500074_NAND2
U84
8500074_NAND2
U85
INVIN2
ACQRB
BWORB
RSTB
TOFF
ACQ6
TOUT1

FIG.156R

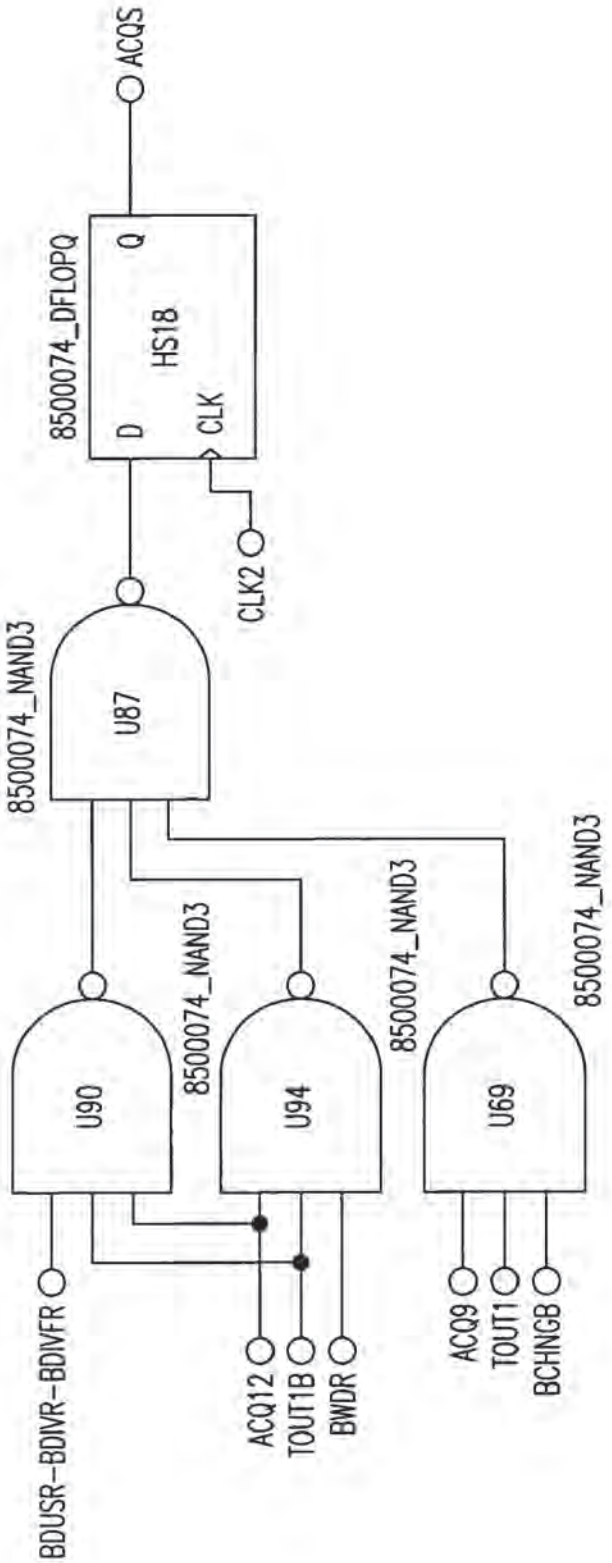

ACQS
8500074_DFLOPQ
Q
HS18
D
CLK
CLK2
8500074_NAND3
U87
U90
U94
U69
BDUSR-BDIVR-BDIVFR
ACQ12
TOUT1B
BWDR
ACQ9
TOUT1
BCHNGB

FIG.156S

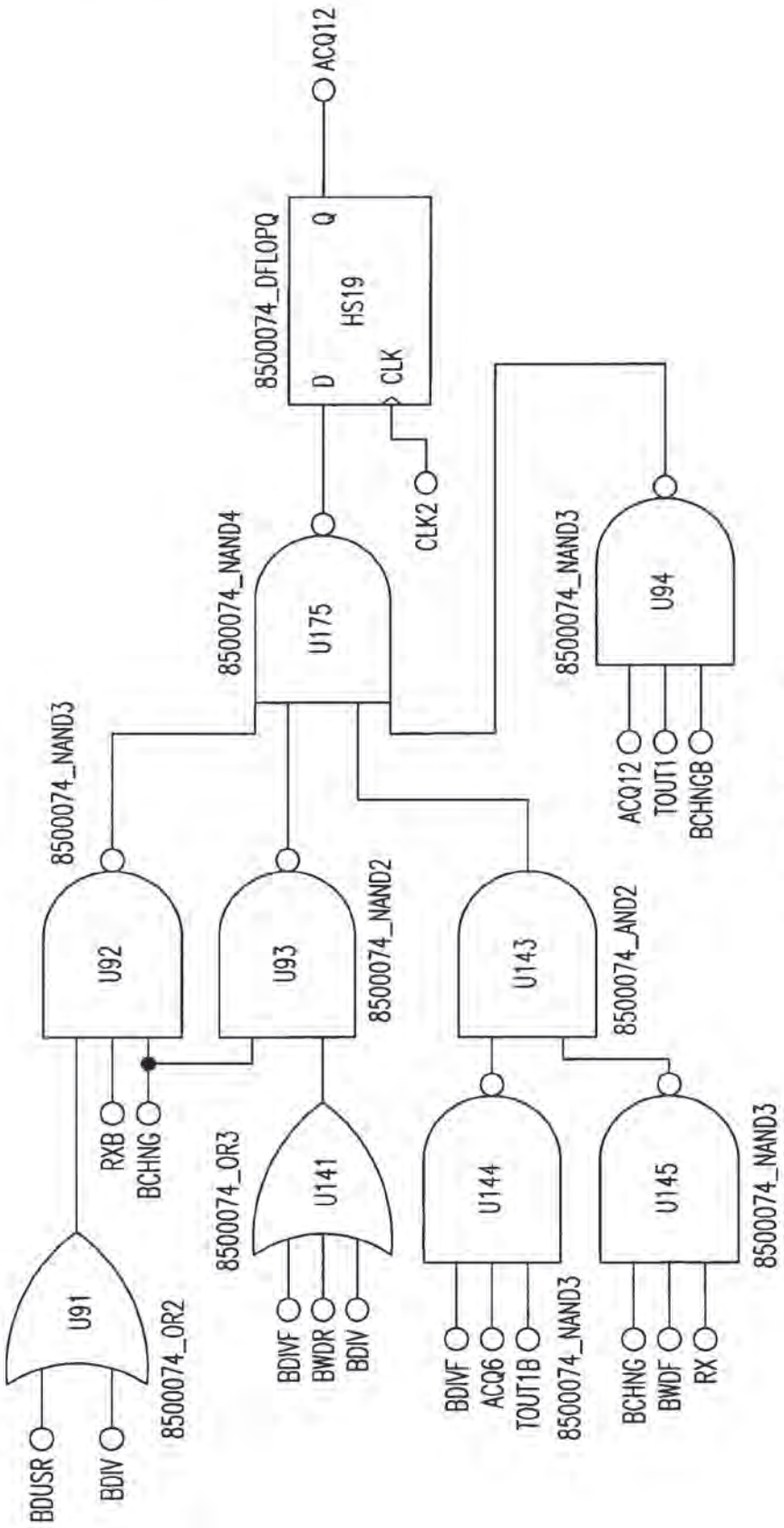

ACQ12
8500074_DFLOPQ
HS19
D
CLK
Q
CLK2
8500074_NAND4
U175
8500074_NAND3
U94
ACQ12
TOUT1
BCHNGB
8500074_NAND3
U92
8500074_NAND2
U93
8500074_AND2
U143
RXB
BCHNG
8500074_OR3
U141
U144
U145
8500074_NAND3
U91
8500074_OR2
BDUSR
BDIV
BDIVF
BWDR
BDIV
BDIVF
ACQ6
TOUT1B
BCHNG
BWDF
RX

FIG.156T

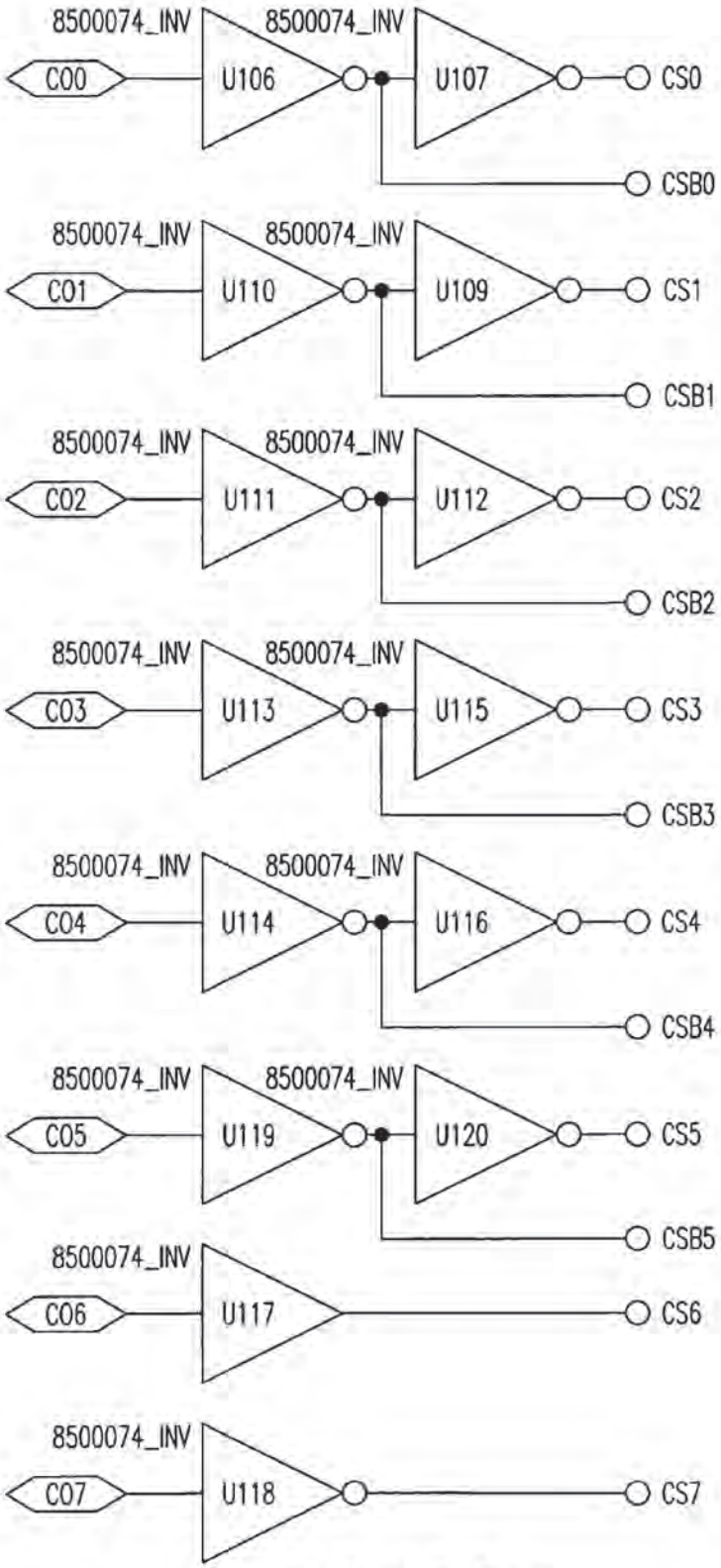

8500074_INV
C00
U106
8500074_INV
U107
CS0
CSB0
8500074_INV
C01
U110
8500074_INV
U109
CS1
CSB1
8500074_INV
C02
U111
8500074_INV
U112
CS2
CSB2
8500074_INV
C03
U113
8500074_INV
U115
CS3
CSB3
8500074_INV
C04
U114
8500074_INV
U116
CS4
CSB4
8500074_INV
C05
U119
8500074_INV
U120
CS5
CSB5
8500074_INV
C06
U117
CS6
8500074_INV
C07
U118
CS7

FIG.156U

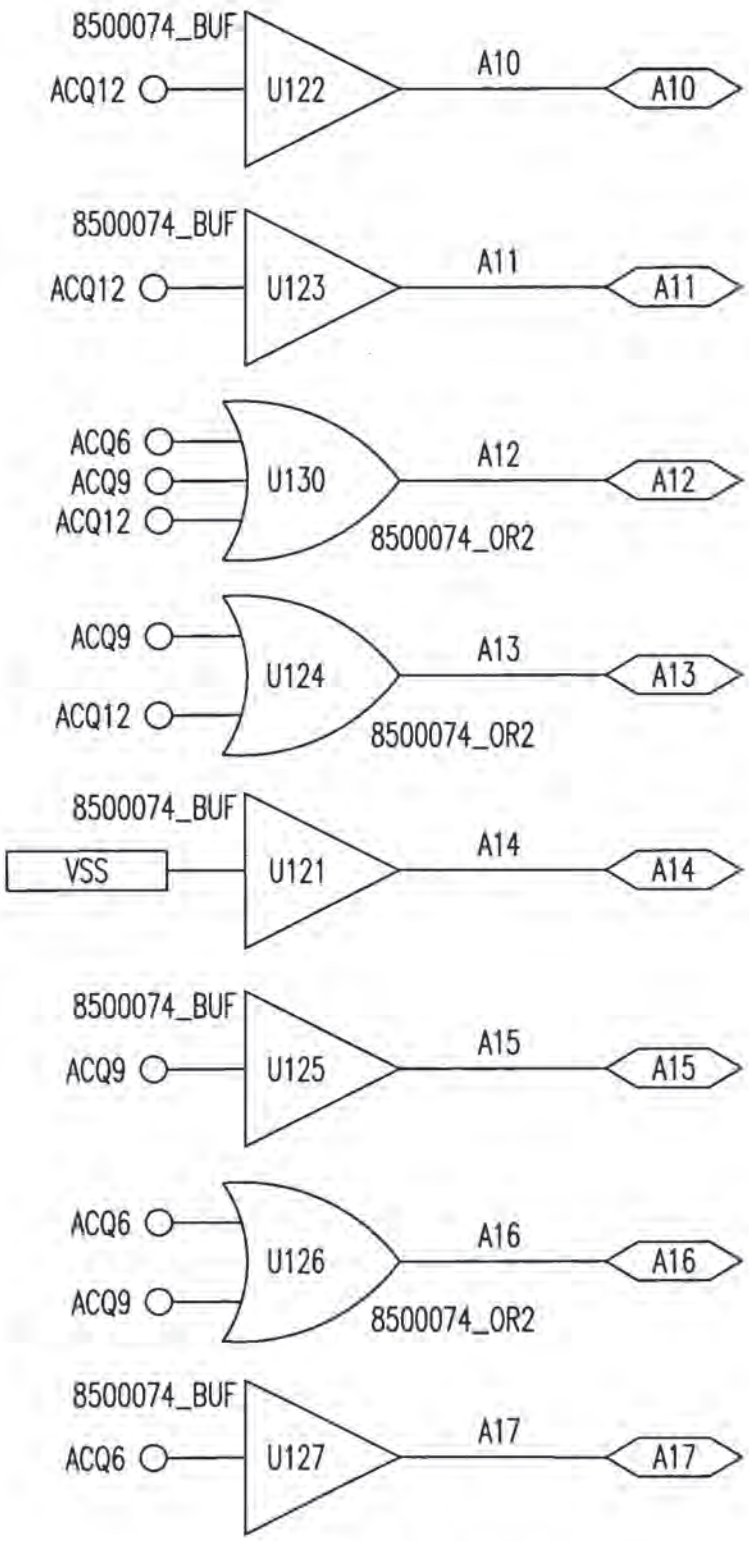

8500074_BUF
ACQ12
U122
A10
A10
8500074_BUF
ACQ12
U123
A11
A11
ACQ6
ACQ9
ACQ12
U130
A12
A12
8500074_OR2
ACQ9
ACQ12
U124
A13
A13
8500074_OR2
8500074_BUF
VSS
U121
A14
A14
8500074_BUF
ACQ9
U125
A15
A15
ACQ6
ACQ9
U126
A16
A16
8500074_OR2
8500074_BUF
ACQ6
U127
A17
A17

FIG.156V

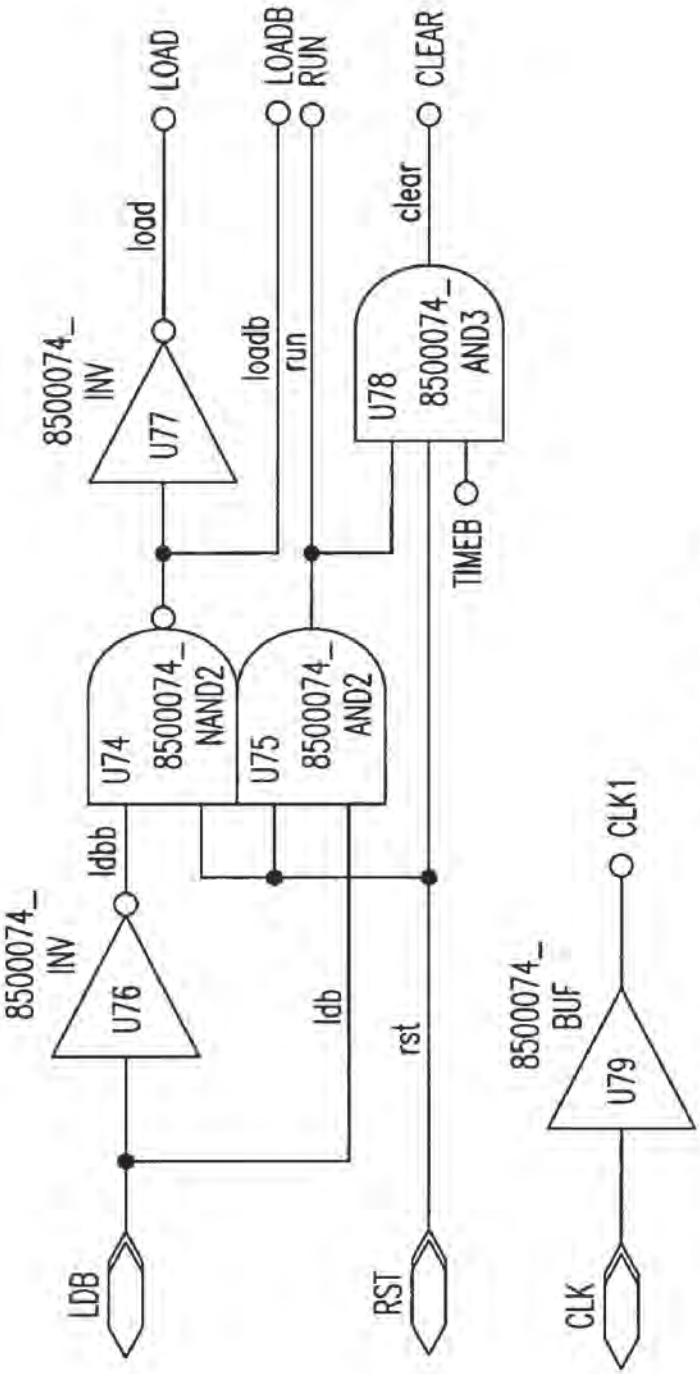

LOAD
LOADB
RUN
CLEAR
load
loadb
run
clear
8500074_
INV
U77
U78
8500074_
AND3
TIMEB
U74
8500074_
NAND2
U75
8500074_
AND2
ldbb
8500074_
INV
U76
ldb
rst
LDB
RST
CLK1
8500074_
BUF
U79
CLK

FIG.157A

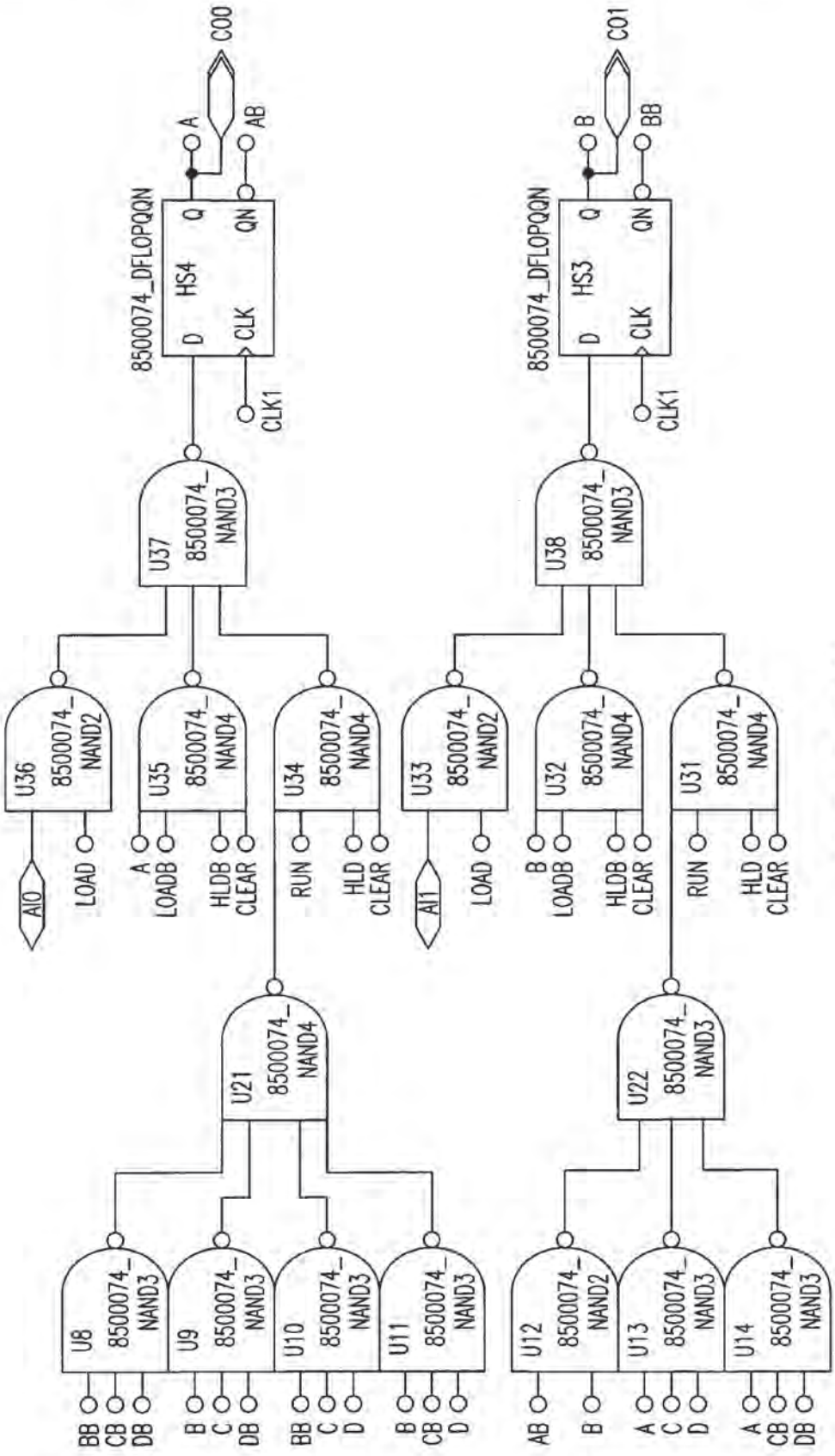

C00
C01
8500074_DFLOPQQN
HS4
HS3
D
CLK
Q
QN
A
AB
B
BB
CLK1
U37
U38
8500074_NAND3
U36
U35
U34
U33
U32
U31
8500074_NAND2
8500074_NAND4
AI0
AI1
LOAD
LOADB
HLDB
CLEAR
RUN
HLD
U21
U22
U8
U9
U10
U11
U12
U13
U14
BB
CB
DB
C
D
AB

FIG. 157B

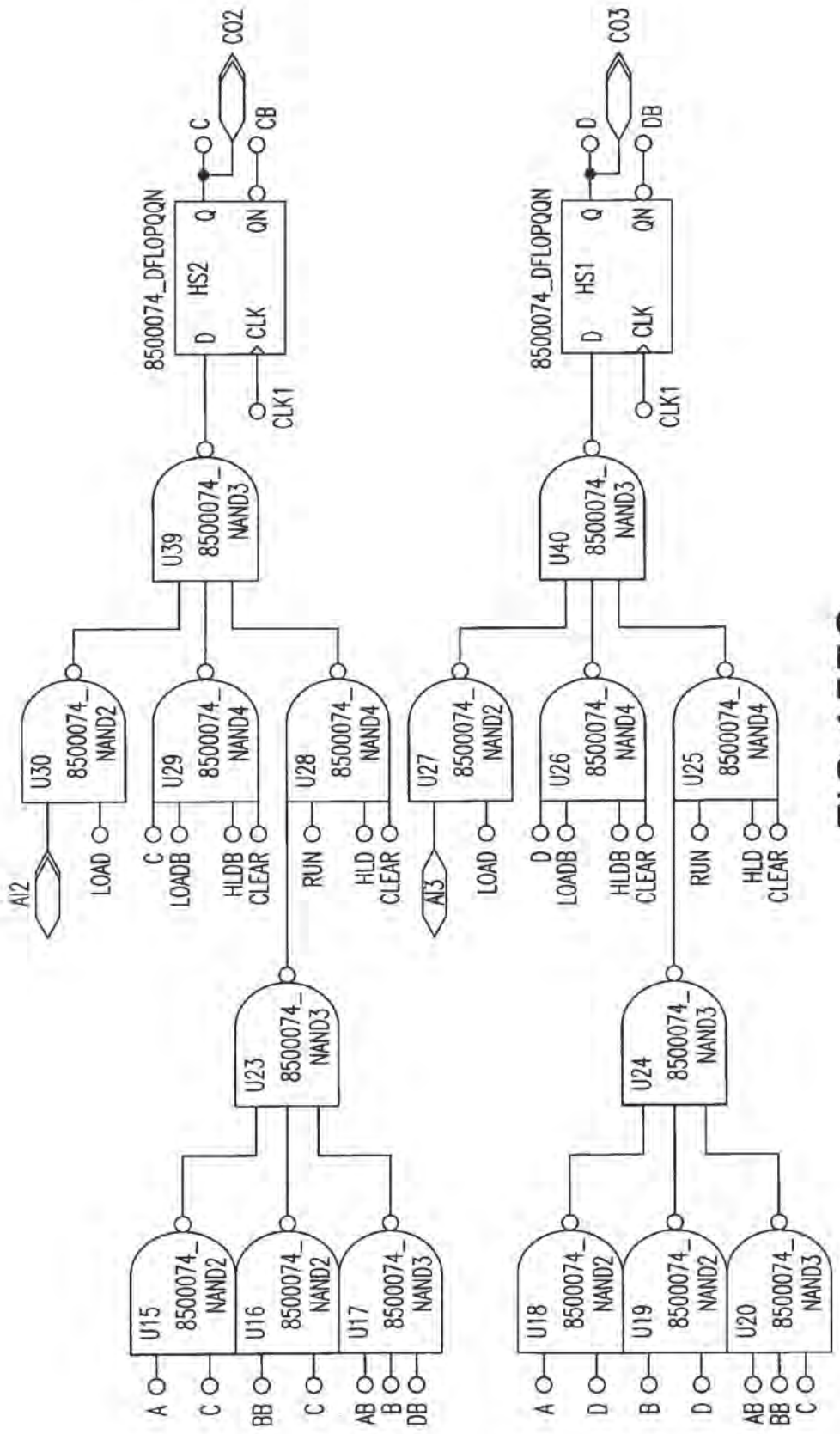

C02
C
CB
8500074_DFLOPQQN
HS2
D
Q
QN
CLK
CLK1
C03
D
DB
HS1
U39
U40
8500074_NAND3
U30
U29
U28
U27
U26
U25
8500074_NAND2
8500074_NAND4
AI2
AI3
LOAD
C
LOADB
HLDB
CLEAR
RUN
HLD
U23
U24
U15
U16
U17
U18
U19
U20
A
BB
AB
B
DB
D

FIG.157C

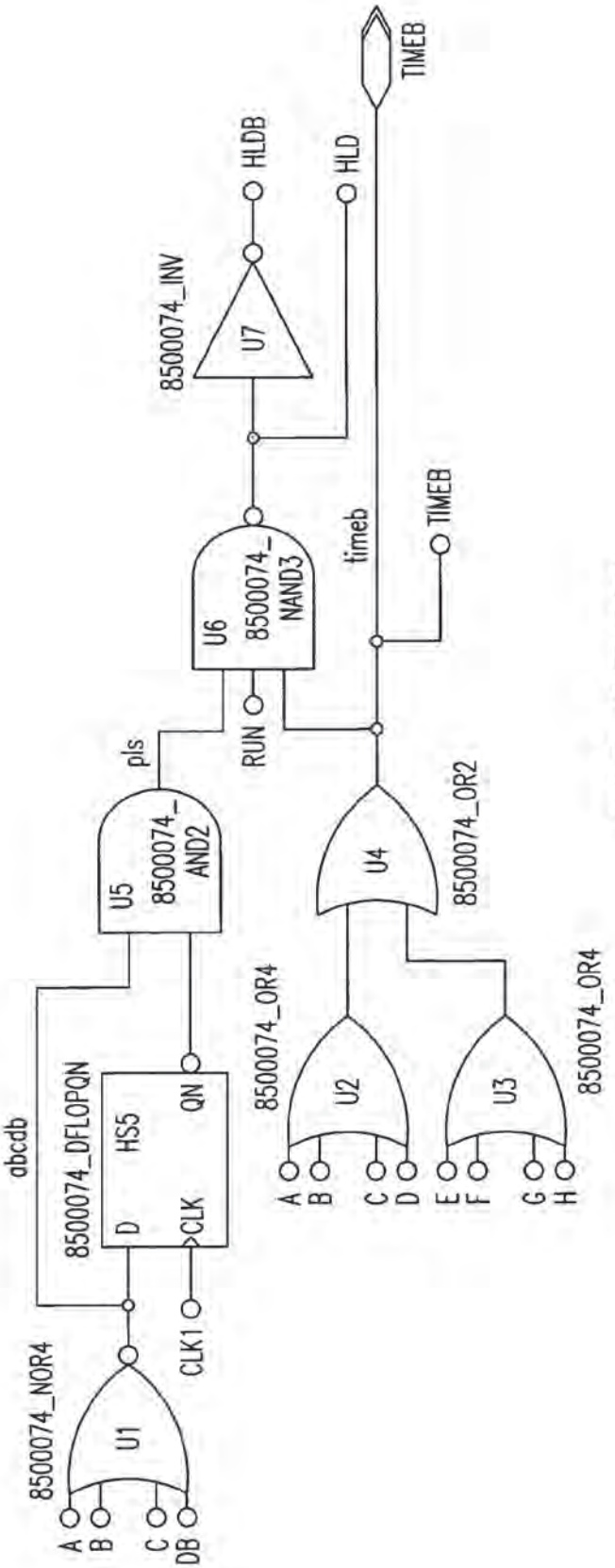

TIMEB
HLDB
HLD
8500074_INV
U7
U6
8500074_
NAND3
timeb
TIMEB
RUN
pls
U5
8500074_
AND2
U4
8500074_OR2
8500074_OR4
U2
8500074_OR4
U3
A
B
C
D
E
F
G
H
abcdb
8500074_DFLOPQN
HS5
D
CLK
QN
CLK1
8500074_NOR4
U1
A
B
C
DB

FIG. 157D

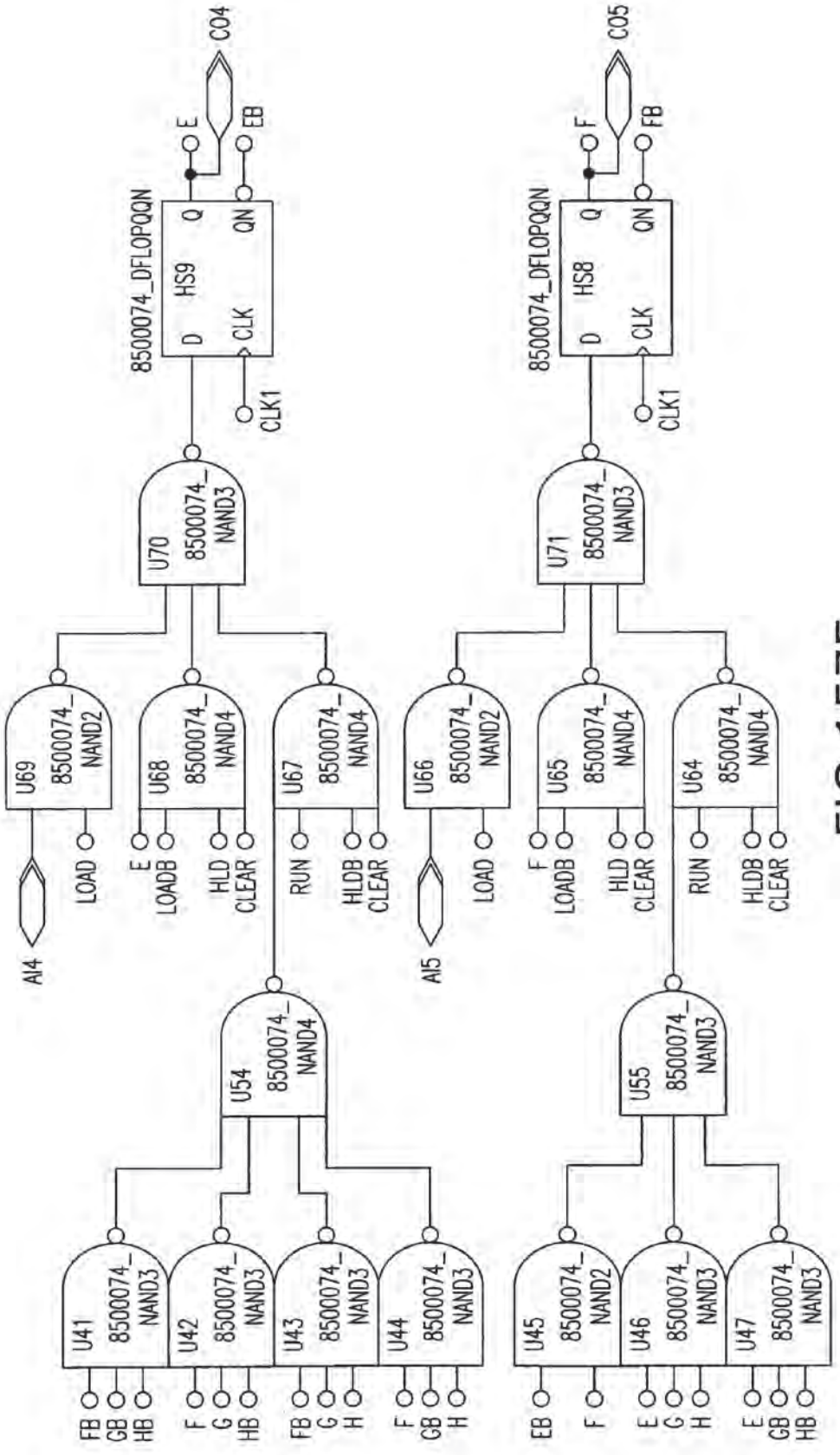

C04
E
EB
8500074_DFLOPQQN
D
HS9
Q
QN
CLK
CLK1
C05
F
FB
HS8
U70
U71
8500074_NAND3
U69
8500074_NAND2
U68
8500074_NAND4
U67
U66
U65
U64
U54
U55
U41
U42
U43
U44
U45
U46
U47
AI4
AI5
LOAD
E
LOADB
HLD
CLEAR
RUN
HLDB
F
FB
GB
HB
G
H

FIG. 157E

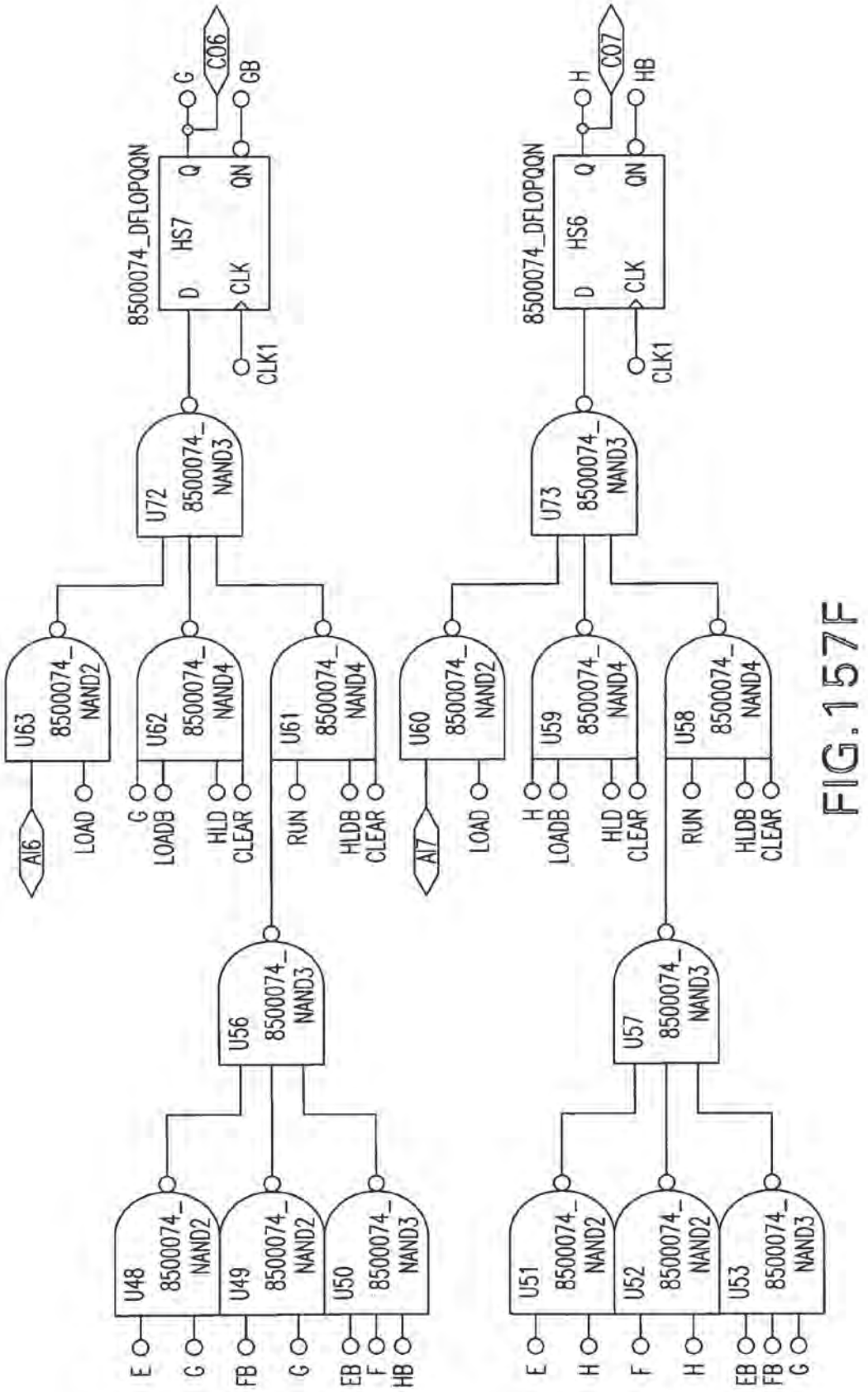

C06
G
GB
8500074_DFLOPQQN
D
HS7
Q
QN
CLK
CLK1
C07
H
HB
8500074_DFLOPQQN
D
HS6
Q
QN
CLK
CLK1
U72
8500074_NAND3
U73
8500074_NAND3
U63
8500074_NAND2
U62
8500074_NAND4
U61
8500074_NAND4
U60
8500074_NAND2
U59
8500074_NAND4
U58
8500074_NAND4
AI6
LOAD
G
LOADB
HLD
CLEAR
RUN
HLDB
CLEAR
AI7
LOAD
H
LOADB
HLD
CLEAR
RUN
HLDB
CLEAR
U56
8500074_NAND3
U57
8500074_NAND3
U48
8500074_NAND2
U49
8500074_NAND2
U50
8500074_NAND3
U51
8500074_NAND2
U52
8500074_NAND2
U53
8500074_NAND3
E
G
FB
G
EB
F
HB
E
H
F
H
EB
FB
G

FIG. 157F

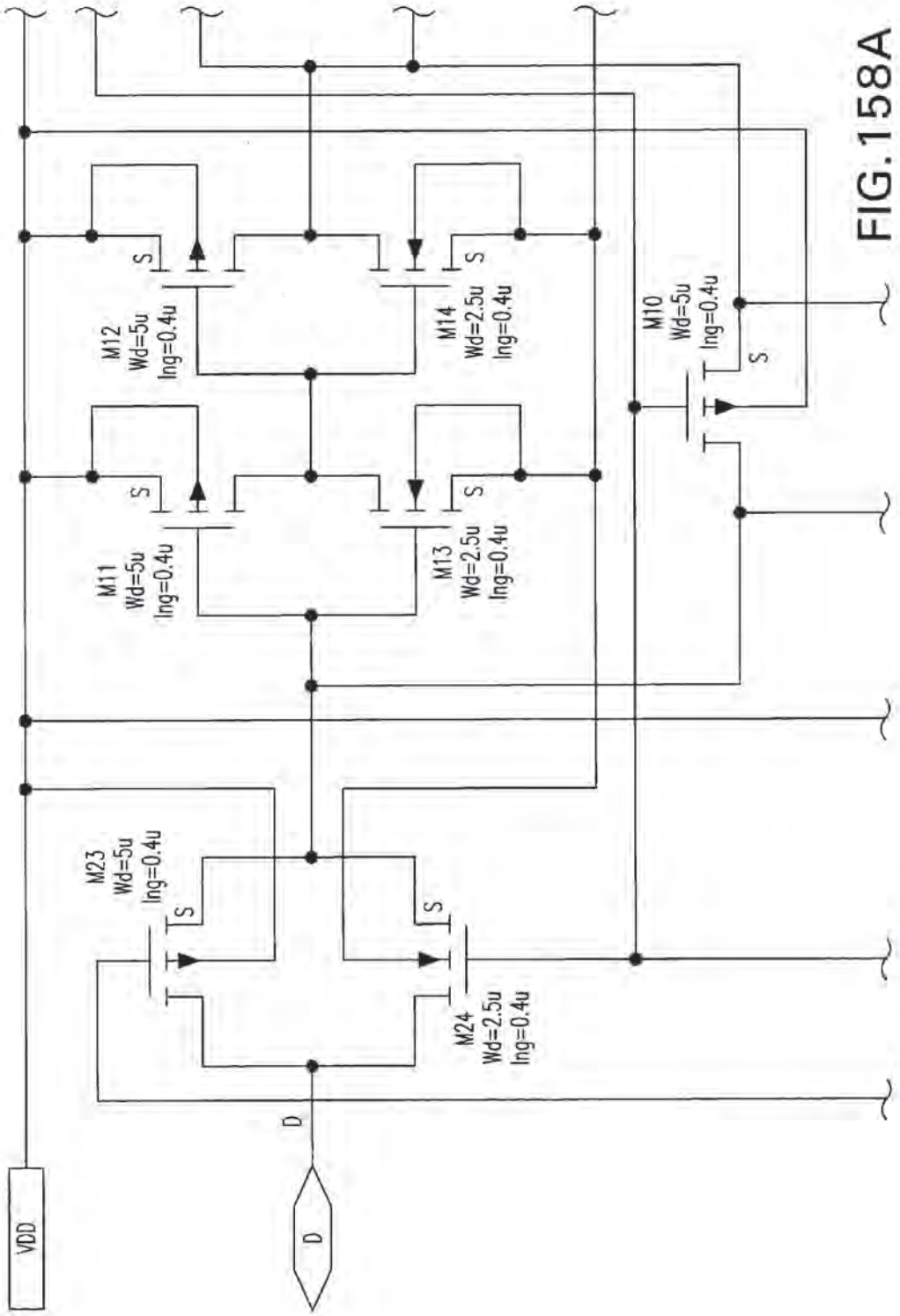

M12
Wd=5u
lng=0.4u
M14
Wd=2.5u
lng=0.4u
M10
Wd=5u
lng=0.4u
M11
Wd=5u
lng=0.4u
M13
Wd=2.5u
lng=0.4u
M23
Wd=5u
lng=0.4u
M24
Wd=2.5u
lng=0.4u
S
D
VDD

FIG.158A

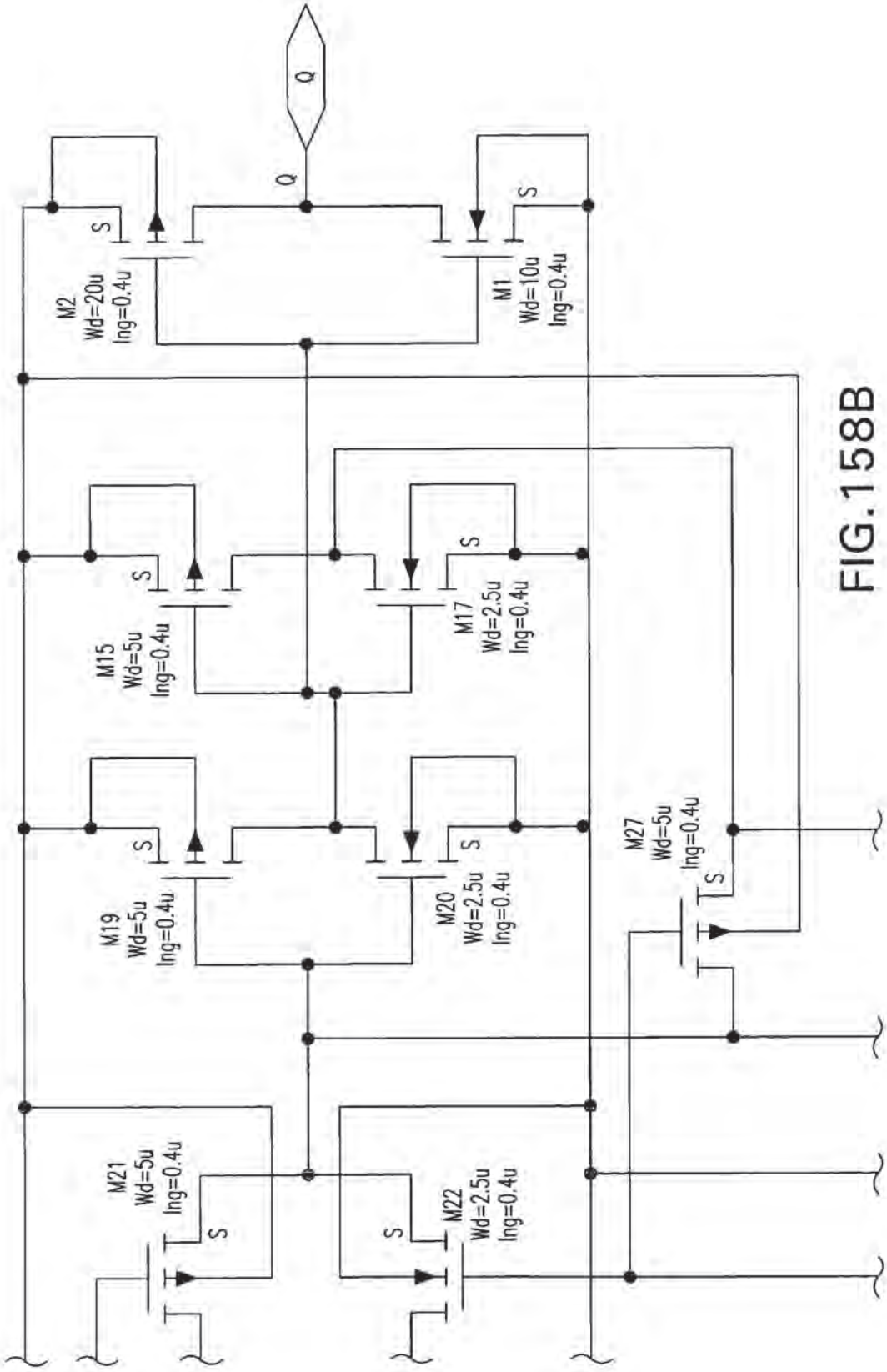

Q
Q
S
M2
Wd=20u
lng=0.4u
S
M1
Wd=10u
lng=0.4u
S
M15
Wd=5u
lng=0.4u
S
M17
Wd=2.5u
lng=0.4u
S
M19
Wd=5u
lng=0.4u
S
M20
Wd=2.5u
lng=0.4u
S
M27
Wd=5u
lng=0.4u
S
M21
Wd=5u
lng=0.4u
S
M22
Wd=2.5u
lng=0.4u

FIG.158B

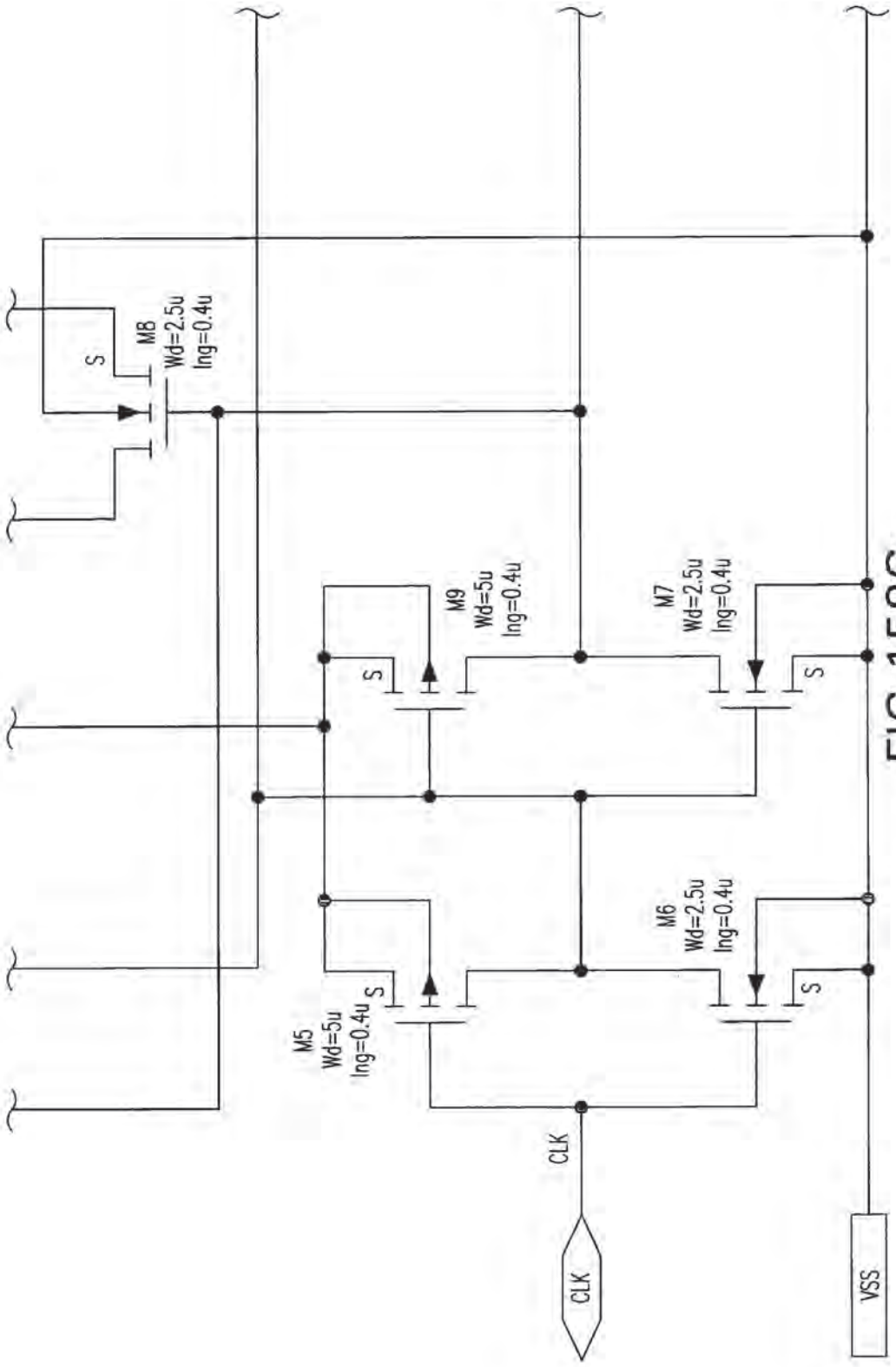

M8
Wd=2.5u
lng=0.4u
S
M9
Wd=5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
M5
Wd=5u
lng=0.4u
CLK
CLK
VSS

FIG.158C

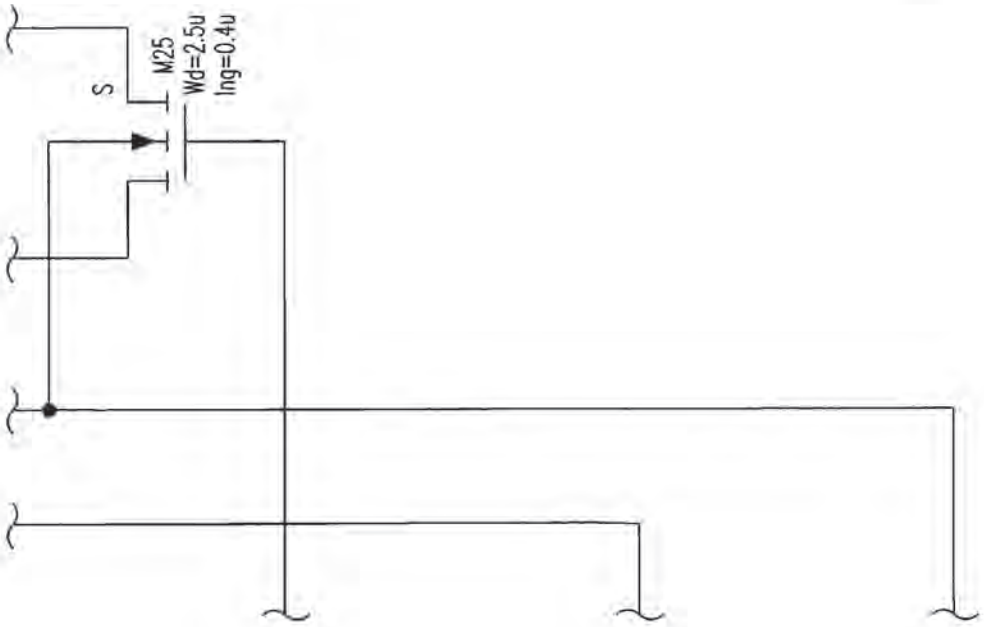


FIG.158D

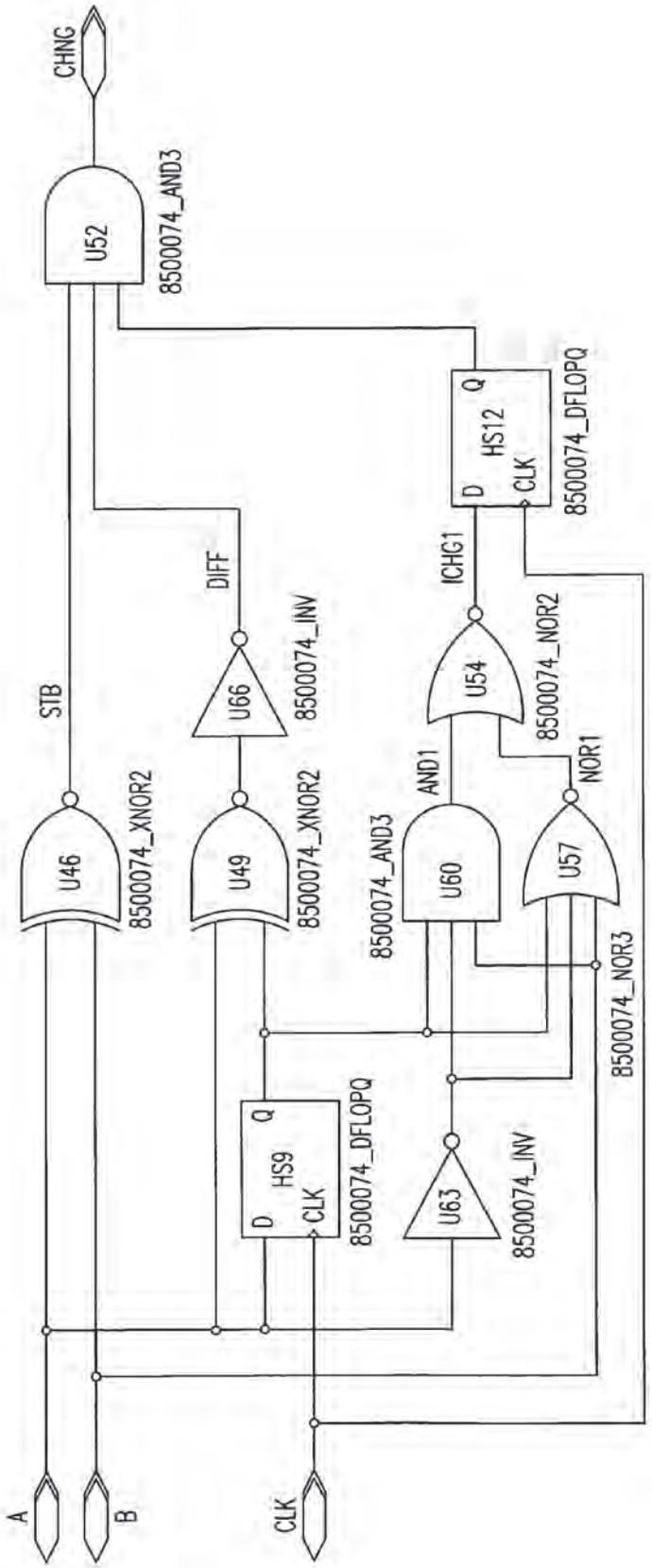

CHNG
U52
8500074_AND3
STB
DIFF
U66
8500074_INV
U46
8500074_XNOR2
U49
8500074_XNOR2
ICHG1
U54
8500074_NOR2
AND1
NOR1
8500074_AND3
U60
U57
8500074_NOR3
HS12
D
Q
CLK
8500074_DFLOPQ
HS9
D
Q
CLK
8500074_DFLOPQ
U63
8500074_INV
A
B
CLK

FIG. 159

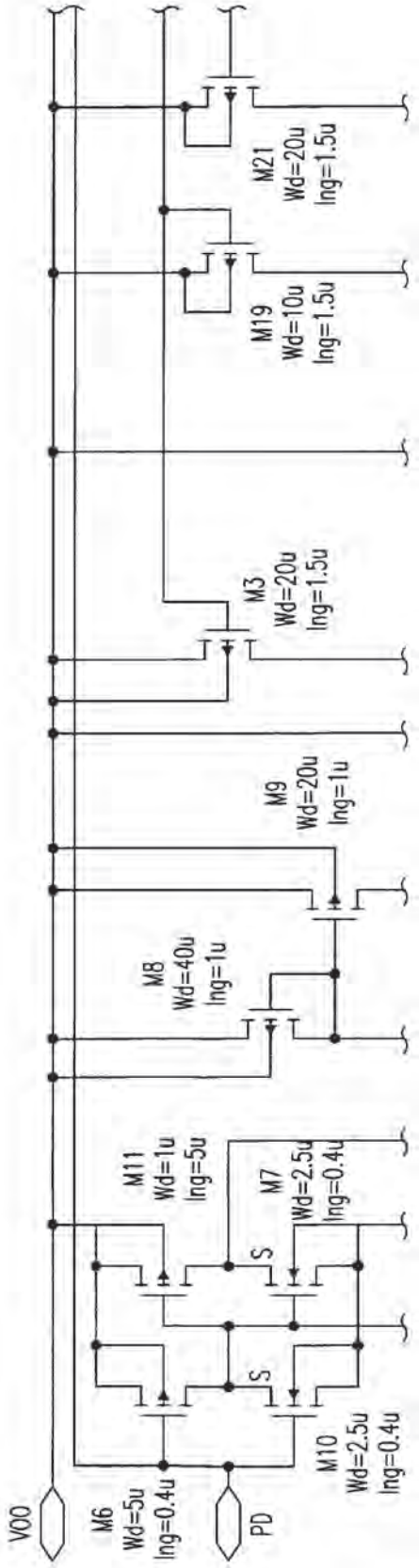

M21
Wd=20u
lng=1.5u
M19
Wd=10u
lng=1.5u
M3
Wd=20u
lng=1.5u
M9
Wd=20u
lng=1u
M8
Wd=40u
lng=1u
M11
Wd=1u
lng=5u
M7
Wd=2.5u
lng=0.4u
S
S
M10
Wd=2.5u
lng=0.4u
M6
Wd=5u
lng=0.4u
VDD
PD

FIG. 160A

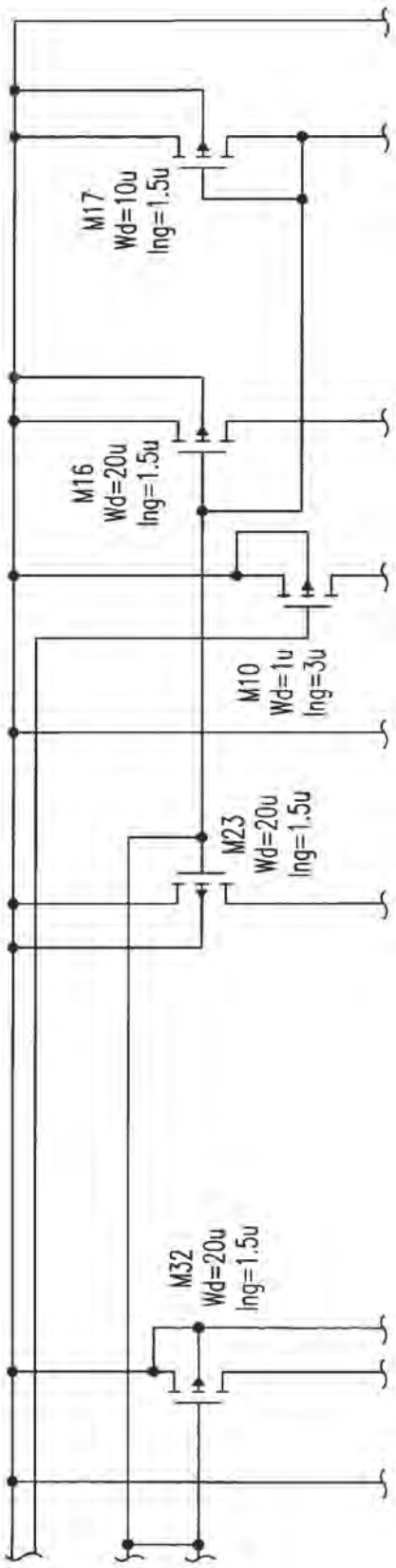

M17
Wd=10u
lng=1.5u
M16
Wd=20u
lng=1.5u
M10
Wd=1u
lng=3u
M23
Wd=20u
lng=1.5u
M32
Wd=20u
lng=1.5u

FIG. 160B

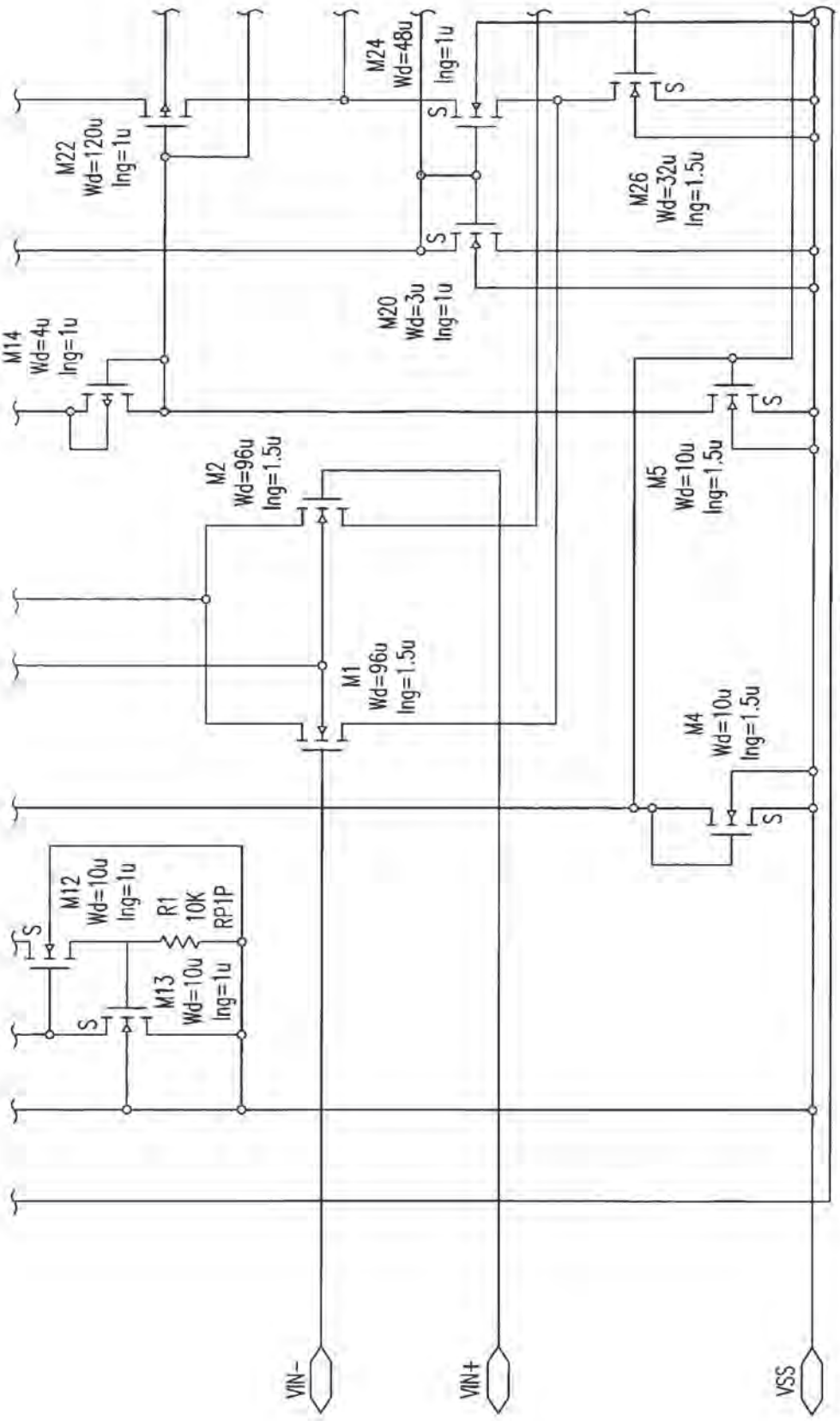

M22
Wd=120u
lng=1u
M24
Wd=48u
lng=1u
M26
Wd=32u
lng=1.5u
M20
Wd=3u
lng=1u
M14
Wd=4u
lng=1u
M2
Wd=96u
lng=1.5u
M5
Wd=10u
lng=1.5u
M1
Wd=96u
lng=1.5u
M4
Wd=10u
lng=1.5u
M12
Wd=10u
lng=1u
R1
10K
RP1P
M13
Wd=10u
lng=1u
S
VIN-
VIN+
VSS

FIG. 160C

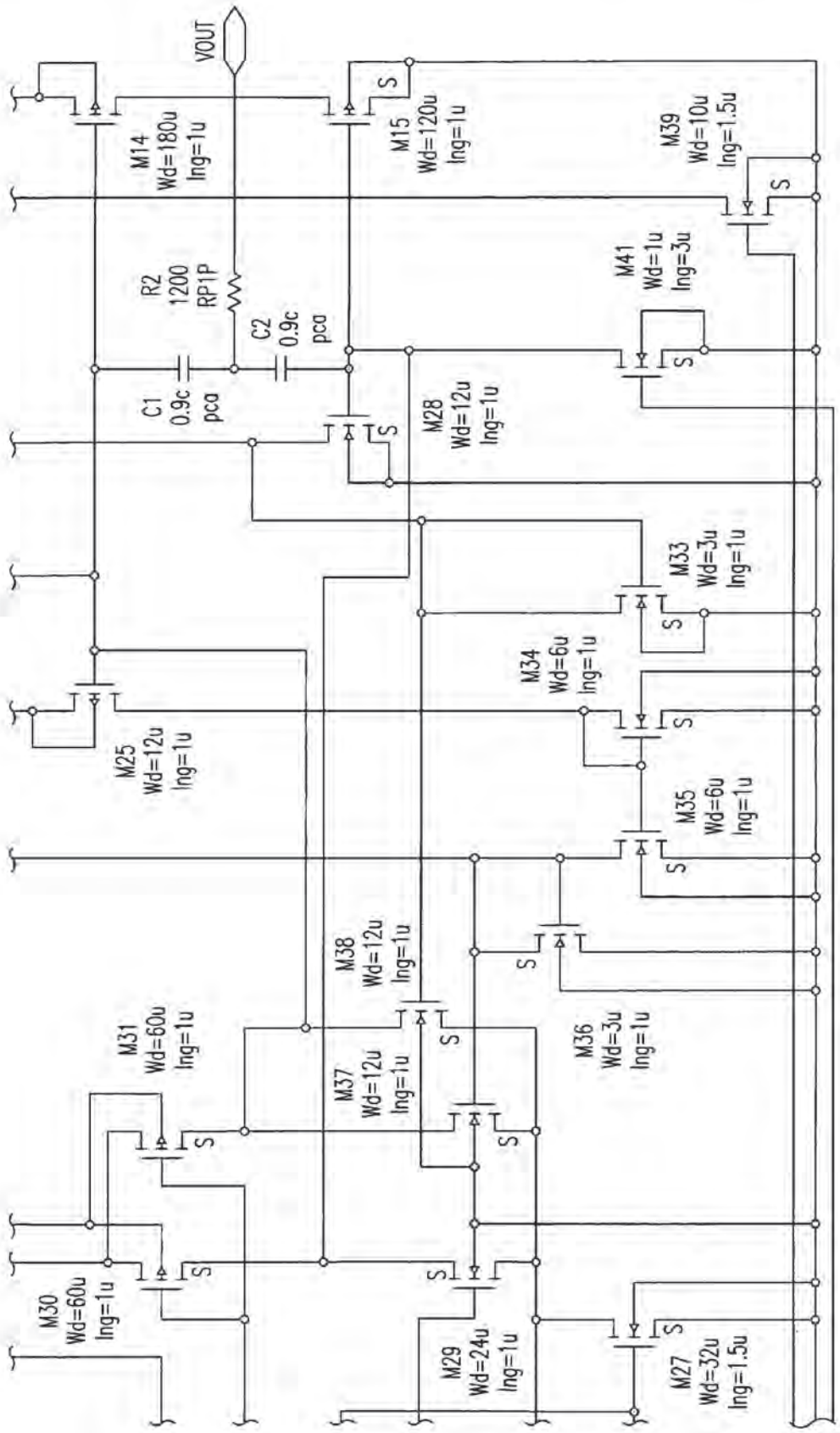

VOUT
M14 Wd=180u lng=1u
M15 Wd=120u lng=1u
M39 Wd=10u lng=1.5u
R2 1200 RP1P
C2 0.9c pca
C1 0.9c pca
M41 Wd=1u lng=3u
M28 Wd=12u lng=1u
M33 Wd=3u lng=1u
M34 Wd=6u lng=1u
M25 Wd=12u lng=1u
M35 Wd=6u lng=1u
M38 Wd=12u lng=1u
M31 Wd=60u lng=1u
M37 Wd=12u lng=1u
M36 Wd=3u lng=1u
M30 Wd=60u lng=1u
M29 Wd=24u lng=1u
M27 Wd=32u lng=1.5u
S

FIG. 160D

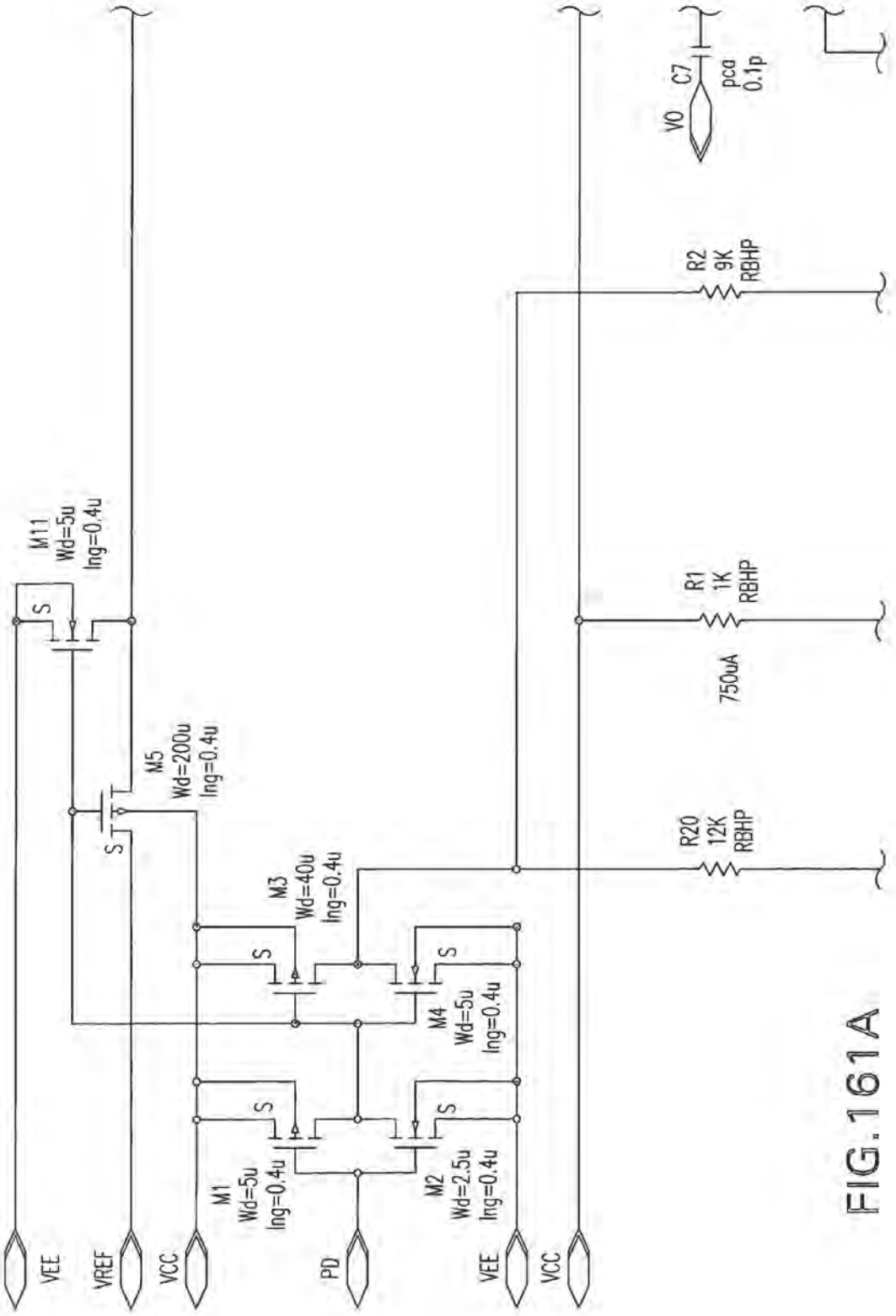

VEE
VREF
VCC
PD
VEE
VCC
M11
Wd=5u
lng=0.4u
M5
Wd=200u
lng=0.4u
M3
Wd=40u
lng=0.4u
M4
Wd=5u
lng=0.4u
M1
Wd=5u
lng=0.4u
M2
Wd=2.5u
lng=0.4u
S
R2
9K
RBHP
R1
1K
RBHP
750uA
R20
12K
RBHP
V0
C7
pca
0.1p

FIG. 161A

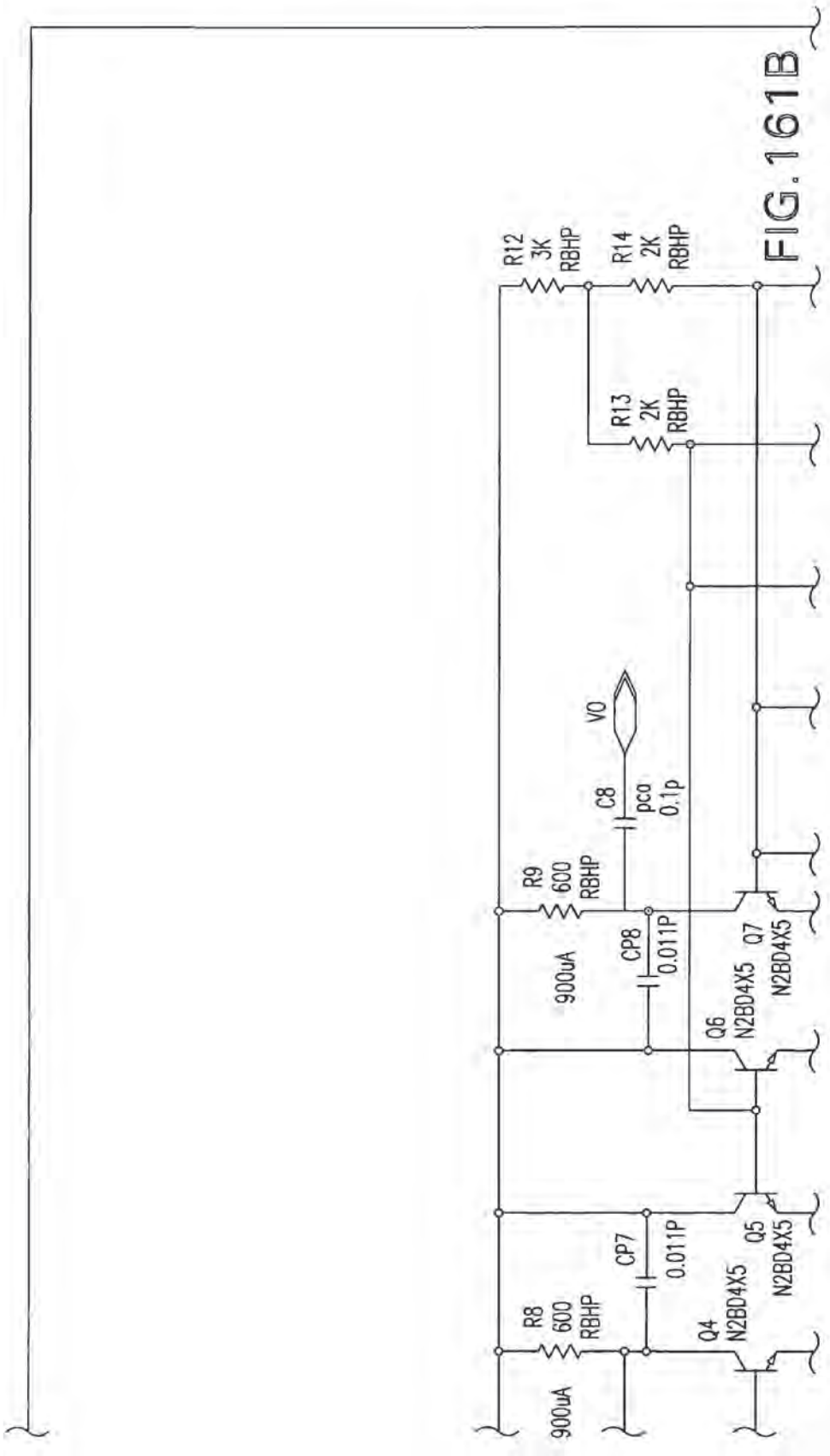

R12
3K
RBHP
R14
2K
RBHP
R13
2K
RBHP
VO
C8
pco
0.1p
R9
600
RBHP
CP8
0.011P
900uA
Q7
N2BD4X5
Q6
N2BD4X5
CP7
0.011P
Q5
N2BD4X5
R8
600
RBHP
Q4
N2BD4X5
900uA

FIG. 161B

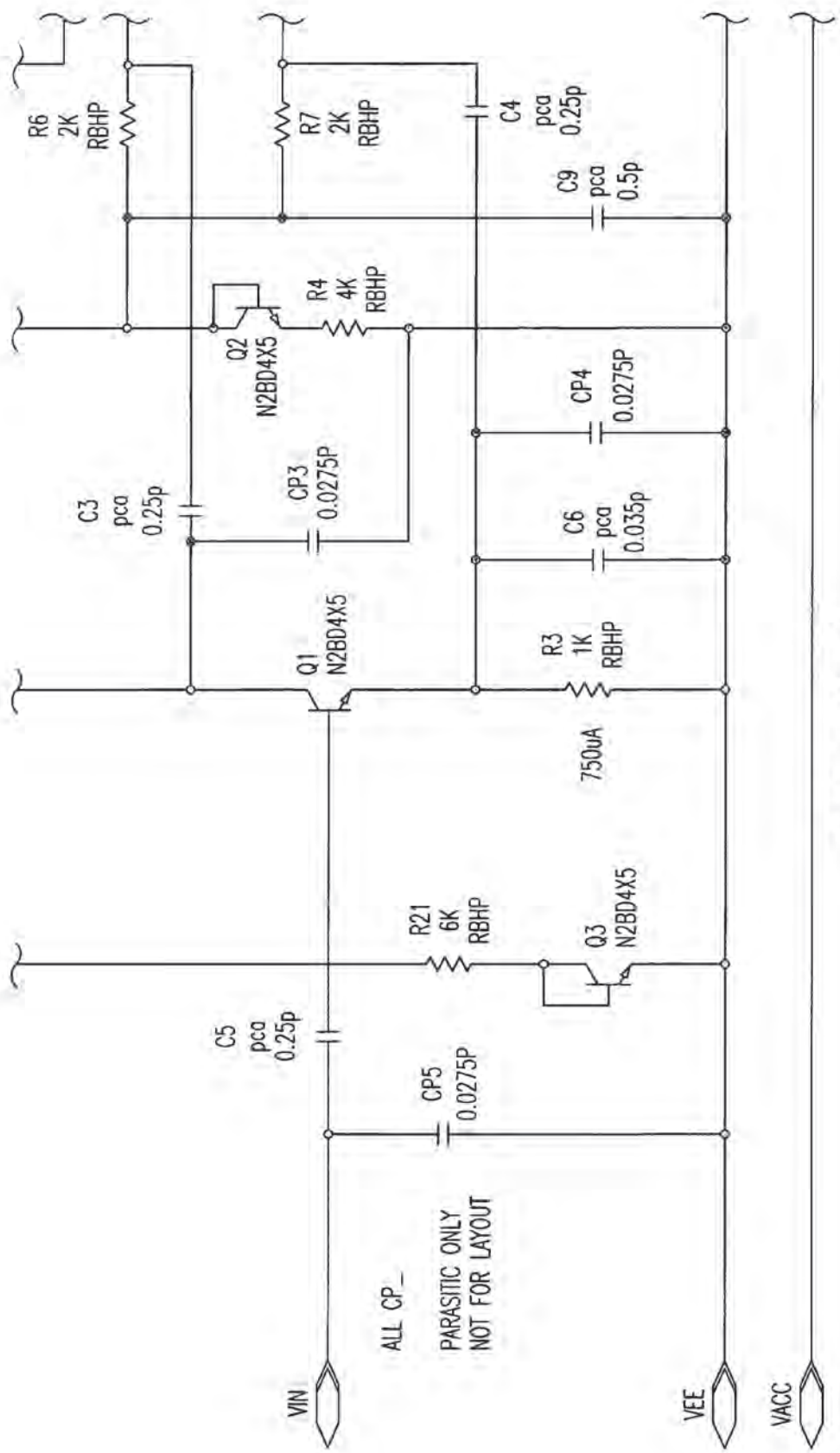

R6
2K
RBHP
R7
2K
RBHP
C4
pca
0.25p
C9
pca
0.5p
R4
4K
RBHP
Q2
N2BD4X5
CP4
0.0275P
CP3
0.0275P
C3
pca
0.25p
C6
pca
0.035p
Q1
N2BD4X5
R3
1K
RBHP
750uA
R21
6K
RBHP
Q3
N2BD4X5
C5
pca
0.25p
CP5
0.0275P
ALL CP_
PARASITIC ONLY
NOT FOR LAYOUT
VIN
VEE
VACC

FIG. 161C

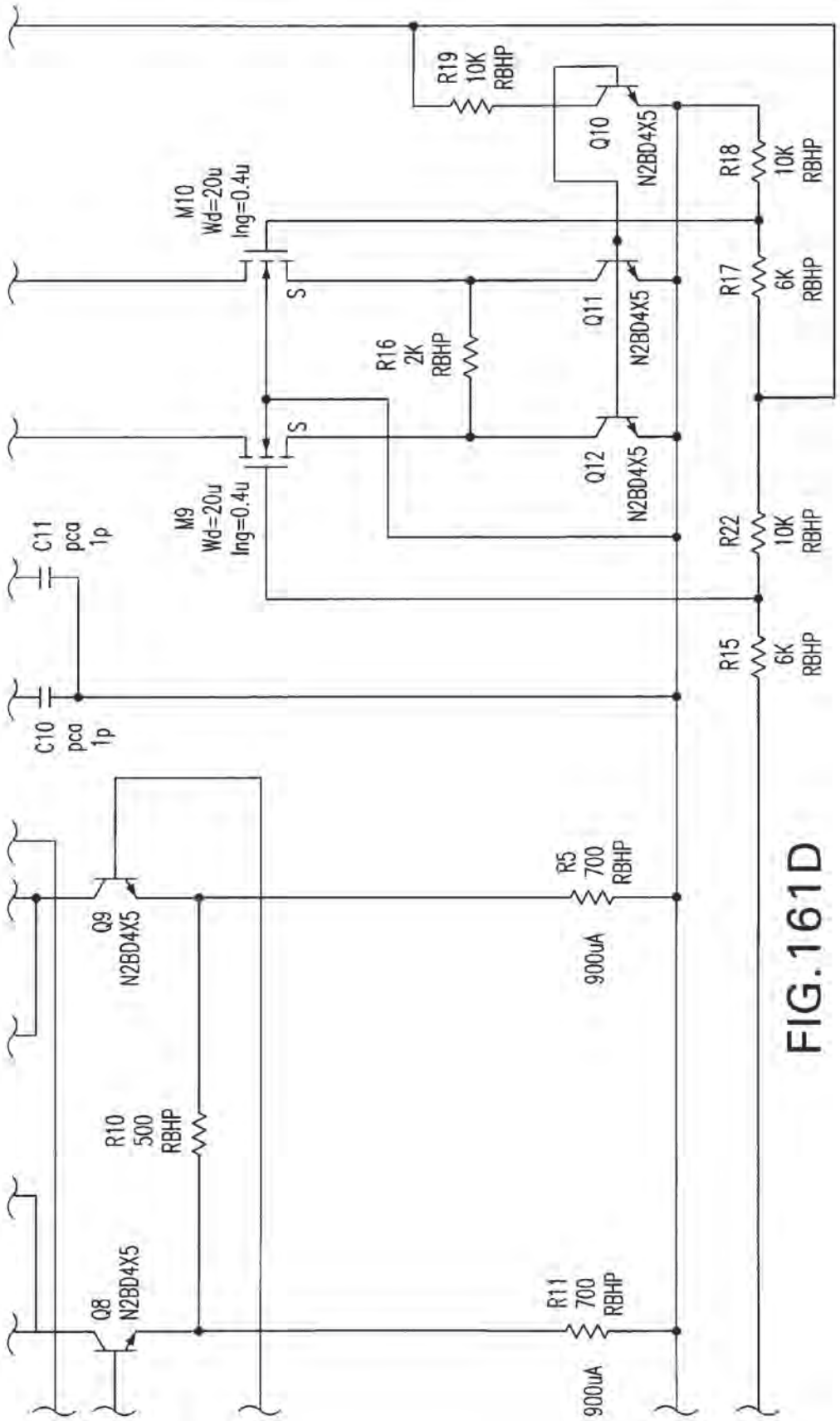

R19
10K
RBHP
Q10
N2BD4X5
R18
10K
RBHP
M10
Wd=20u
lng=0.4u
S
R17
6K
RBHP
Q11
N2BD4X5
R16
2K
RBHP
S
Q12
N2BD4X5
M9
Wd=20u
lng=0.4u
C11
pca
1p
R22
10K
RBHP
R15
6K
RBHP
C10
pca
1p
R5
700
RBHP
Q9
N2BD4X5
900uA
R10
500
RBHP
Q8
N2BD4X5
R11
700
RBHP
900uA

FIG.161D

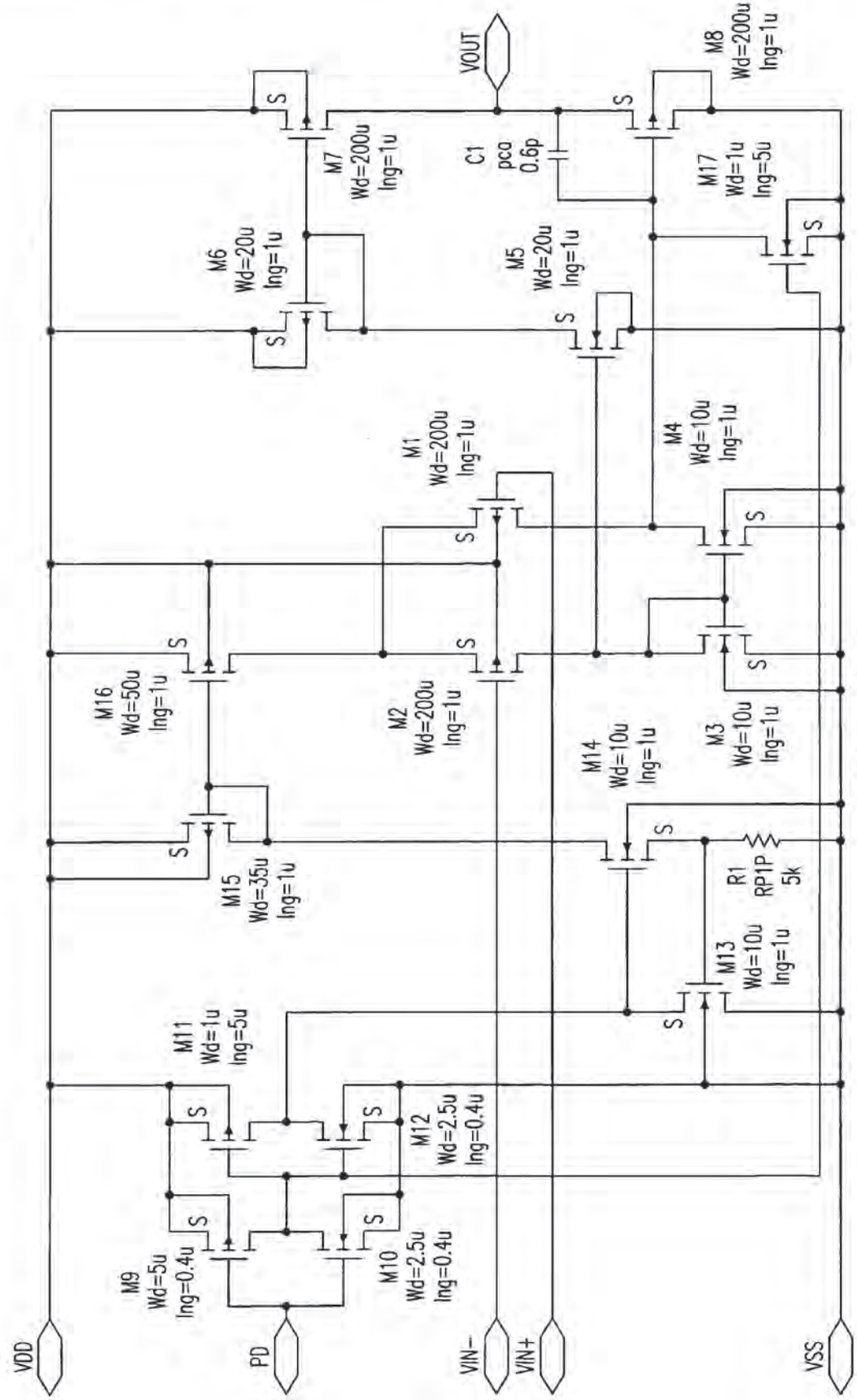

VOUT
M8 Wd=200u lng=1u
M7 Wd=200u lng=1u
C1 pca 0.6p
M17 Wd=1u lng=5u
M6 Wd=20u lng=1u
M5 Wd=20u lng=1u
M1 Wd=200u lng=1u
M4 Wd=10u lng=1u
M16 Wd=50u lng=1u
M2 Wd=200u lng=1u
M3 Wd=10u lng=1u
M14 Wd=10u lng=1u
M15 Wd=35u lng=1u
R1 RP1P 5k
M13 Wd=10u lng=1u
M11 Wd=1u lng=5u
M12 Wd=2.5u lng=0.4u
M9 Wd=5u lng=0.4u
M10 Wd=2.5u lng=0.4u
VDD
PD
VIN-
VIN+
VSS

FIG. 162

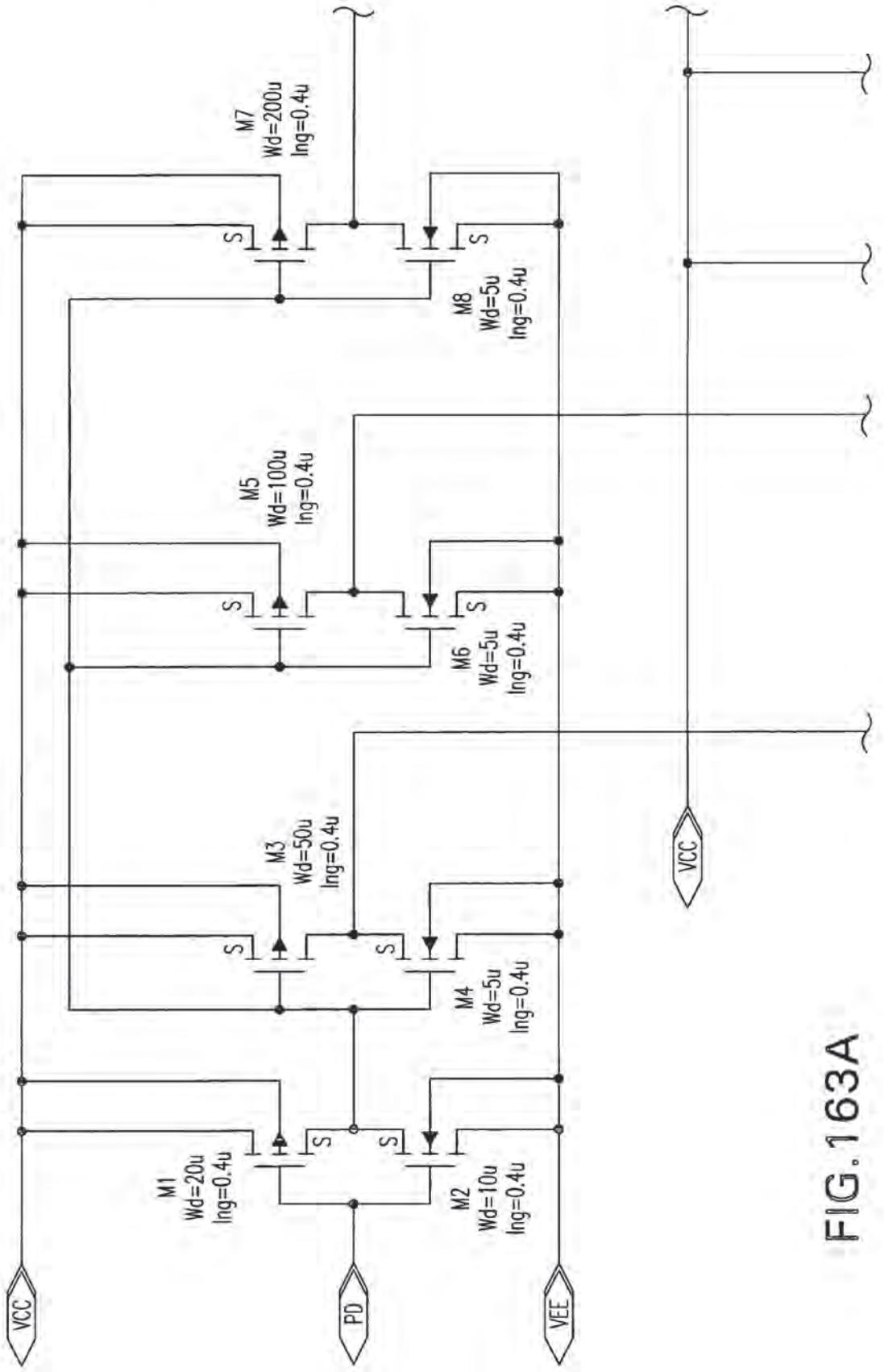
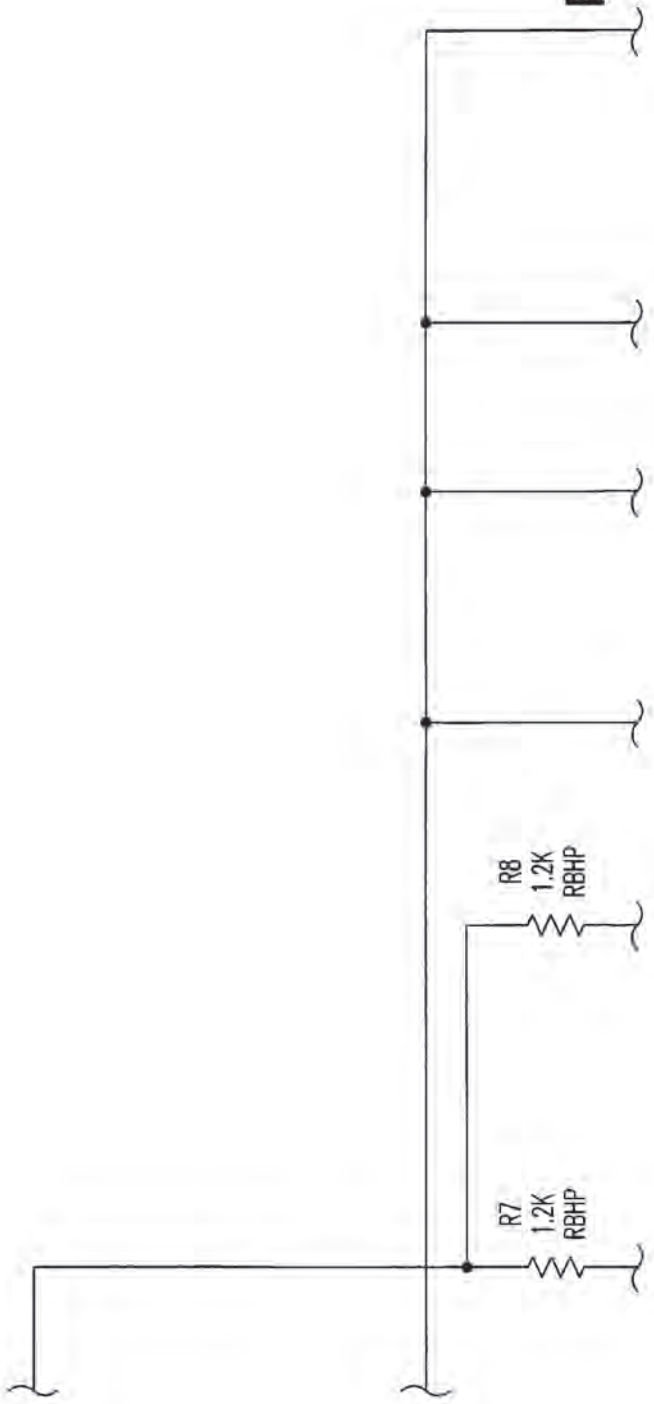

M7
Wd=200u
lng=0.4u
M8
Wd=5u
lng=0.4u
M5
Wd=100u
lng=0.4u
M6
Wd=5u
lng=0.4u
M3
Wd=50u
lng=0.4u
M4
Wd=5u
lng=0.4u
M1
Wd=20u
lng=0.4u
M2
Wd=10u
lng=0.4u
S
VCC
PD
VEE
VCC

FIG. 163A

FIG. 163B



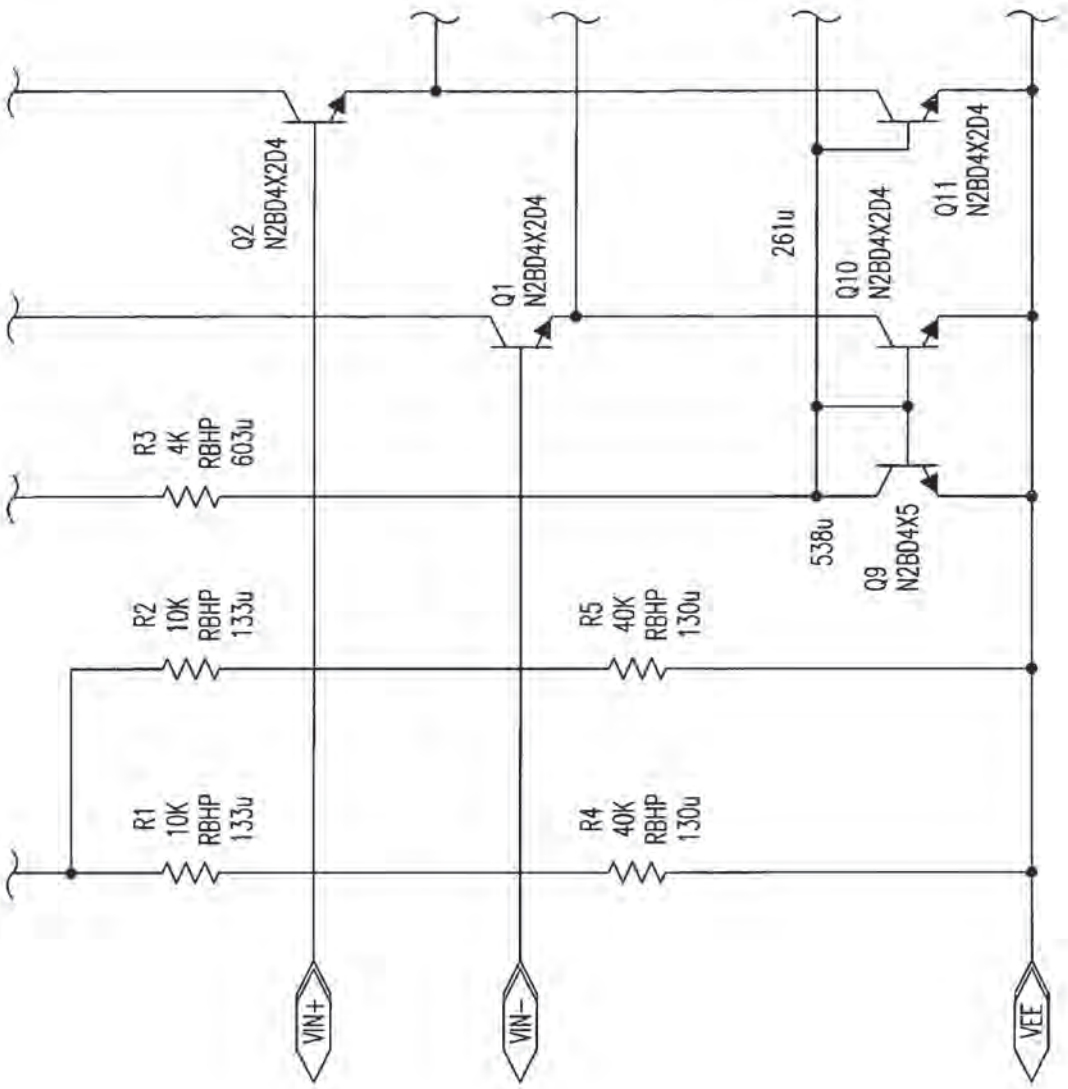

Q2
N2BD4X2D4
Q1
N2BD4X2D4
261u
Q10
N2BD4X2D4
Q11
N2BD4X2D4
R3
4K
RBHP
603u
538u
Q9
N2BD4X5
R2
10K
RBHP
133u
R5
40K
RBHP
130u
R1
10K
RBHP
133u
R4
40K
RBHP
130u
VIN+
VIN-
VEE

FIG.163C

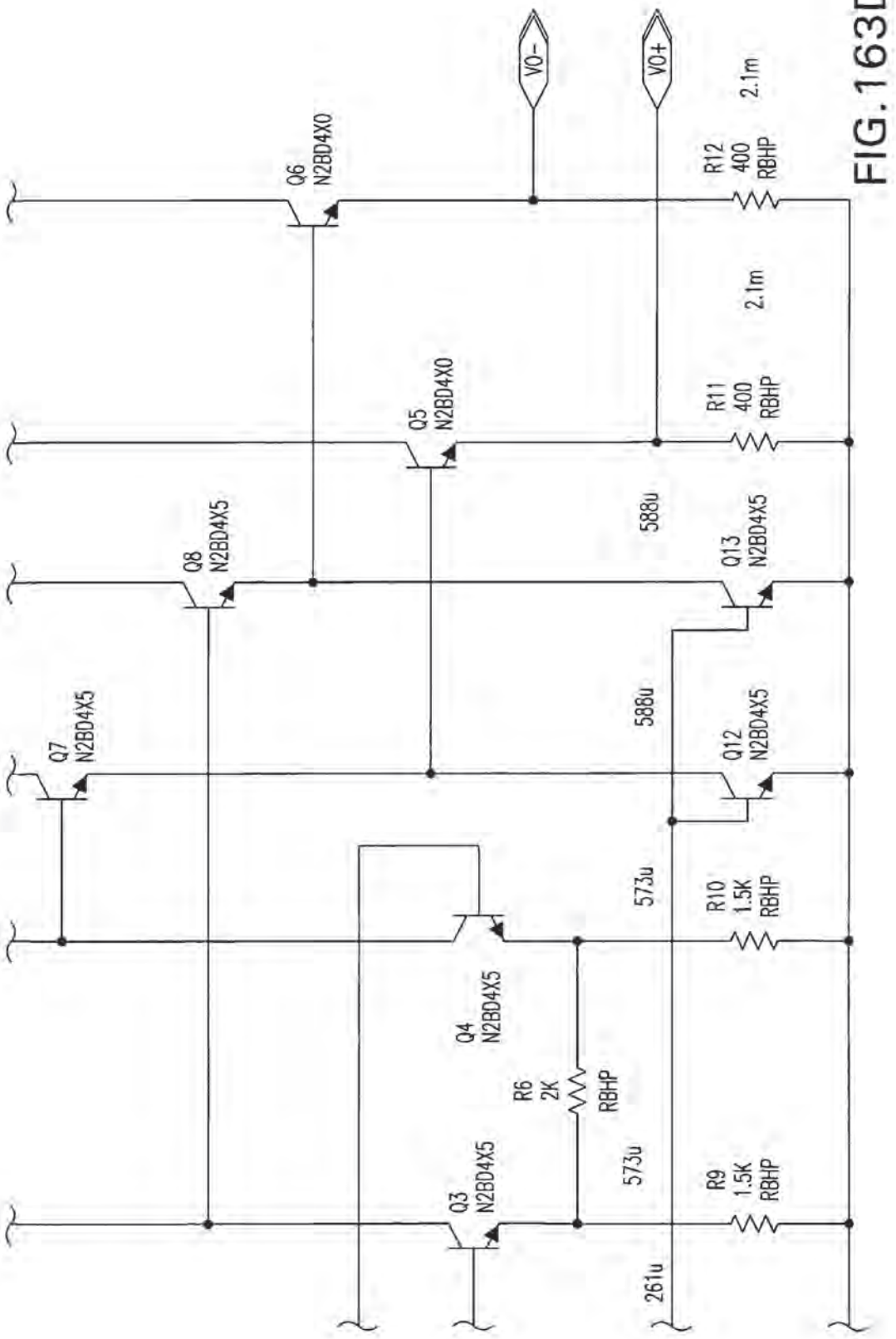

VO-
VO+
Q6 N2BD4X0
Q5 N2BD4X0
Q8 N2BD4X5
Q13 N2BD4X5
Q7 N2BD4X5
Q12 N2BD4X5
Q4 N2BD4X5
Q3 N2BD4X5
R12 400 RBHP 2.1m
R11 400 RBHP 2.1m
R10 1.5K RBHP
R9 1.5K RBHP
R6 2K RBHP
588u
588u
573u
573u
261u

FIG. 163D

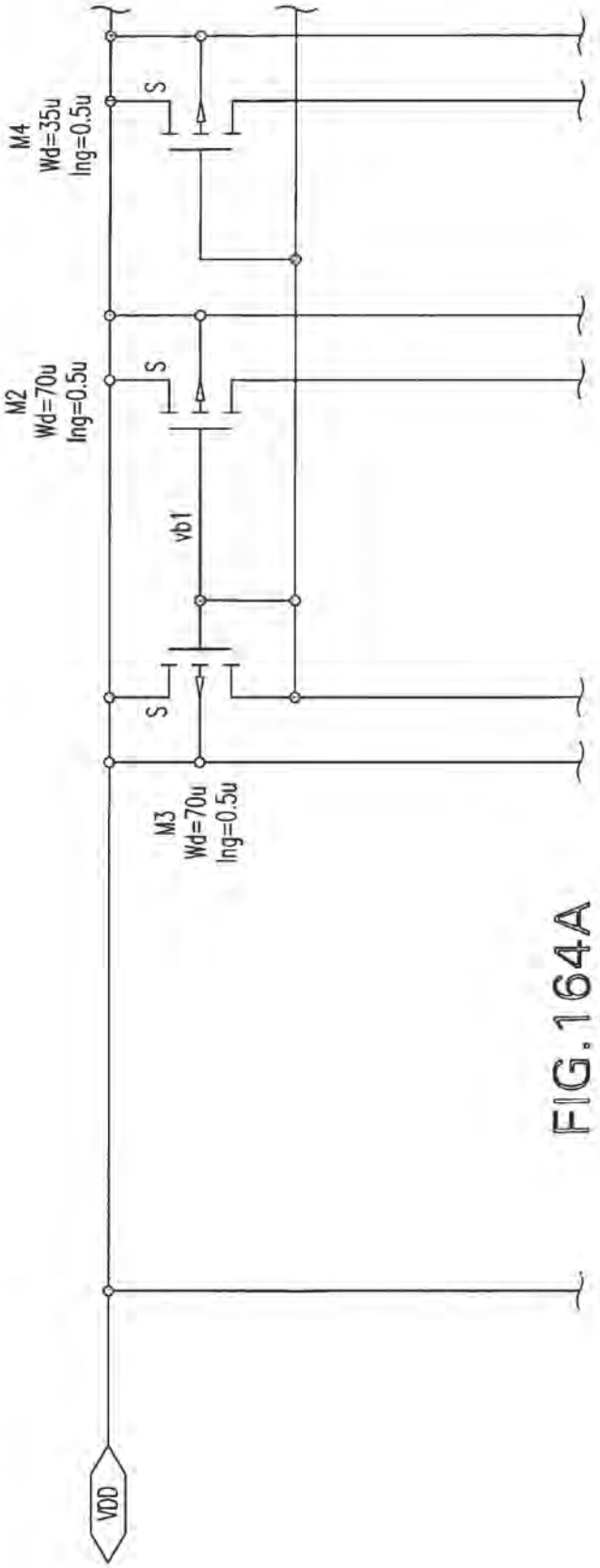


FIG. 164A



FIG. 164B

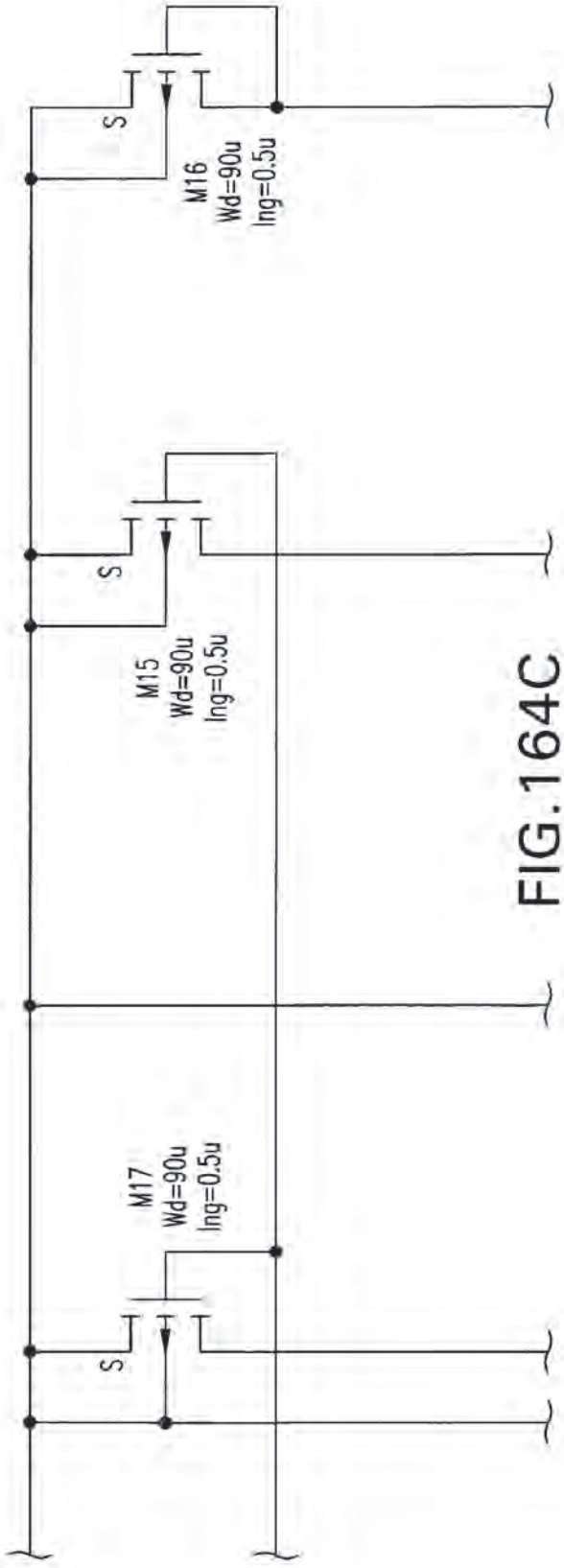


FIG. 164C

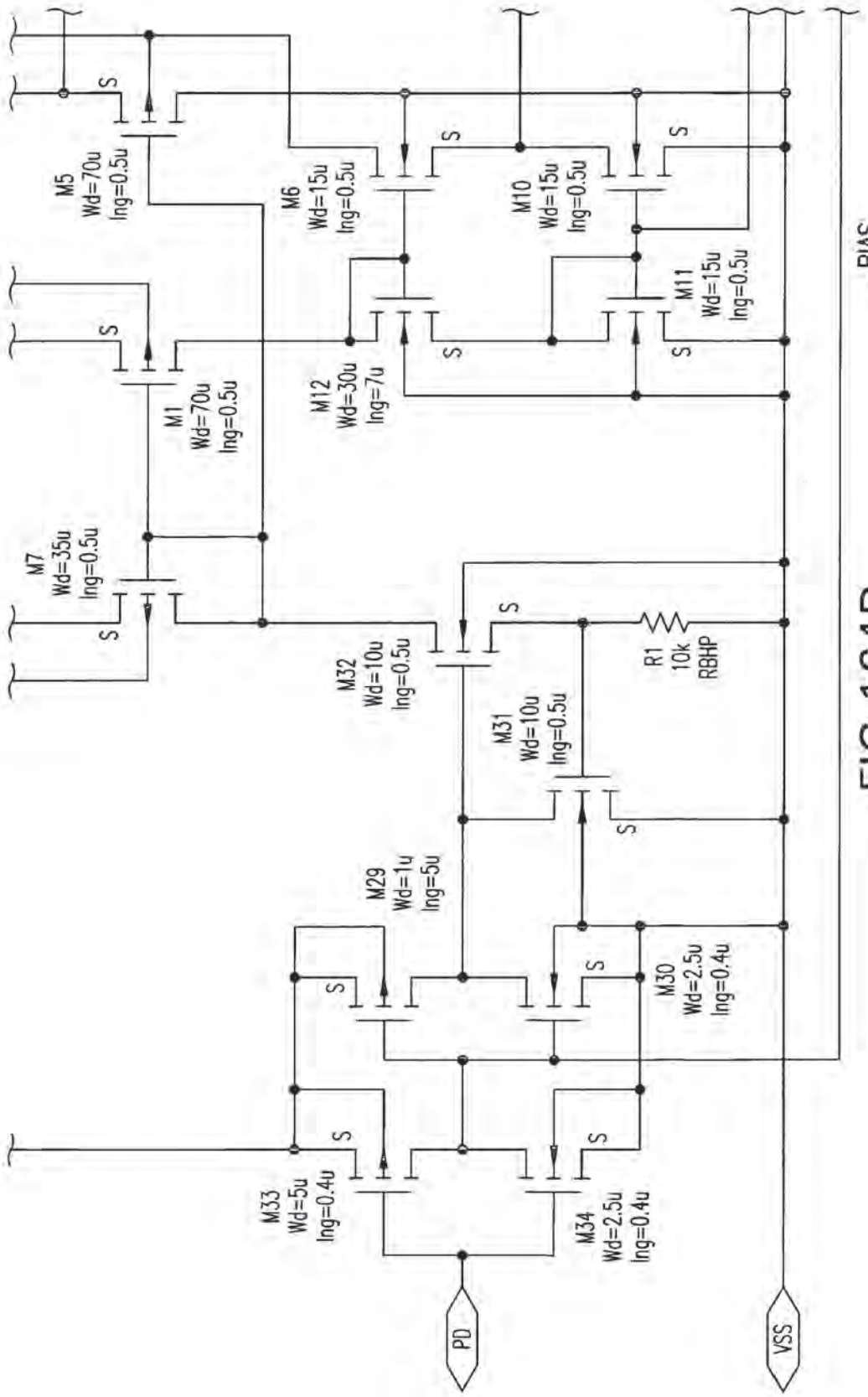

M5
Wd=70u
lng=0.5u
M6
Wd=15u
lng=0.5u
M10
Wd=15u
lng=0.5u
M11
Wd=15u
lng=0.5u
BIAS
M1
Wd=70u
lng=0.5u
M12
Wd=30u
lng=7u
M7
Wd=35u
lng=0.5u
M32
Wd=10u
lng=0.5u
R1
10k
RBHP
M31
Wd=10u
lng=0.5u
M29
Wd=1u
lng=5u
M30
Wd=2.5u
lng=0.4u
M33
Wd=5u
lng=0.4u
M34
Wd=2.5u
lng=0.4u
PD
VSS
S

FIG. 164D

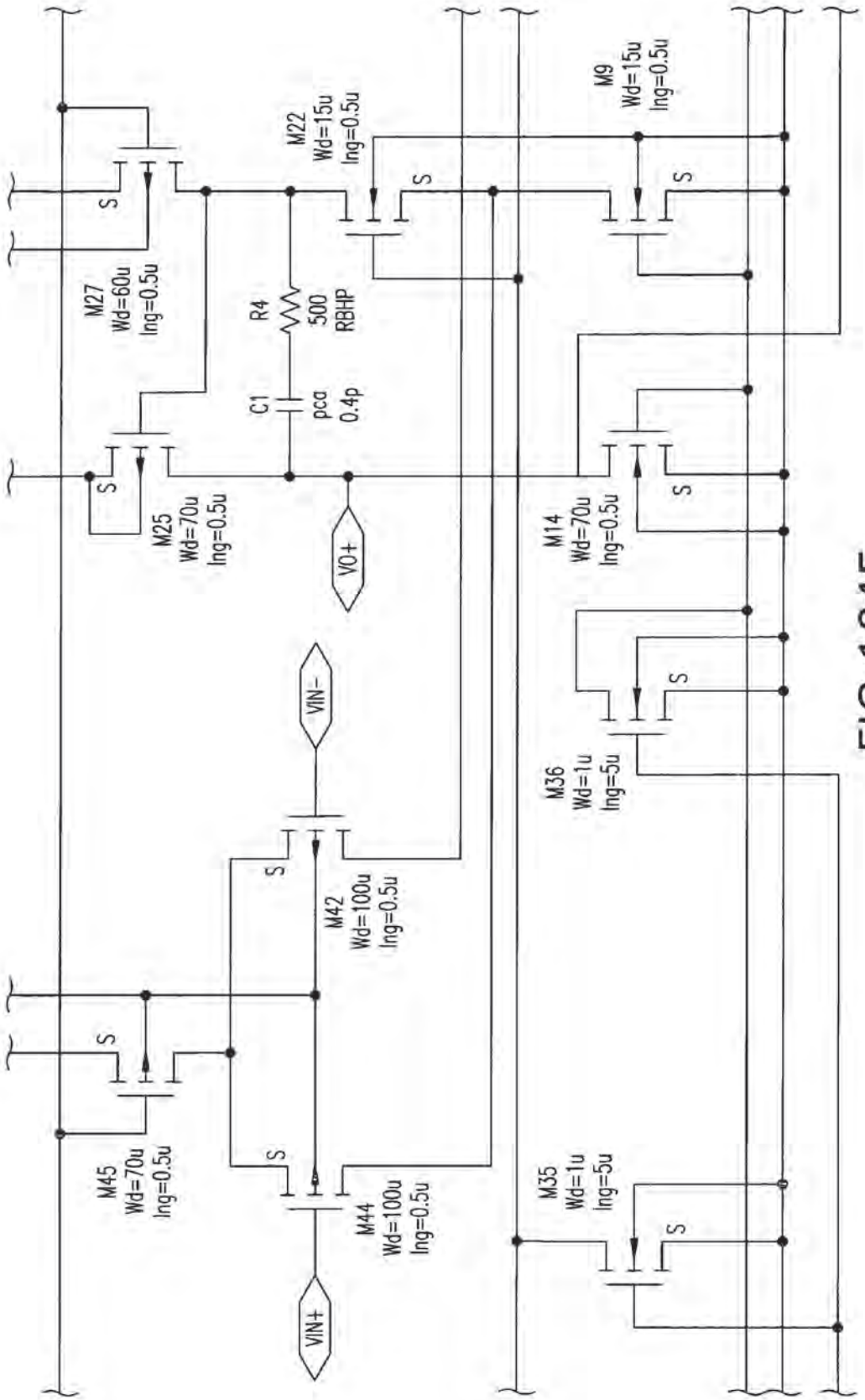

M22
Wd=15u
lng=0.5u
M9
Wd=15u
lng=0.5u
M27
Wd=60u
lng=0.5u
R4
500
RBHP
C1
pca
0.4p
M25
Wd=70u
lng=0.5u
VO+
M14
Wd=70u
lng=0.5u
VIN-
M36
Wd=1u
lng=5u
M42
Wd=100u
lng=0.5u
M45
Wd=70u
lng=0.5u
M44
Wd=100u
lng=0.5u
M35
Wd=1u
lng=5u
VIN+
S

FIG. 164E

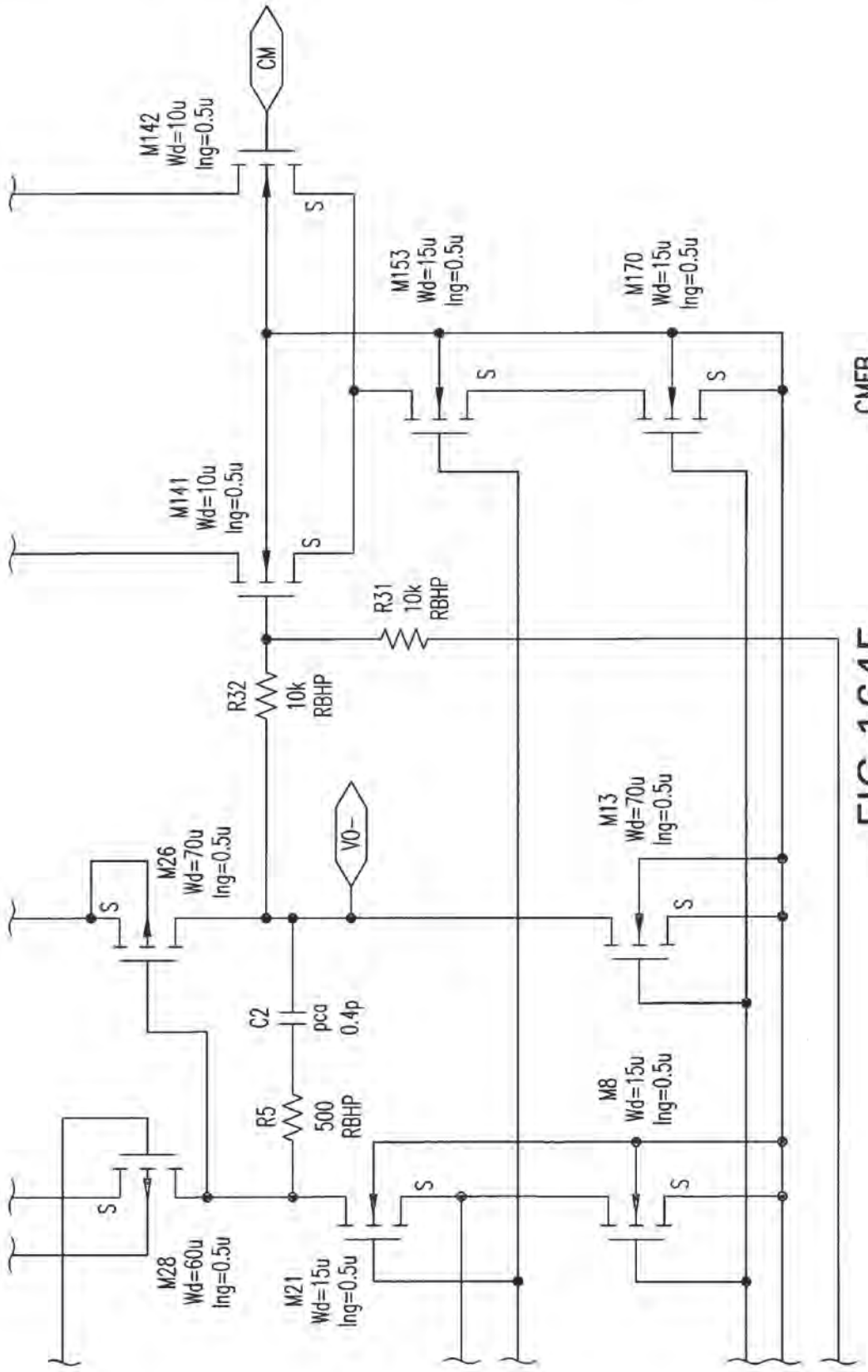

CM
M142 Wd=10u lng=0.5u
M153 Wd=15u lng=0.5u
M170 Wd=15u lng=0.5u
M141 Wd=10u lng=0.5u
R31 10k RBHP
R32 10k RBHP
VO-
M26 Wd=70u lng=0.5u
M13 Wd=70u lng=0.5u
C2 pca 0.4p
R5 500 RBHP
M8 Wd=15u lng=0.5u
M28 Wd=60u lng=0.5u
M21 Wd=15u lng=0.5u
S
CMFB

FIG. 164F

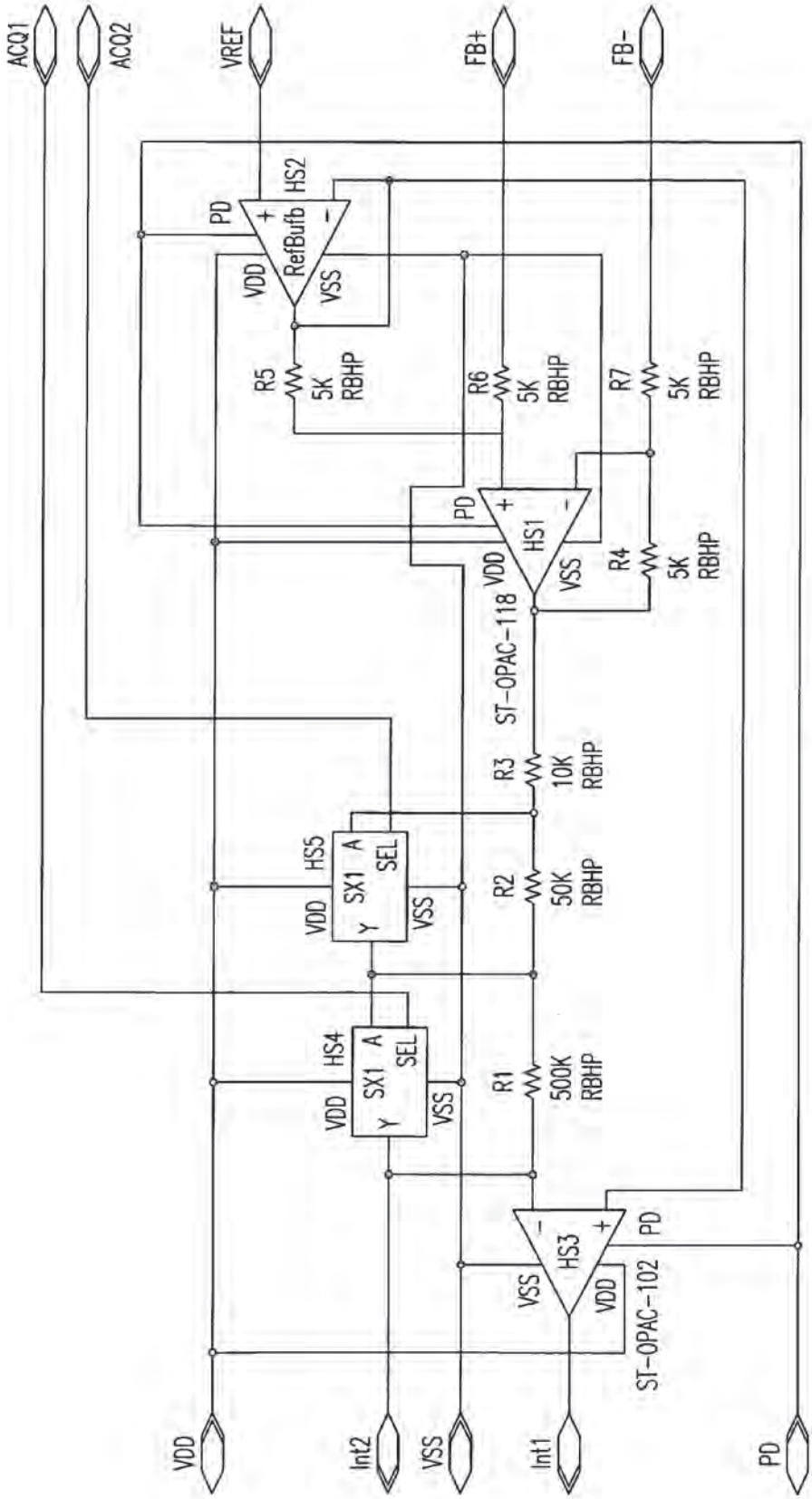

ACQ1
ACQ2
VREF
FB+
FB-
HS2
PD
RefBufb
VDD
VSS
R5
5K
RBHP
R6
5K
RBHP
R7
5K
RBHP
HS1
R4
5K
RBHP
ST-OPAC-118
R3
10K
RBHP
HS5
SX1
A
SEL
Y
R2
50K
RBHP
HS4
R1
500K
RBHP
HS3
ST-OPAC-102
Int2
Int1

FIG. 165

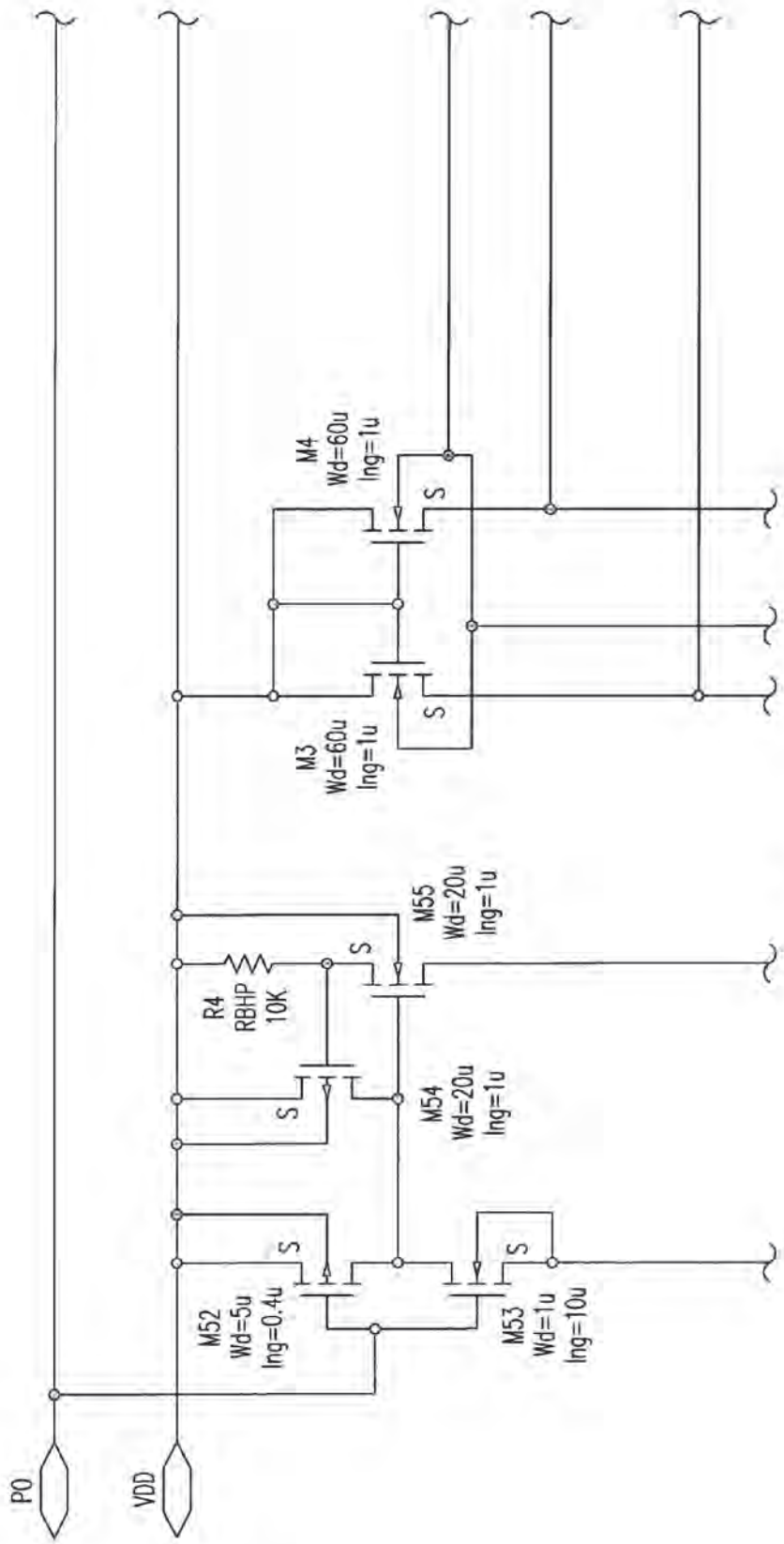

M4
Wd=60u
lng=1u
S
M3
Wd=60u
lng=1u
S
M55
Wd=20u
lng=1u
S
R4
RBHP
10K
S
M54
Wd=20u
lng=1u
S
M52
Wd=5u
lng=0.4u
S
M53
Wd=1u
lng=10u
P0
VDD

FIG. 166A

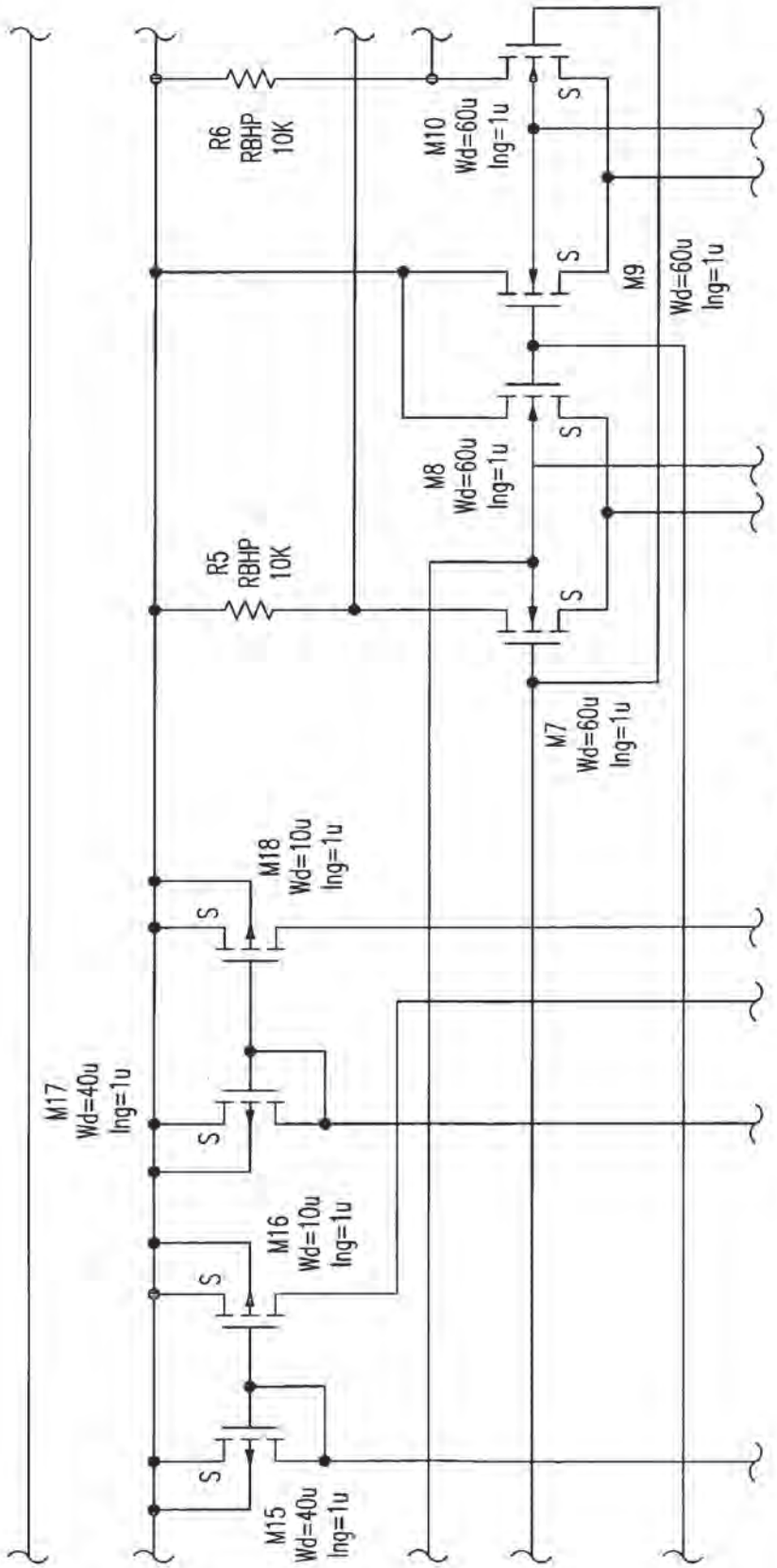

R6
RBHP
10K
R5
RBHP
10K
M10
Wd=60u
lng=1u
M9
Wd=60u
lng=1u
M8
Wd=60u
lng=1u
M7
Wd=60u
lng=1u
M18
Wd=10u
lng=1u
M17
Wd=40u
lng=1u
M16
Wd=10u
lng=1u
M15
Wd=40u
lng=1u
S

FIG.166B

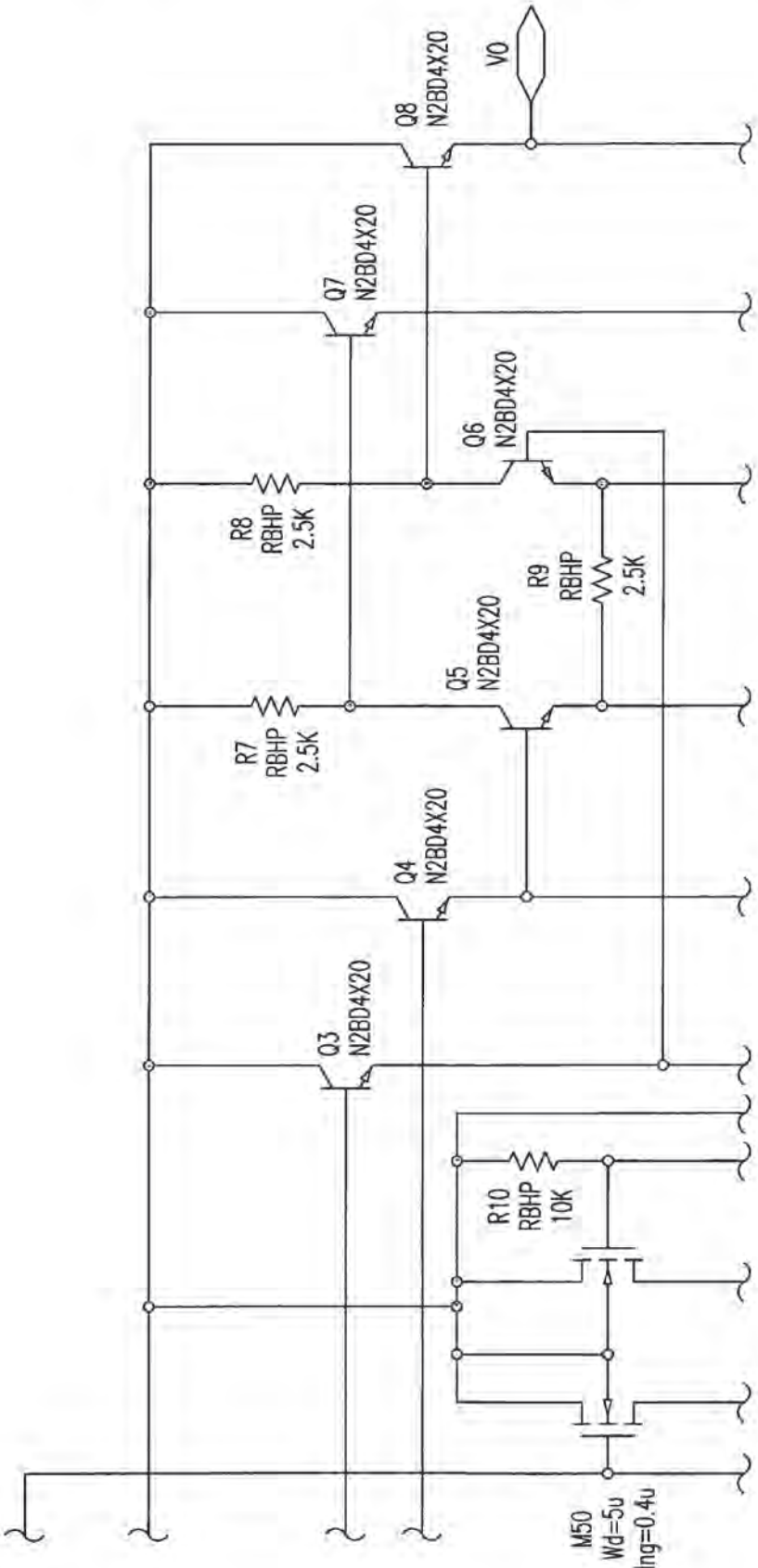

VO
Q8 N2BD4X20
Q7 N2BD4X20
Q6 N2BD4X20
Q5 N2BD4X20
Q4 N2BD4X20
Q3 N2BD4X20
R8 RBHP 2.5K
R9 RBHP 2.5K
R7 RBHP 2.5K
R10 RBHP 10K
M50 Wd=5u lng=0.4u

FIG. 166C

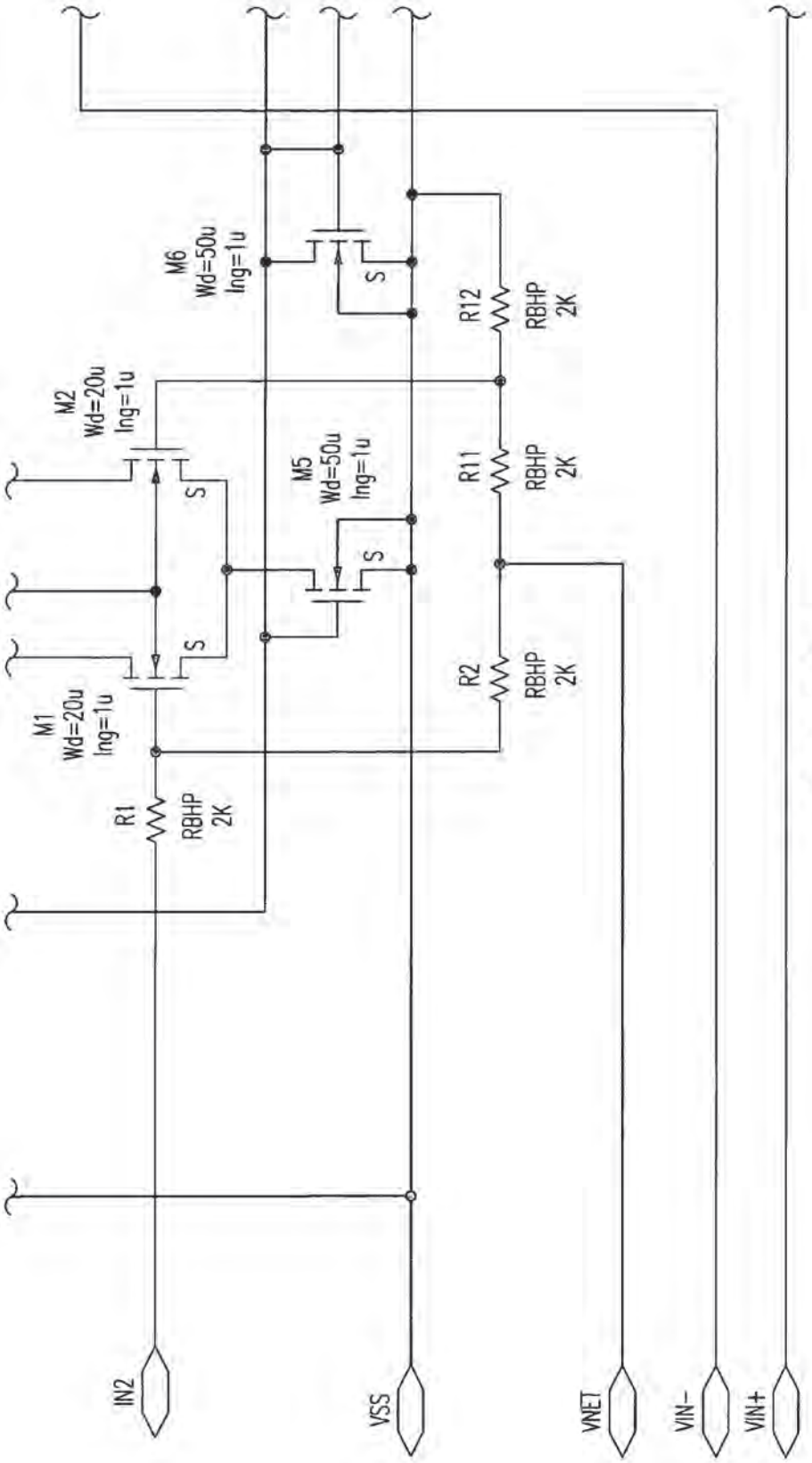

M6
Wd=50u
lng=1u
S
R12
RBHP
2K
M2
Wd=20u
lng=1u
M5
Wd=50u
lng=1u
R11
RBHP
2K
S
S
S
R2
RBHP
2K
M1
Wd=20u
lng=1u
R1
RBHP
2K
IN2
VSS
VNET
VIN-
VIN+

FIG. 166D

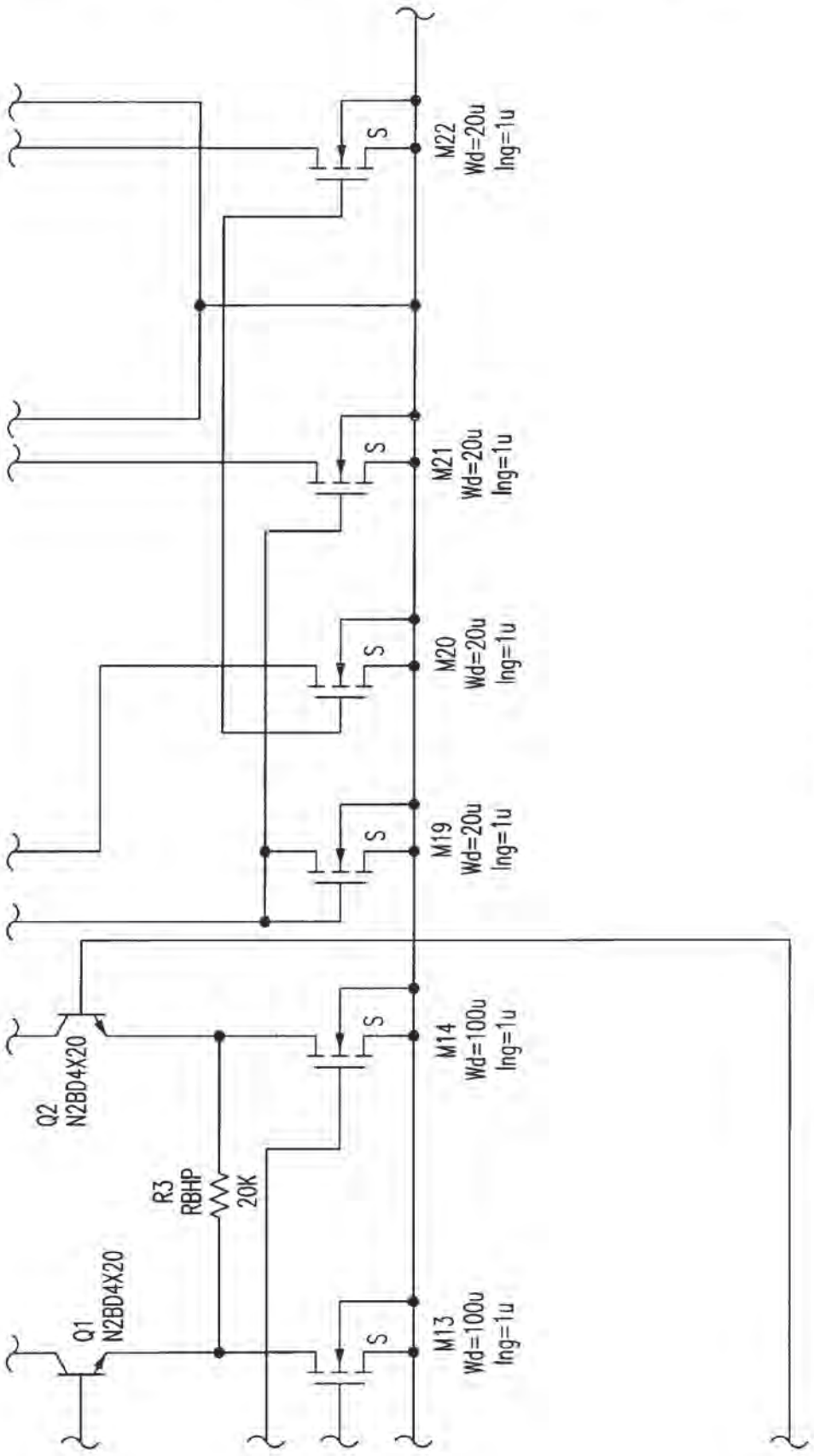

M22
Wd=20u
lng=1u
M21
Wd=20u
lng=1u
M20
Wd=20u
lng=1u
M19
Wd=20u
lng=1u
M14
Wd=100u
lng=1u
M13
Wd=100u
lng=1u
Q2
N2BD4X20
Q1
N2BD4X20
R3
RBHP
20K
S

FIG.166E

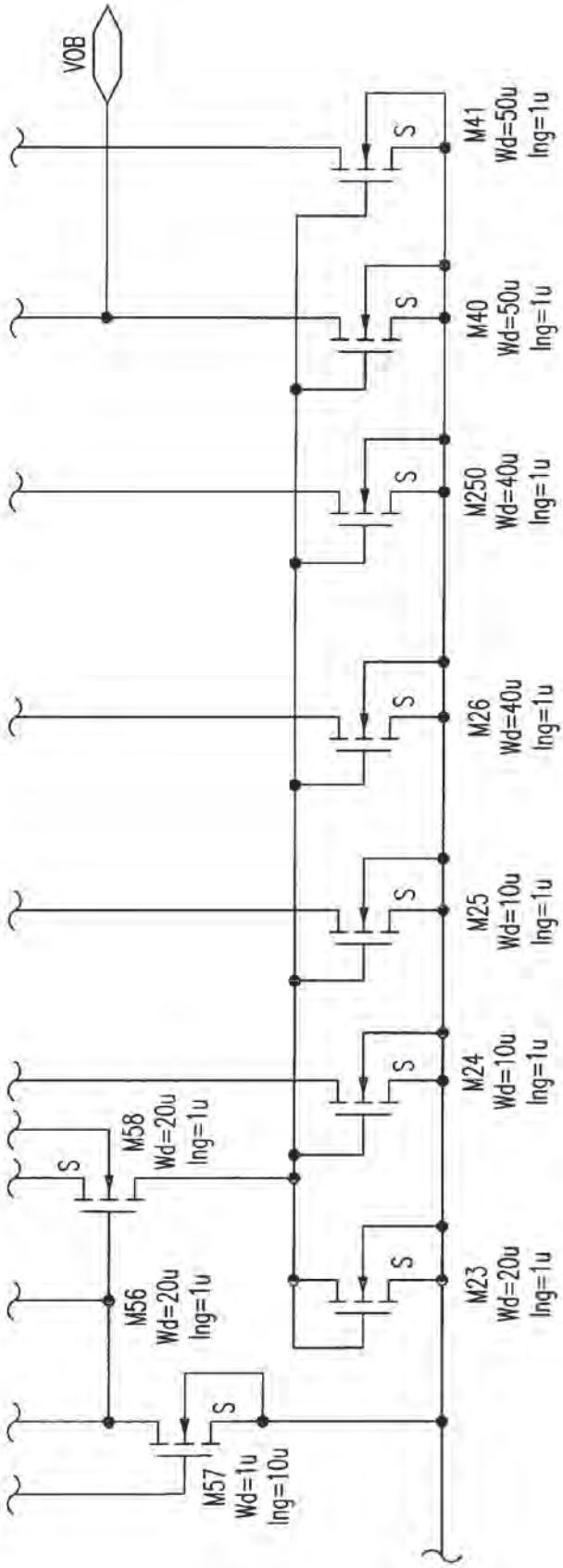

VOB
M41 Wd=50u lng=1u
M40 Wd=50u lng=1u
M250 Wd=40u lng=1u
M26 Wd=40u lng=1u
M25 Wd=10u lng=1u
M24 Wd=10u lng=1u
M23 Wd=20u lng=1u
M58 Wd=20u lng=1u
M56 Wd=20u lng=1u
M57 Wd=1u lng=10u
S

FIG.166F

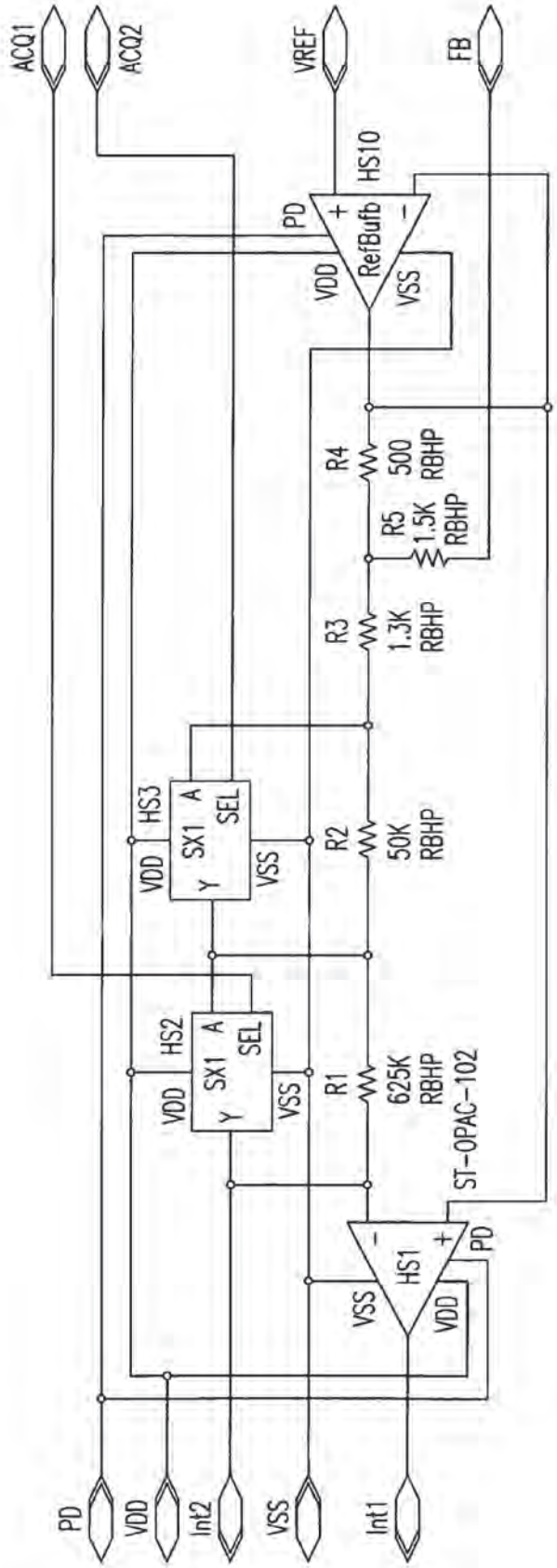

ACQ1
ACQ2
VREF
FB
HS10
PD
RefBufb
VDD
VSS
R4
500
RBHP
R5
1.5K
RBHP
R3
1.3K
RBHP
HS3
SX1
A
SEL
Y
R2
50K
RBHP
HS2
R1
625K
RBHP
ST-OPAC-102
HS1
Int2
Int1

FIG.167

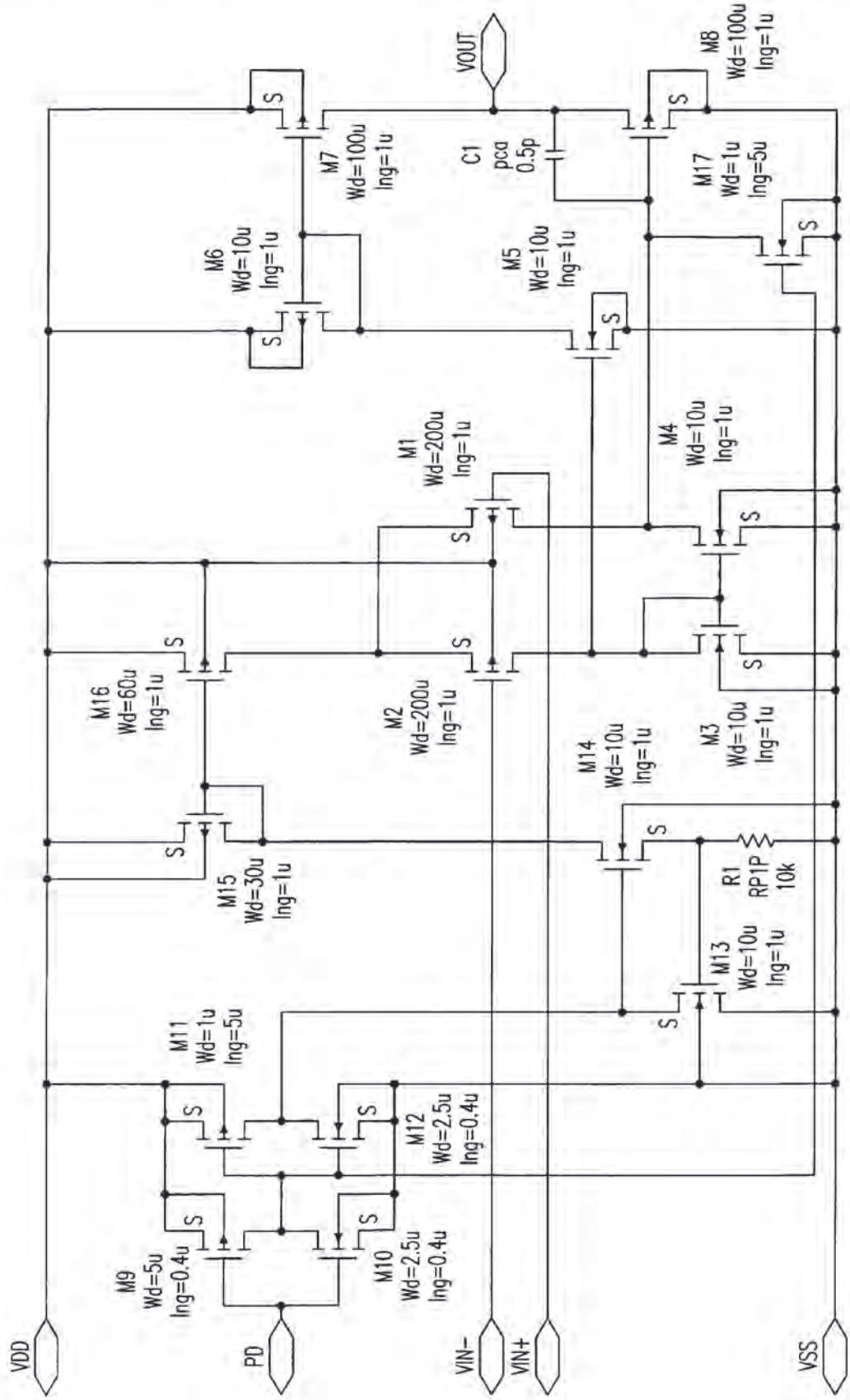

VOUT
M8 Wd=100u lng=1u
M7 Wd=100u lng=1u
C1 pca 0.5p
M17 Wd=1u lng=5u
M6 Wd=10u lng=1u
M5 Wd=10u lng=1u
M1 Wd=200u lng=1u
M4 Wd=10u lng=1u
M16 Wd=60u lng=1u
M2 Wd=200u lng=1u
M3 Wd=10u lng=1u
M14 Wd=10u lng=1u
M15 Wd=30u lng=1u
R1 RP1P 10k
M13 Wd=10u lng=1u
M11 Wd=1u lng=5u
M12 Wd=2.5u lng=0.4u
M9 Wd=5u lng=0.4u
M10 Wd=2.5u lng=0.4u
VDD
PD
VIN-
VIN+
VSS

FIG. 168

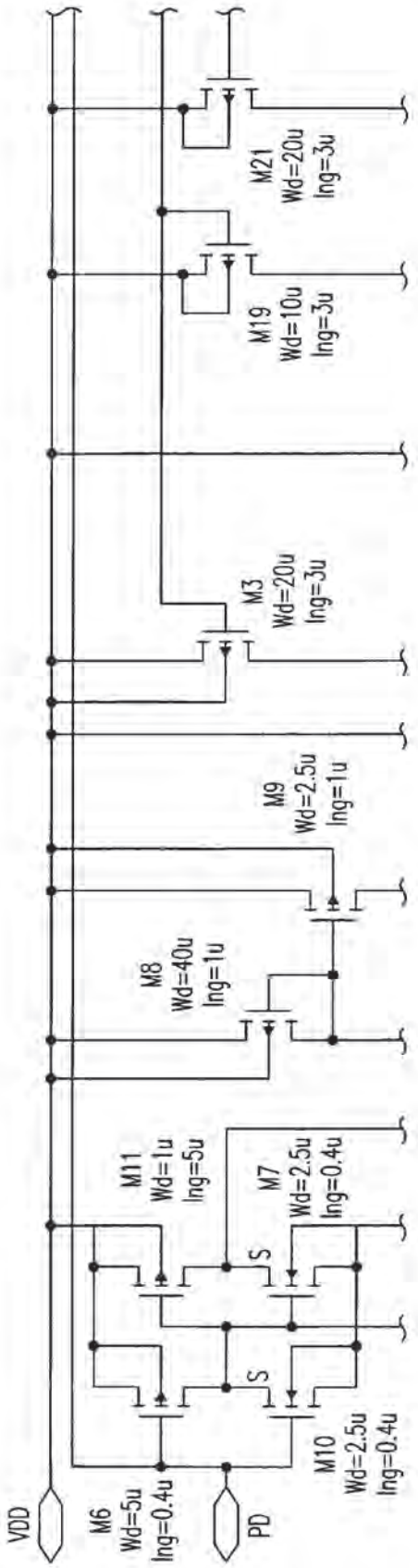

M21
Wd=20u
lng=3u
M19
Wd=10u
lng=3u
M3
Wd=20u
lng=3u
M9
Wd=2.5u
lng=1u
M8
Wd=40u
lng=1u
M11
Wd=1u
lng=5u
M7
Wd=2.5u
lng=0.4u
S
S
M10
Wd=2.5u
lng=0.4u
M6
Wd=5u
lng=0.4u
VDD
PD

FIG.169A

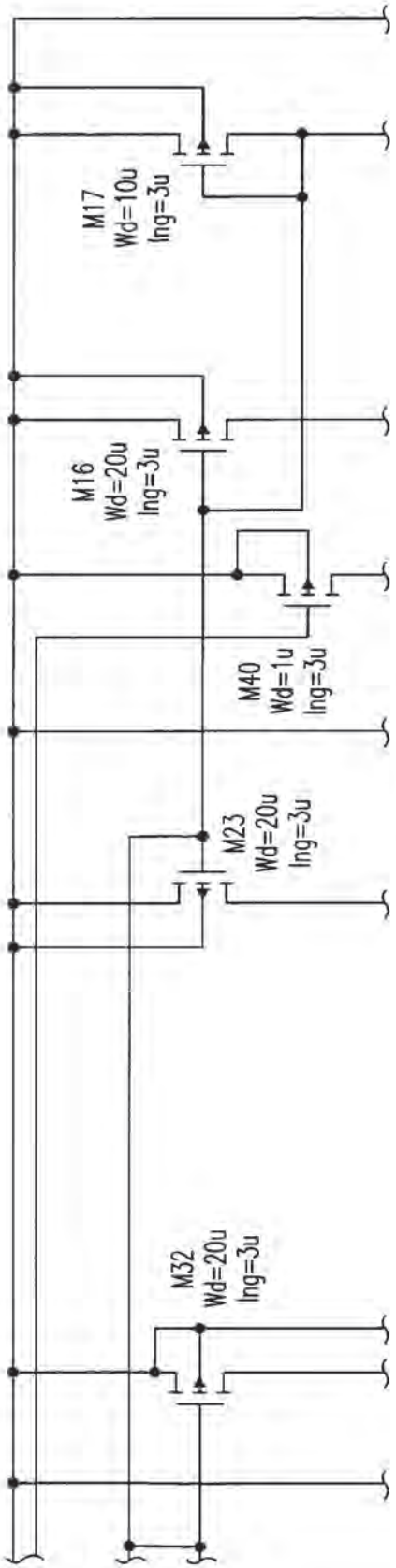

M17
Wd=10u
lng=3u
M16
Wd=20u
lng=3u
M40
Wd=1u
lng=3u
M23
Wd=20u
lng=3u
M32
Wd=20u
lng=3u

FIG.169B

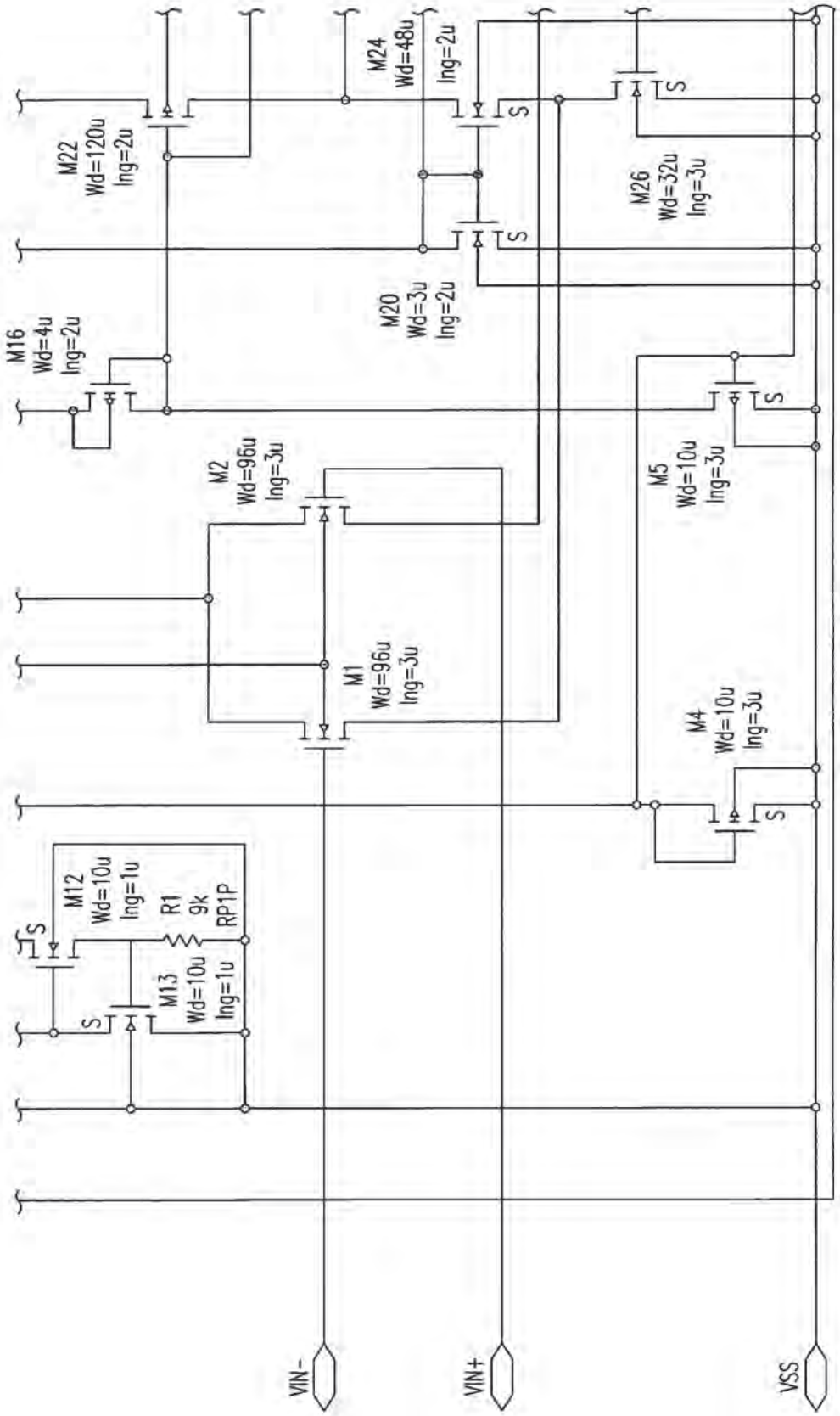

M22
Wd=120u
lng=2u
M24
Wd=48u
lng=2u
M26
Wd=32u
lng=3u
M20
Wd=3u
lng=2u
M16
Wd=4u
lng=2u
M2
Wd=96u
lng=3u
M5
Wd=10u
lng=3u
M1
Wd=96u
lng=3u
M4
Wd=10u
lng=3u
M12
Wd=10u
lng=1u
R1
9k
RP1P
M13
Wd=10u
lng=1u
S
VIN-
VIN+
VSS

FIG. 169C

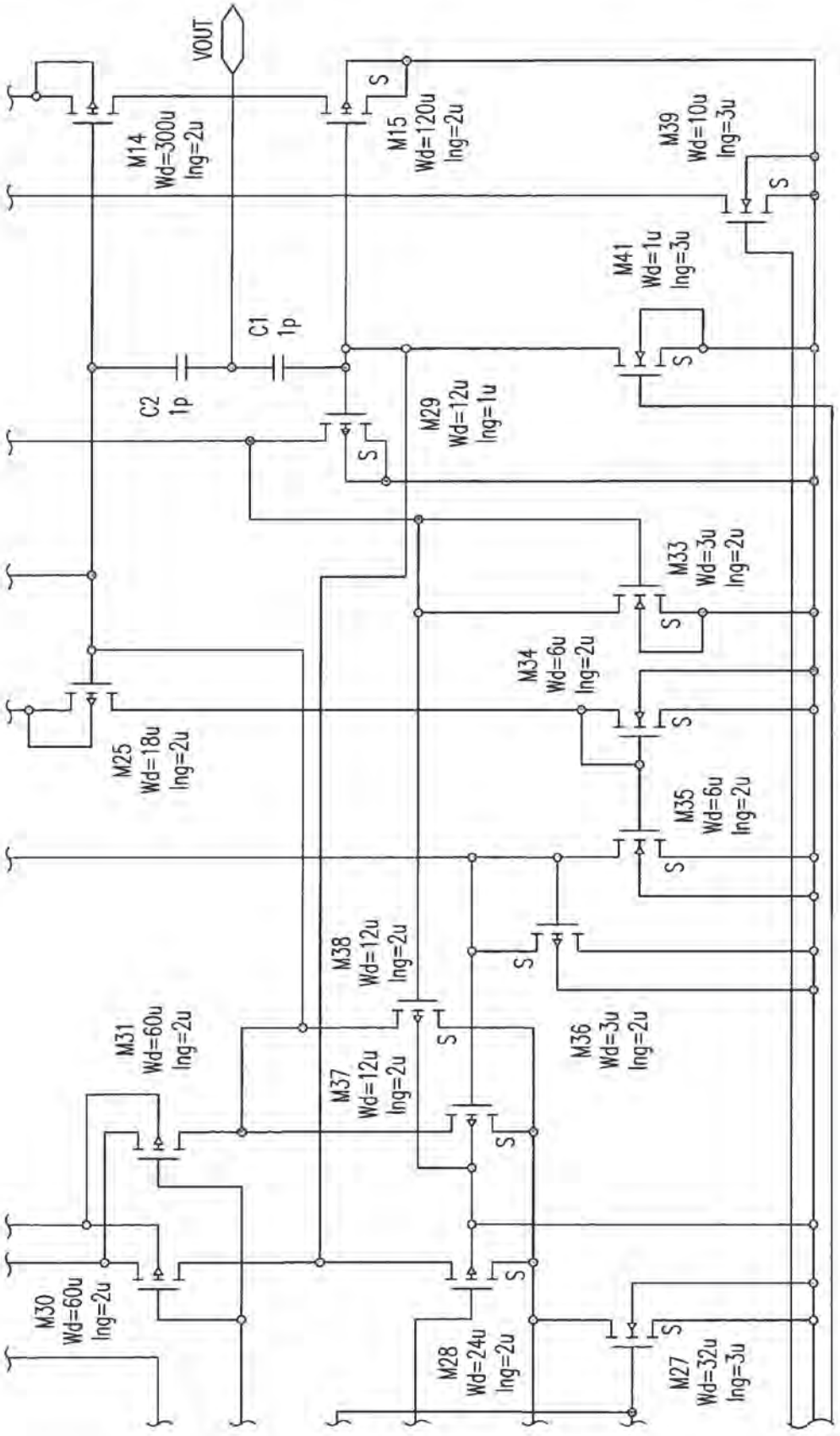

VOUT
M14 Wd=300u lng=2u
M15 Wd=120u lng=2u
M39 Wd=10u lng=3u
M41 Wd=1u lng=3u
C1 1p
C2 1p
M29 Wd=12u lng=1u
M33 Wd=3u lng=2u
M34 Wd=6u lng=2u
M25 Wd=18u lng=2u
M35 Wd=6u lng=2u
M38 Wd=12u lng=2u
M31 Wd=60u lng=2u
M36 Wd=3u lng=2u
M37 Wd=12u lng=2u
M30 Wd=60u lng=2u
M28 Wd=24u lng=2u
M27 Wd=32u lng=3u
S

FIG. 169D

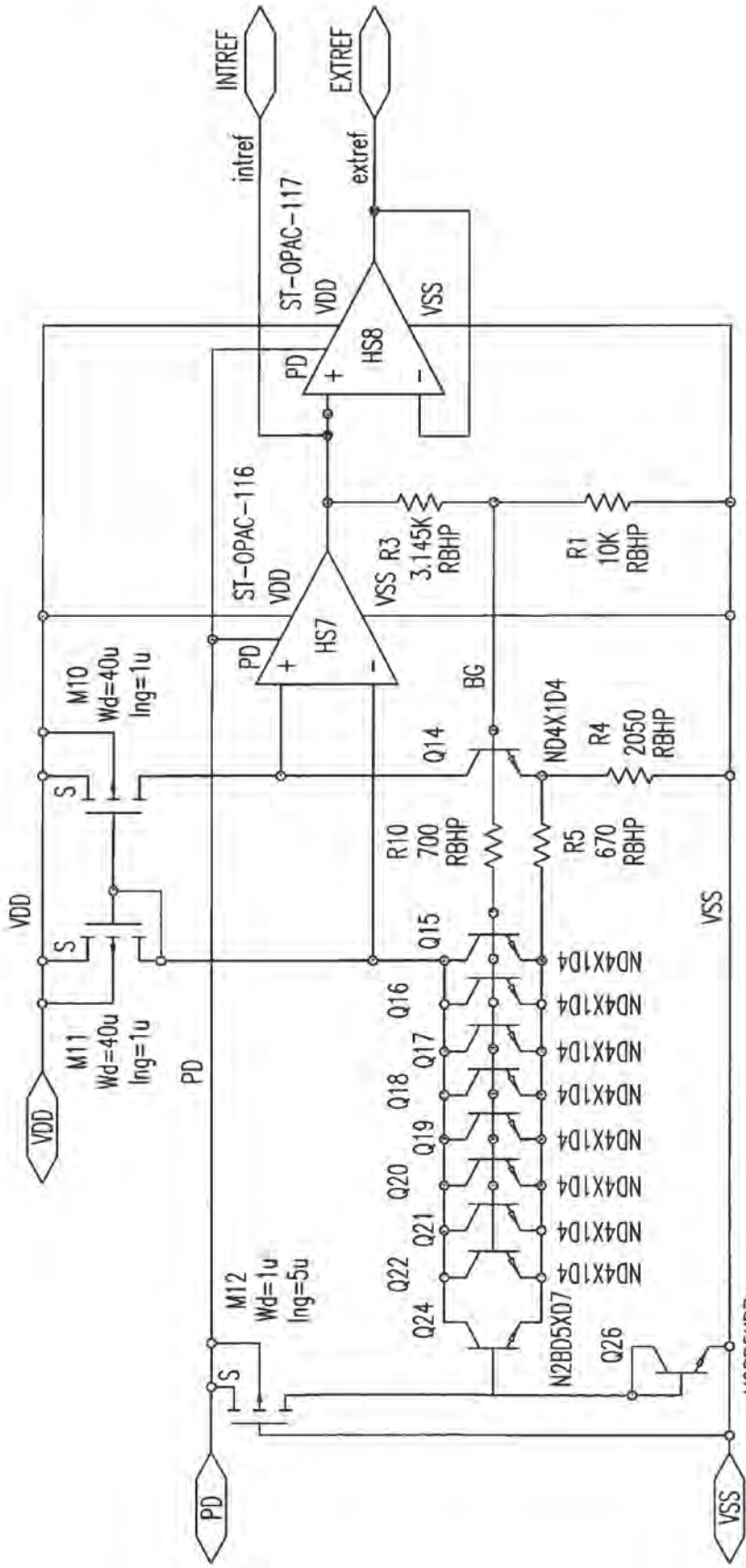

INTREF
EXTREF
intref
extref
ST-OPAC-117
VDD
VSS
PD
HS8
ST-OPAC-116
HS7
R3
3.145K
RBHP
R1
10K
RBHP
M10
Wd=40u
lng=1u
M11
Wd=40u
lng=1u
M12
Wd=1u
lng=5u
BG
Q14
ND4X1D4
R4
2050
RBHP
R10
700
RBHP
R5
670
RBHP
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q24
Q26
N2BD5XD7

FIG. 170

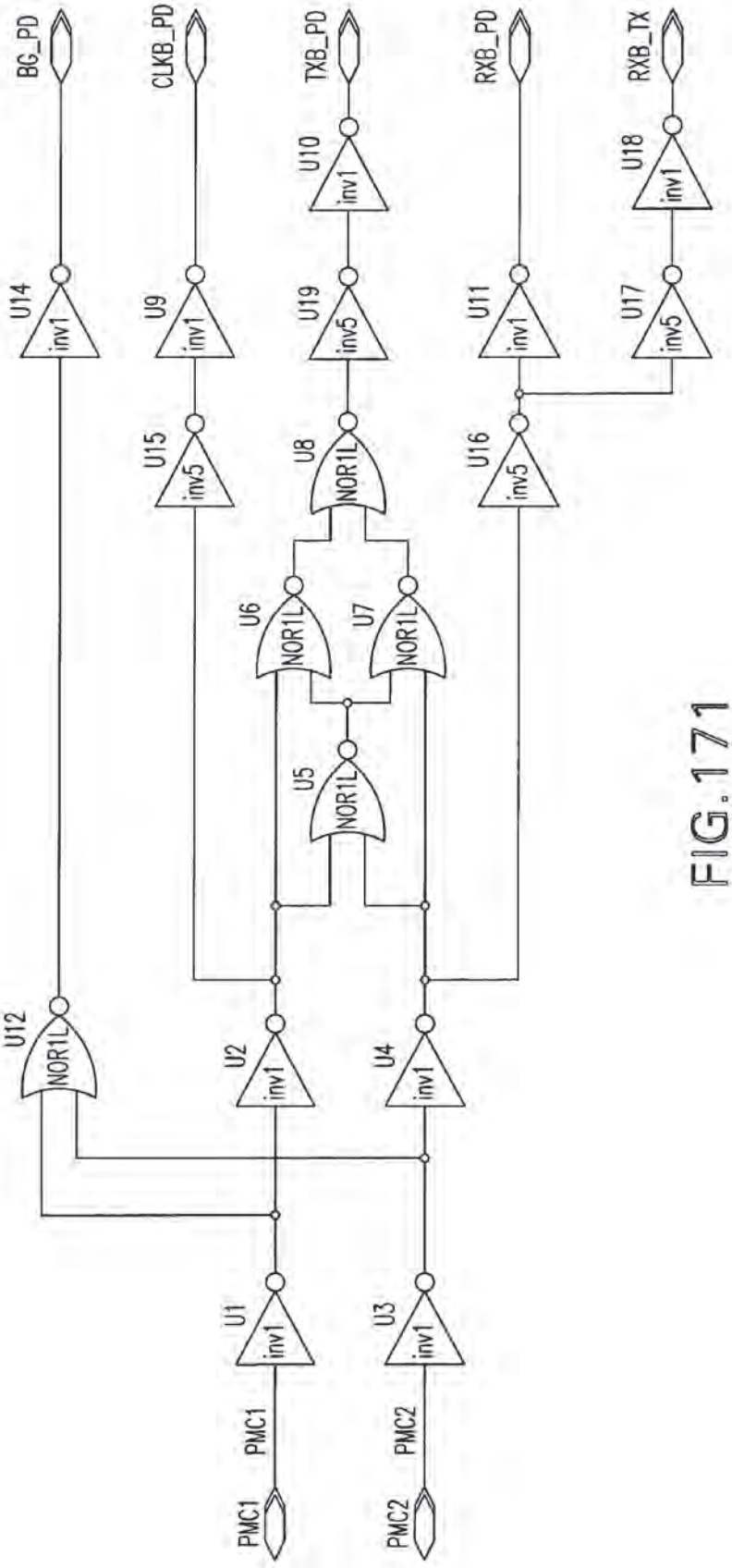

BG_PD
CLKB_PD
TXB_PD
RXB_PD
RXB_TX
U14 inv1
U9 inv1
U10 inv1
U11 inv1
U18 inv1
U19 inv5
U17 inv5
U15 inv5
U8 NOR1L
U16 inv5
U6 NOR1L
U7 NOR1L
U5 NOR1L
U12 NOR1L
U2 inv1
U4 inv1
U1 inv1
U3 inv1
PMC1
PMC2
PMC1
PMC2

FIG. 171

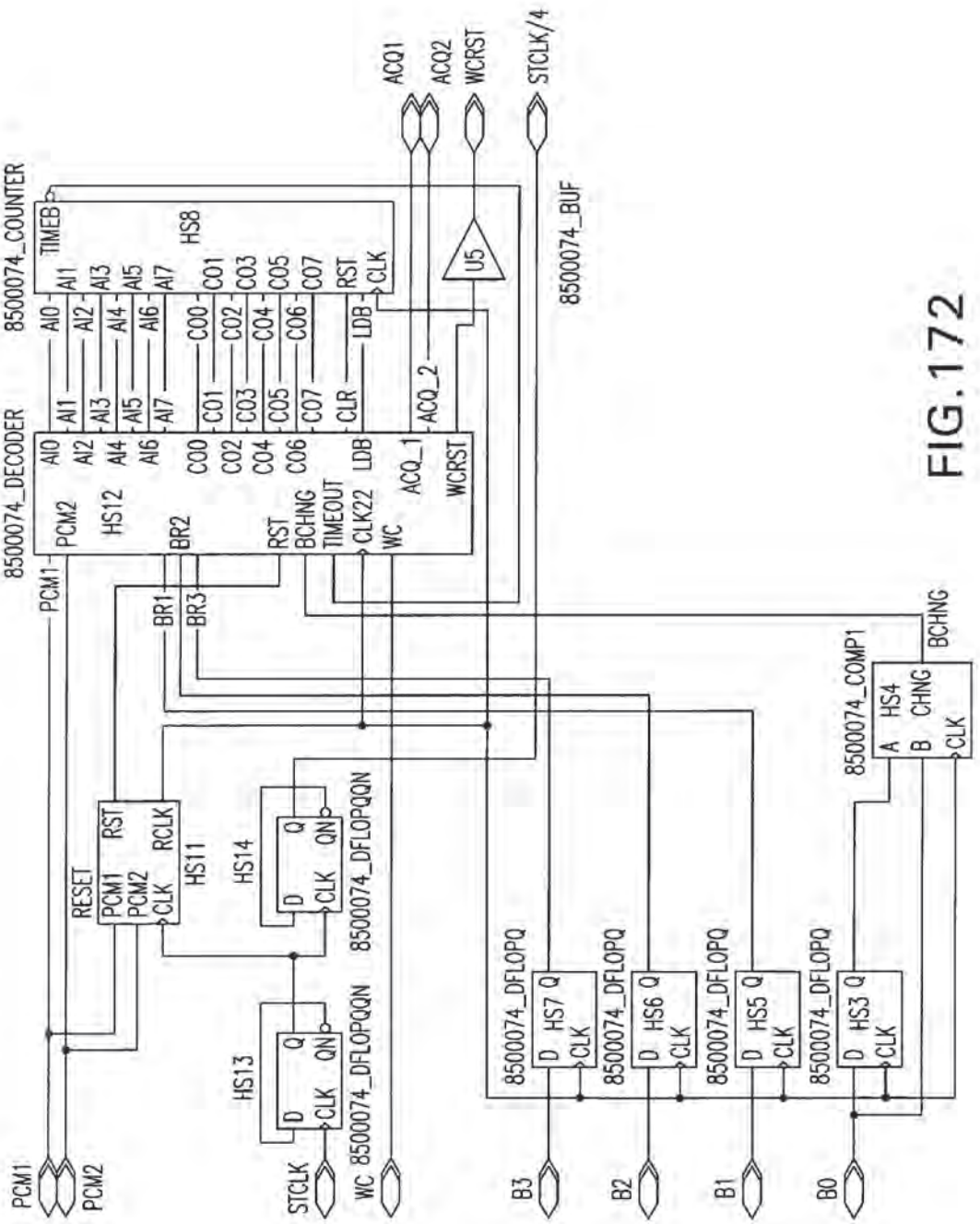

8500074_COUNTER
TIMEB
HS8
8500074_DECODER
PCM2
HS12
PCM1
RESET
HS11
HS14
HS13
8500074_DFLOPQQN
STCLK
WC
ACQ1
ACQ2
WCRST
STCLK/4
U5
8500074_BUF
ACQ_1
ACQ_2
BR1
BR2
BR3
RST
BCHNG
TIMEOUT
CLK22
LDB
CLR
8500074_DFLOPQ
HS7
HS6
HS5
HS3
B3
B2
B1
B0
8500074_COMP1
HS4
CHNG
BCHNG

FIG. 172

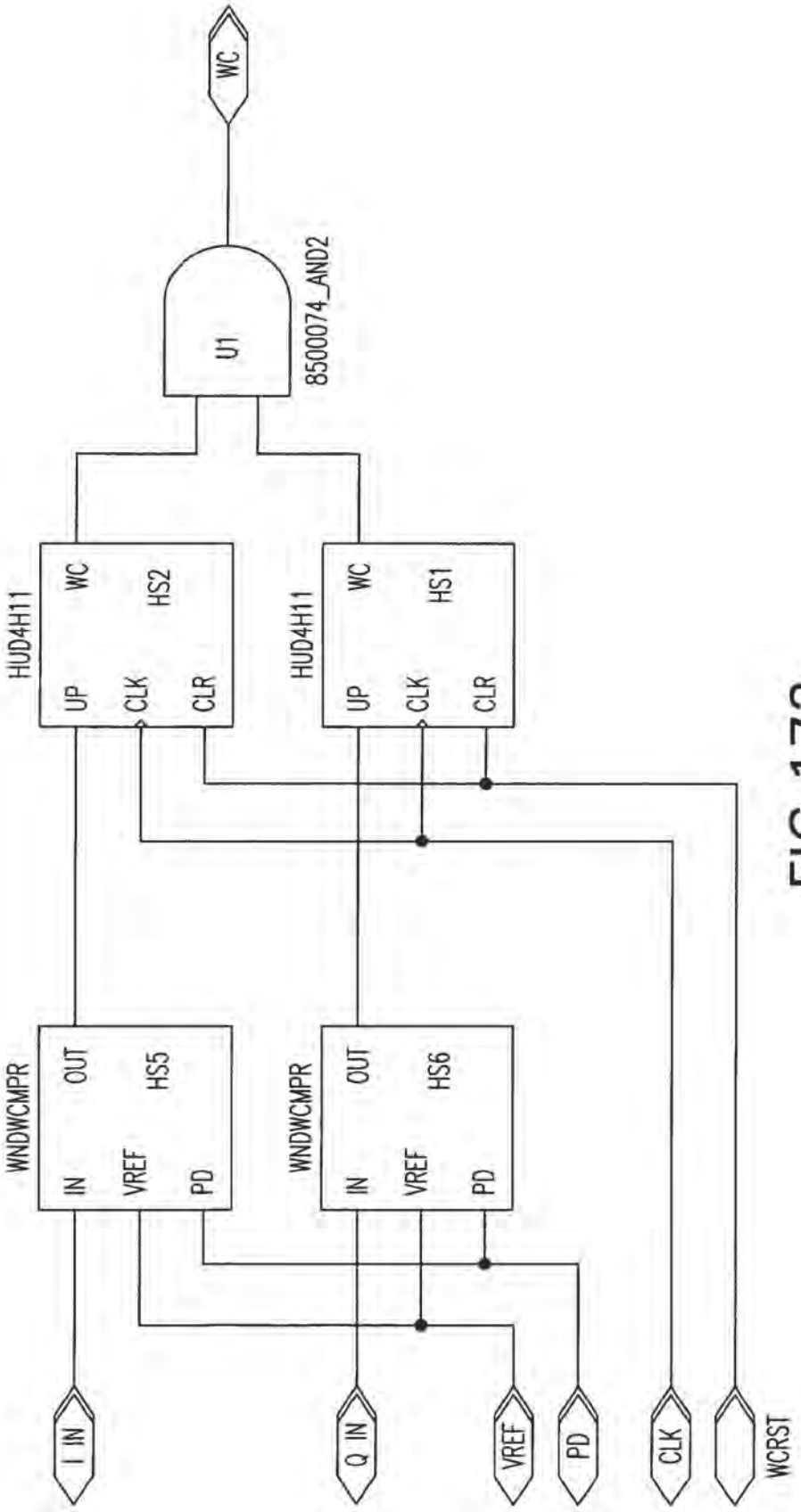

WC
U1
8500074_AND2
HUD4H11
WC
HS2
UP
CLK
CLR
HUD4H11
WC
HS1
UP
CLK
CLR
WNDWCMPR
OUT
HS5
IN
VREF
PD
WNDWCMPR
OUT
HS6
IN
VREF
PD
I IN
Q IN
VREF
PD
CLK
WCRST

FIG.173

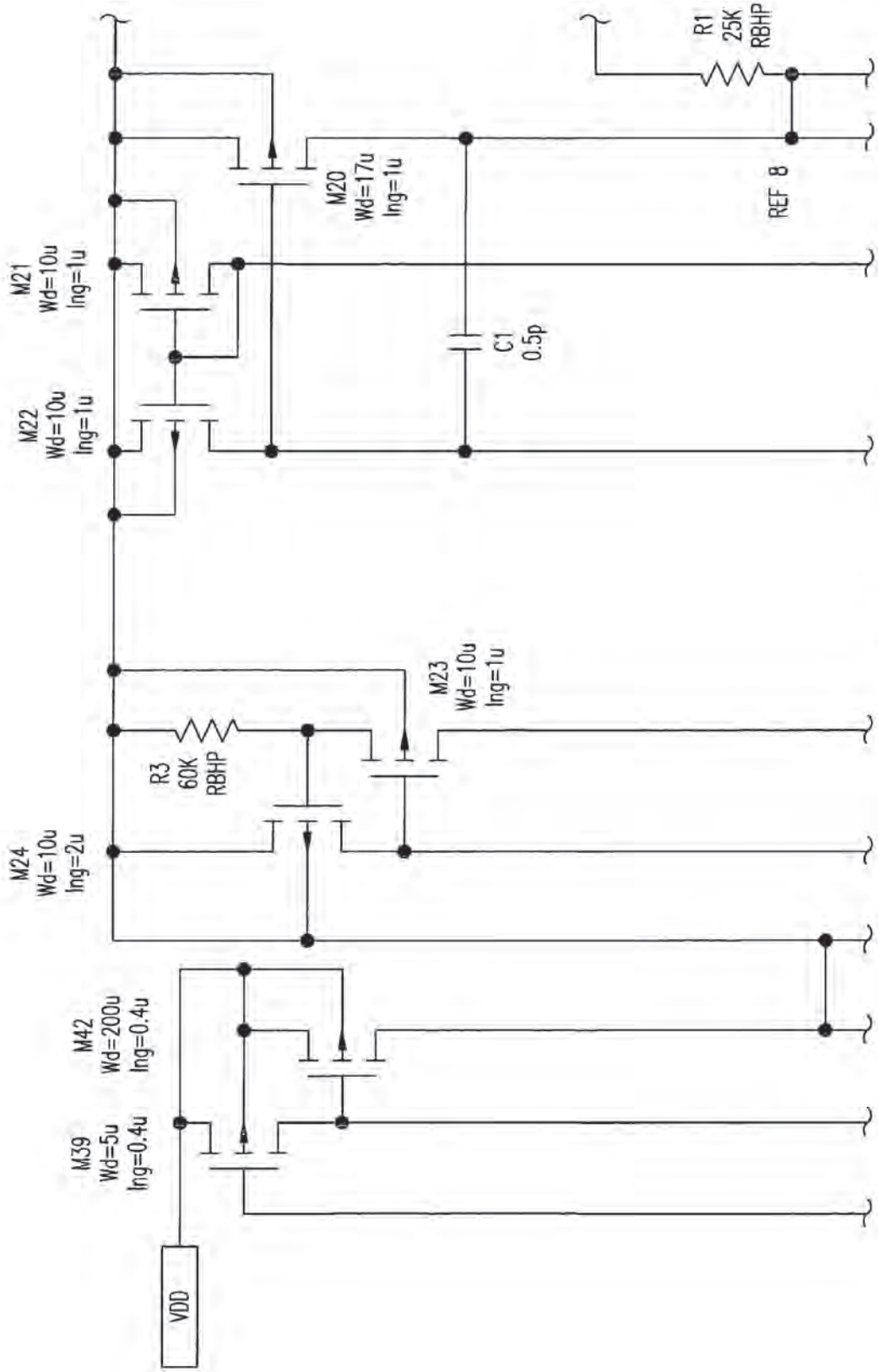

R1
25K
RBHP
M20
Wd=17u
lng=1u
REF 8
M21
Wd=10u
lng=1u
C1
0.5p
M22
Wd=10u
lng=1u
M23
Wd=10u
lng=1u
R3
60K
RBHP
M24
Wd=10u
lng=2u
M42
Wd=200u
lng=0.4u
M39
Wd=5u
lng=0.4u
VDD

FIG.174A

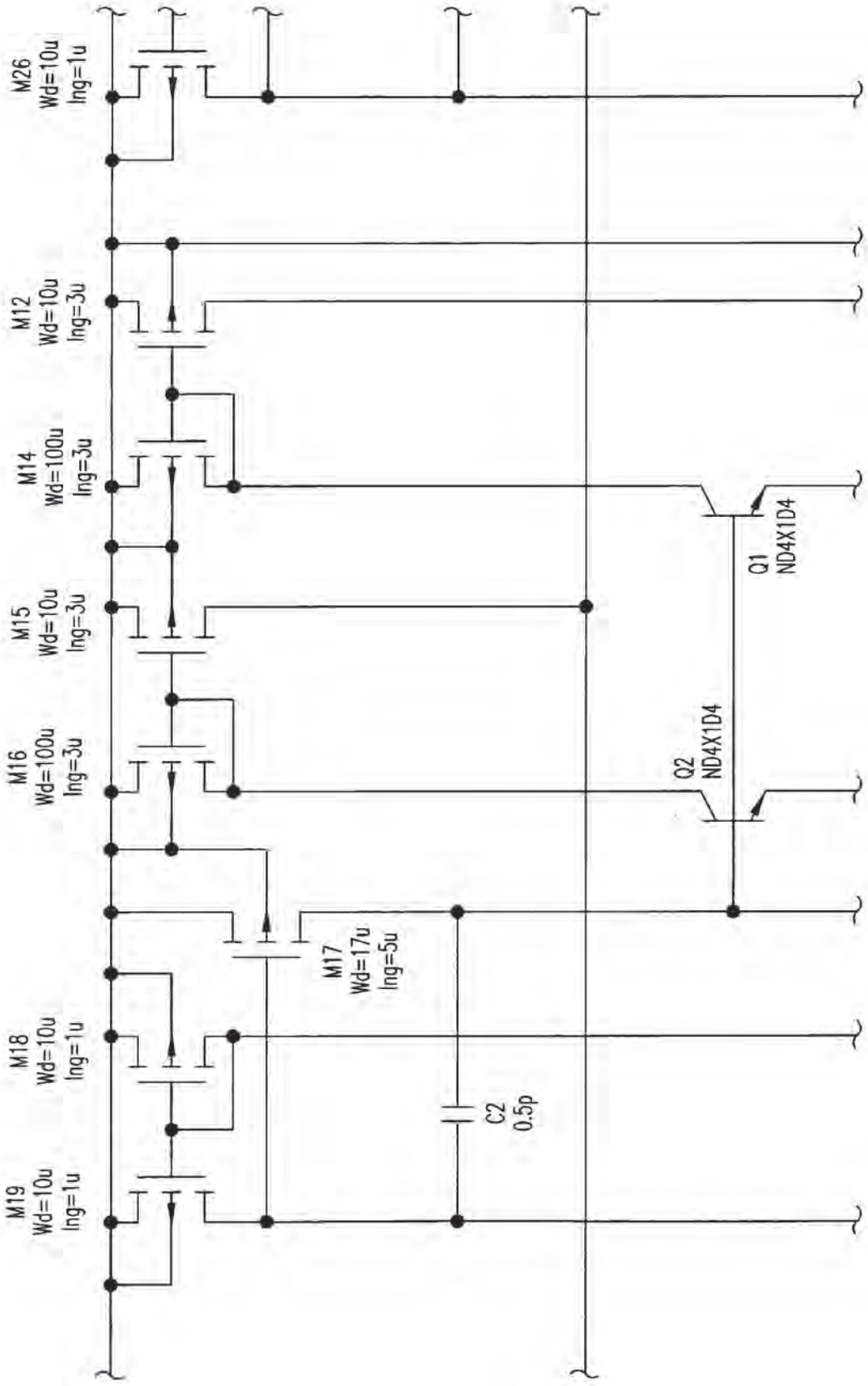

M26
Wd=10u
lng=1u
M12
Wd=10u
lng=3u
M14
Wd=100u
lng=3u
M15
Wd=10u
lng=3u
M16
Wd=100u
lng=3u
M17
Wd=17u
lng=5u
M18
Wd=10u
lng=1u
M19
Wd=10u
lng=1u
C2
0.5p
Q1
ND4X1D4
Q2
ND4X1D4

FIG. 174B

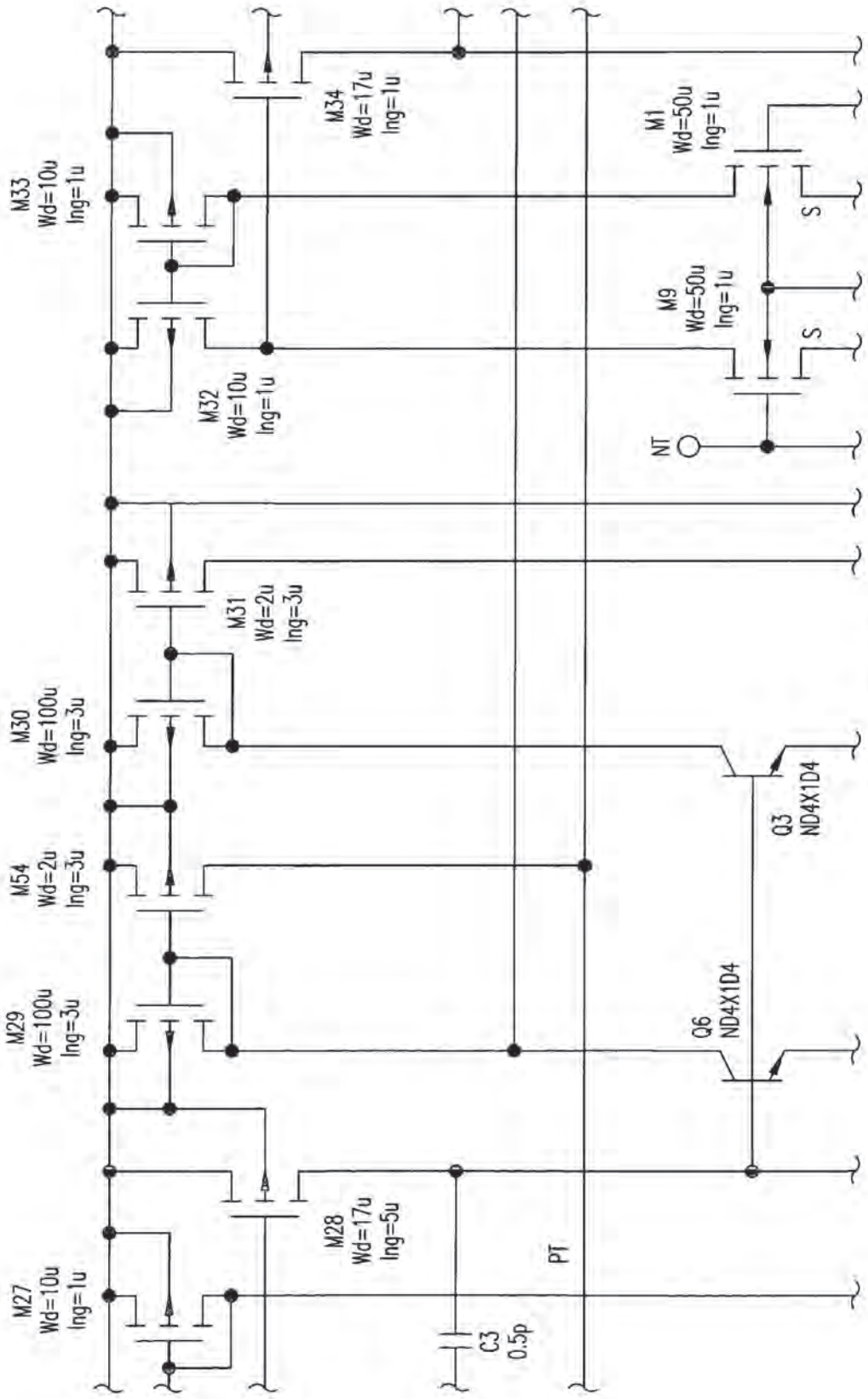

M33
Wd=10u
lng=1u
M34
Wd=17u
lng=1u
M1
Wd=50u
lng=1u
S
M9
Wd=50u
lng=1u
S
M32
Wd=10u
lng=1u
NT
M31
Wd=2u
lng=3u
M30
Wd=100u
lng=3u
Q3
ND4X1D4
M54
Wd=2u
lng=3u
M29
Wd=100u
lng=3u
Q6
ND4X1D4
M28
Wd=17u
lng=5u
M27
Wd=10u
lng=1u
C3
0.5p
PT

FIG. 174C

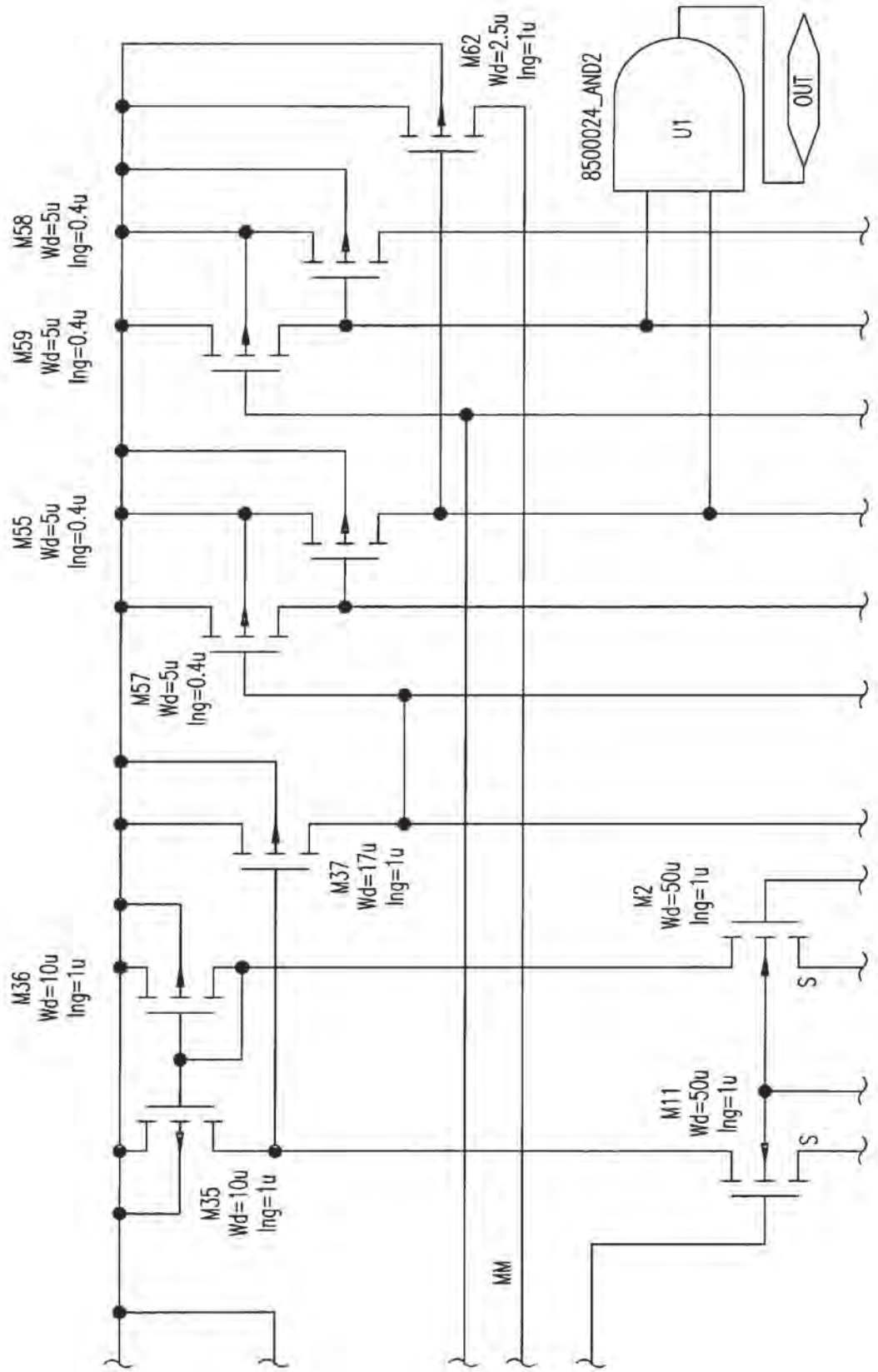

M62
Wd=2.5u
lng=1u
8500024_AND2
U1
OUT
M58
Wd=5u
lng=0.4u
M59
Wd=5u
lng=0.4u
M55
Wd=5u
lng=0.4u
M57
Wd=5u
lng=0.4u
M37
Wd=17u
lng=1u
M2
Wd=50u
lng=1u
M36
Wd=10u
lng=1u
M11
Wd=50u
lng=1u
M35
Wd=10u
lng=1u
MM
S
S

FIG.174D

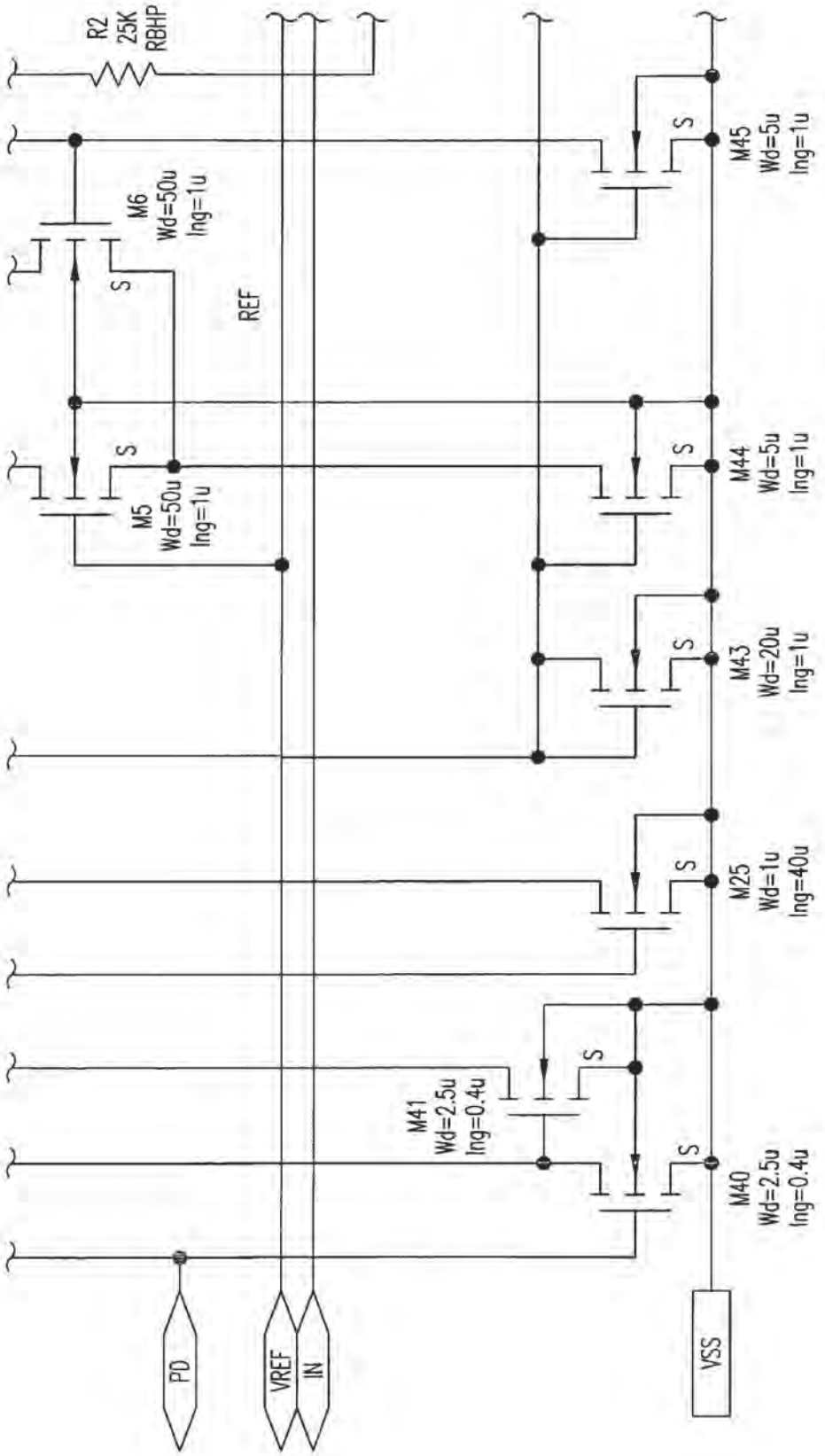

R2
25K
RBHP
M6
Wd=50u
lng=1u
M5
Wd=50u
lng=1u
REF
M45
Wd=5u
lng=1u
M44
Wd=5u
lng=1u
M43
Wd=20u
lng=1u
M25
Wd=1u
lng=40u
M41
Wd=2.5u
lng=0.4u
M40
Wd=2.5u
lng=0.4u
S
PD
VREF
IN
VSS
OP AMP
BIAS
2 INVERTERS

FIG. 174E

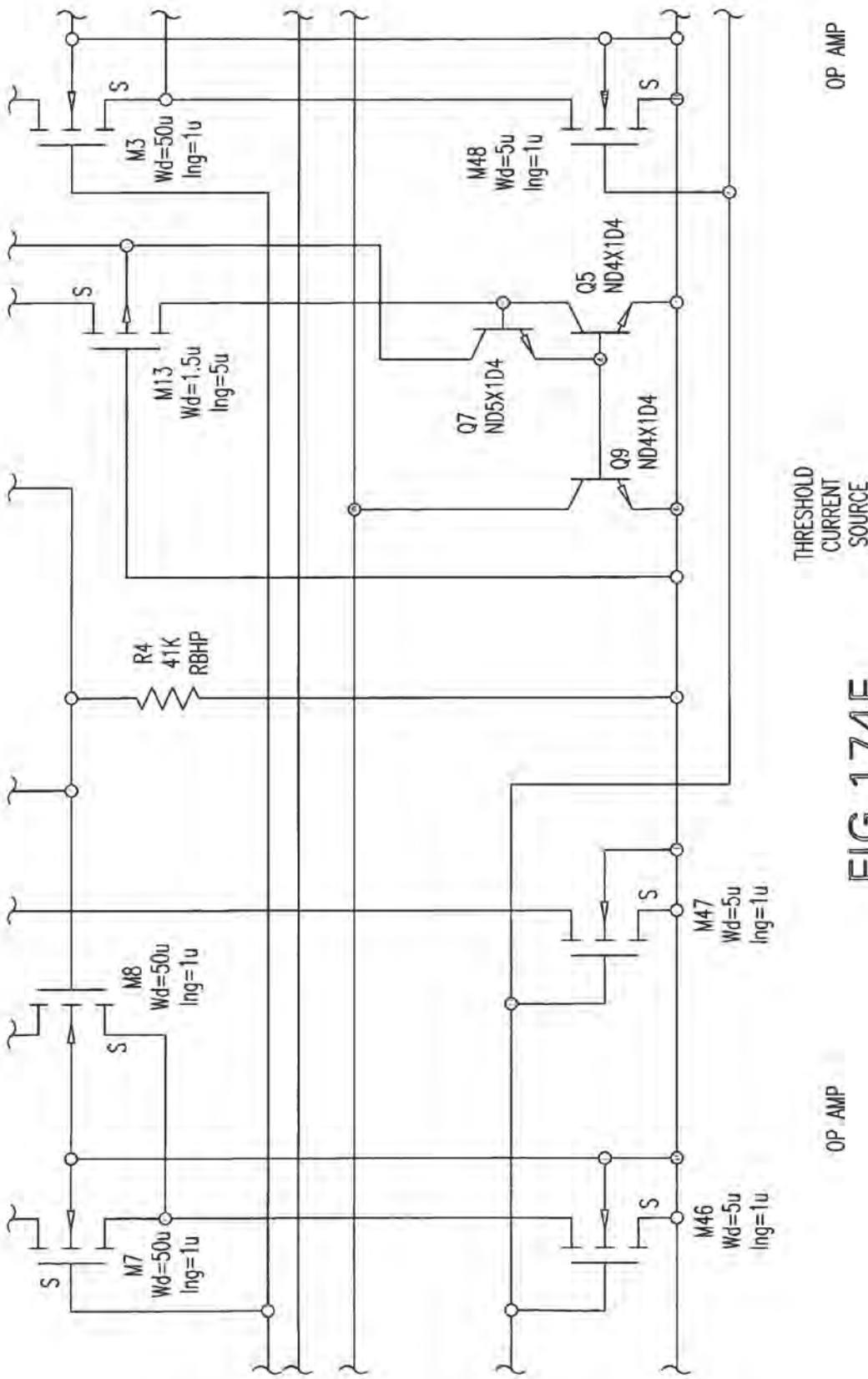

OP AMP
M3
Wd=50u
lng=1u
M48
Wd=5u
lng=1u
Q5
ND4X1D4
M13
Wd=1.5u
lng=5u
Q7
ND5X1D4
Q9
ND4X1D4
THRESHOLD
CURRENT
SOURCE
R4
41K
RBHP
M8
Wd=50u
lng=1u
M47
Wd=5u
lng=1u
OP AMP
M7
Wd=50u
lng=1u
M46
Wd=5u
lng=1u
S

FIG. 174F

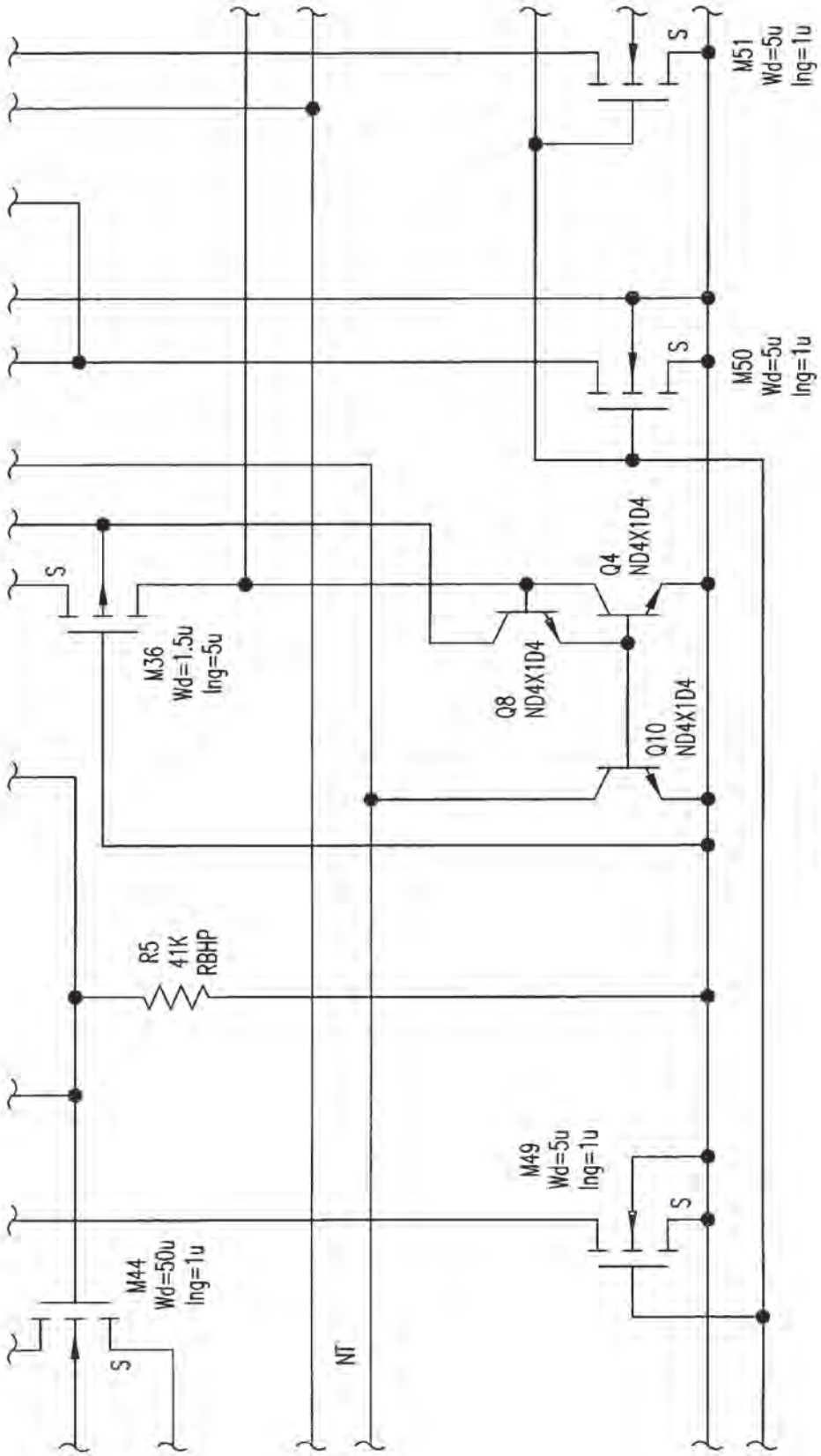

M51
Wd=5u
lng=1u
S
M50
Wd=5u
lng=1u
OP AMP
Q4
ND4X1D4
Q8
ND4X1D4
Q10
ND4X1D4
M36
Wd=1.5u
lng=5u
R5
41K
RBHP
M49
Wd=5u
lng=1u
M44
Wd=50u
lng=1u
NT
HYSTERESIS
CURRENT
SOURCE

FIG. 174G

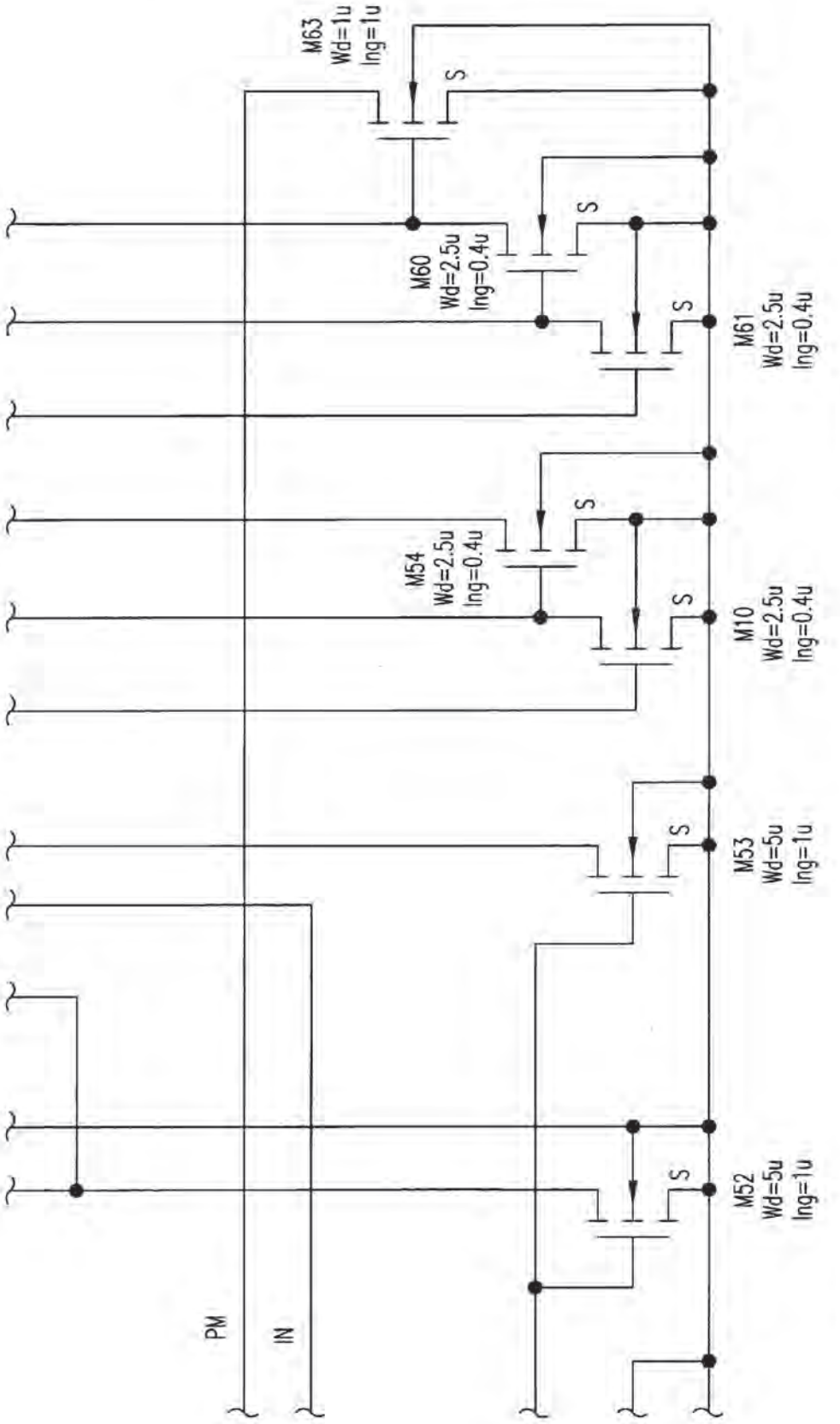

M63
Wd=1u
lng=1u
S
M60
Wd=2.5u
lng=0.4u
M61
Wd=2.5u
lng=0.4u
M54
Wd=2.5u
lng=0.4u
M10
Wd=2.5u
lng=0.4u
M53
Wd=5u
lng=1u
M52
Wd=5u
lng=1u
PM
IN
4 INVERTERS
OP AMP

FIG.174H

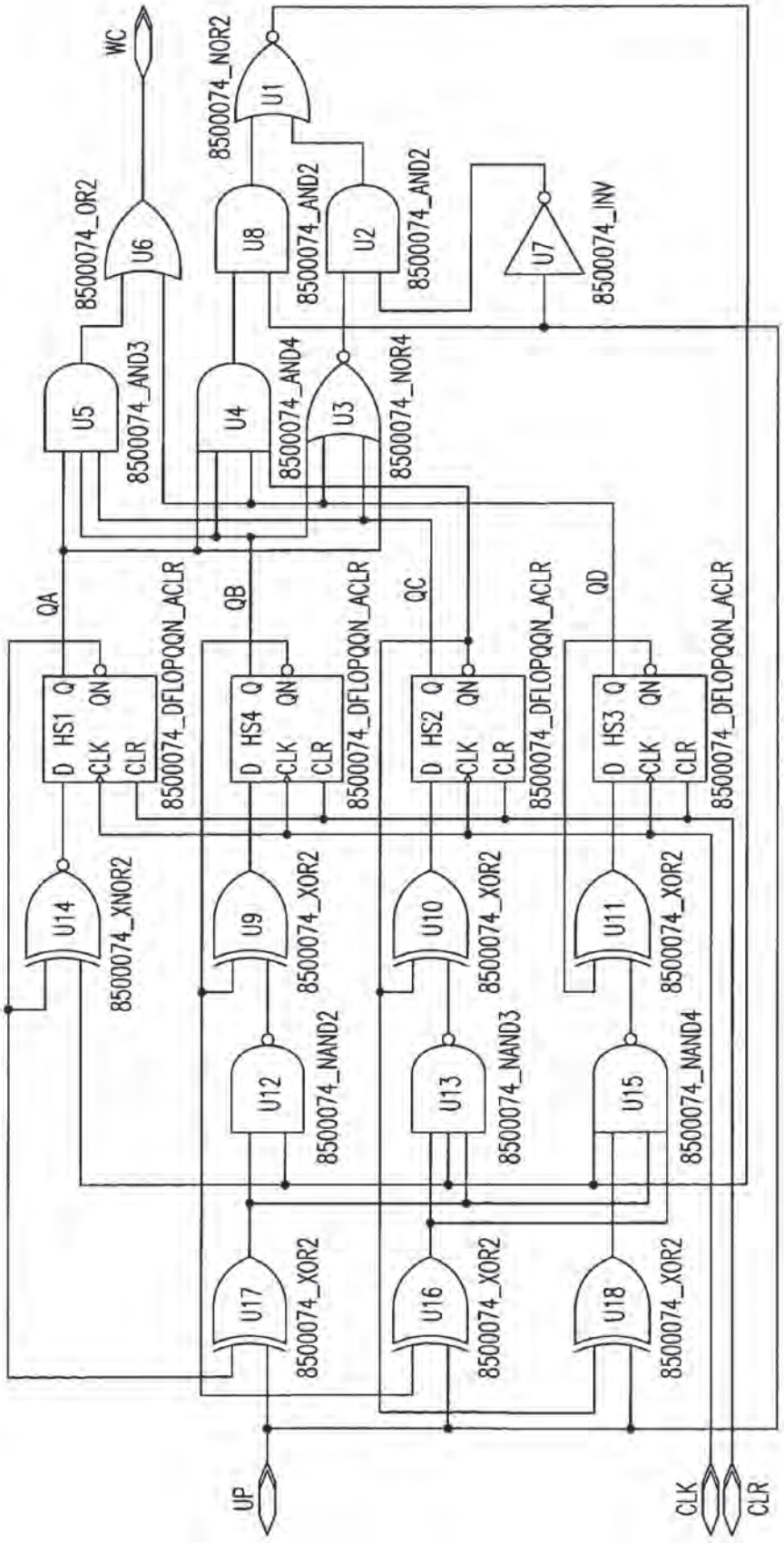

WC
8500074_NOR2
U1
8500074_OR2
U6
8500074_AND2
U8
8500074_AND2
U2
8500074_INV
U7
U5
8500074_AND3
U4
8500074_AND4
U3
8500074_NOR4
QA
QB
QC
QD
8500074_DFLOPQQN_ACLR
D HS1 Q
CLK QN
CLR
D HS4 Q
CLK QN
CLR
D HS2 Q
CLK QN
CLR
D HS3 Q
CLK QN
CLR
U14
8500074_XNOR2
U9
U10
U11
8500074_XOR2
U12
8500074_NAND2
U13
8500074_NAND3
U15
8500074_NAND4
U17
U16
U18
UP
CLK
CLR

FIG. 175

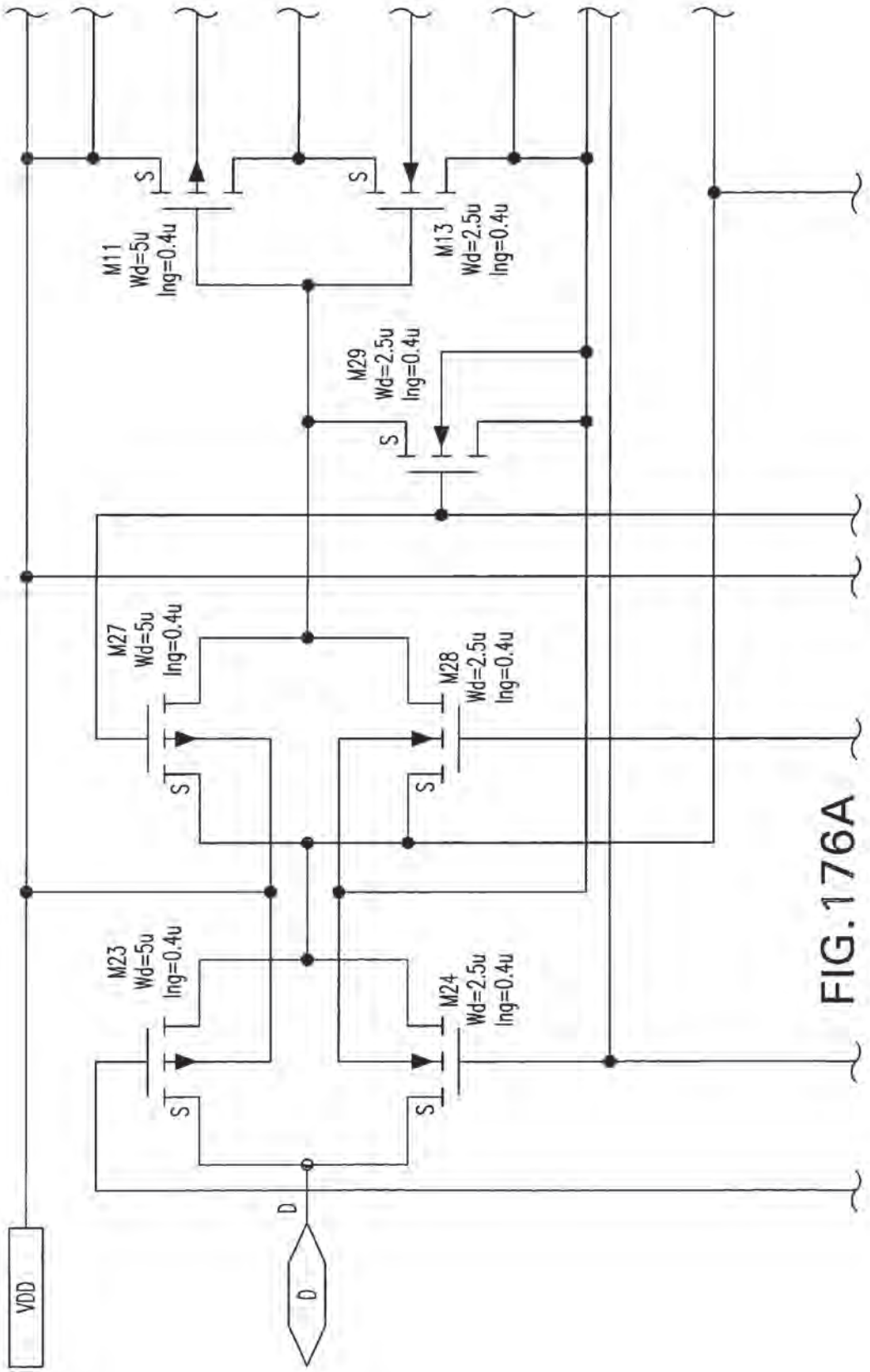

M11
Wd=5u
lng=0.4u
M13
Wd=2.5u
lng=0.4u
M29
Wd=2.5u
lng=0.4u
M27
Wd=5u
lng=0.4u
M28
Wd=2.5u
lng=0.4u
M23
Wd=5u
lng=0.4u
M24
Wd=2.5u
lng=0.4u
S
D
VDD

FIG. 176A

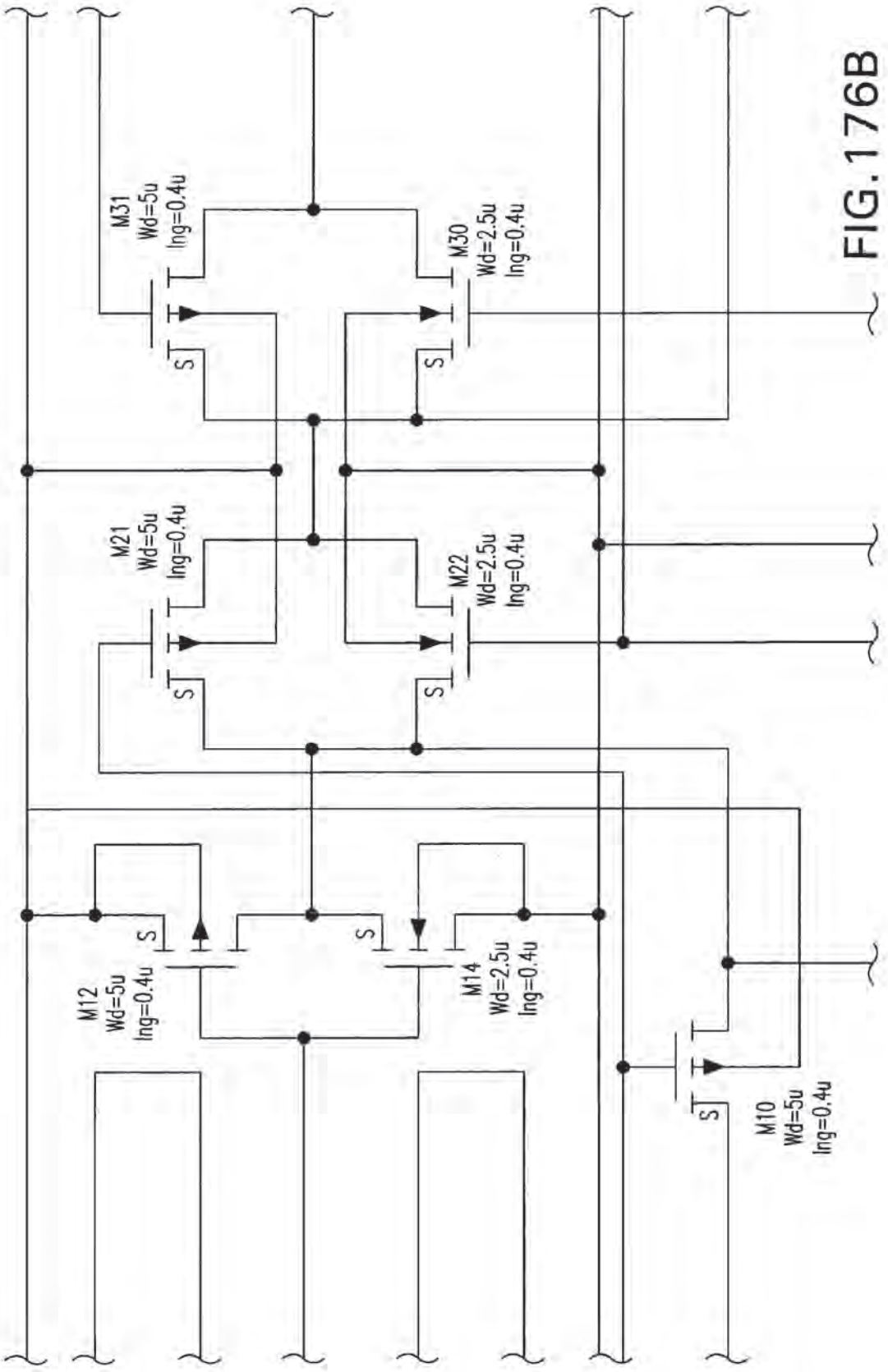

M31
Wd=5u
lng=0.4u
M30
Wd=2.5u
lng=0.4u
M21
Wd=5u
lng=0.4u
M22
Wd=2.5u
lng=0.4u
M12
Wd=5u
lng=0.4u
M14
Wd=2.5u
lng=0.4u
M10
Wd=5u
lng=0.4u
S

FIG. 176B

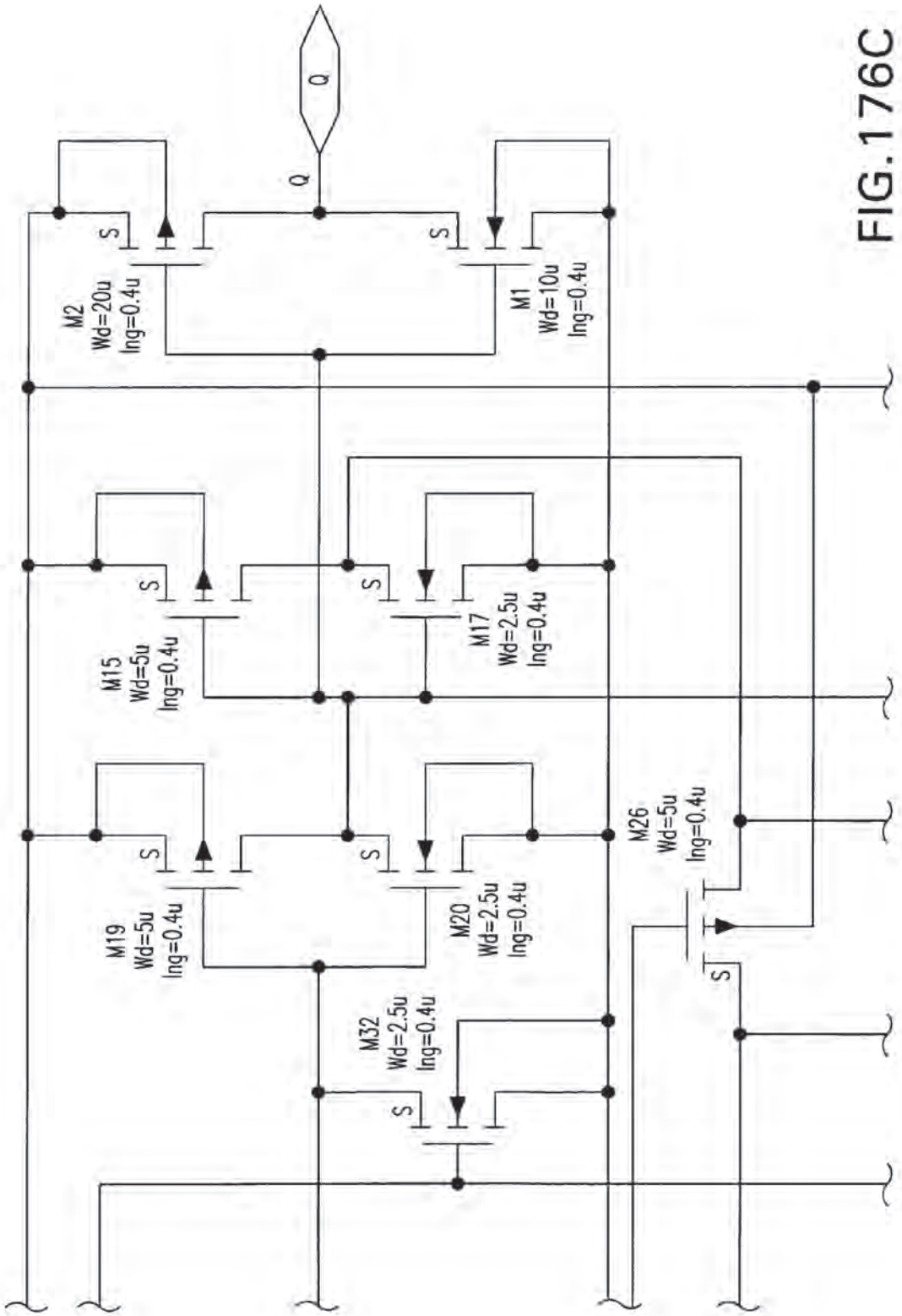

Q
Q
S
M2
Wd=20u
lng=0.4u
S
M1
Wd=10u
lng=0.4u
S
M15
Wd=5u
lng=0.4u
S
M17
Wd=2.5u
lng=0.4u
S
M19
Wd=5u
lng=0.4u
S
M20
Wd=2.5u
lng=0.4u
M26
Wd=5u
lng=0.4u
S
M32
Wd=2.5u
lng=0.4u
S

FIG.176C

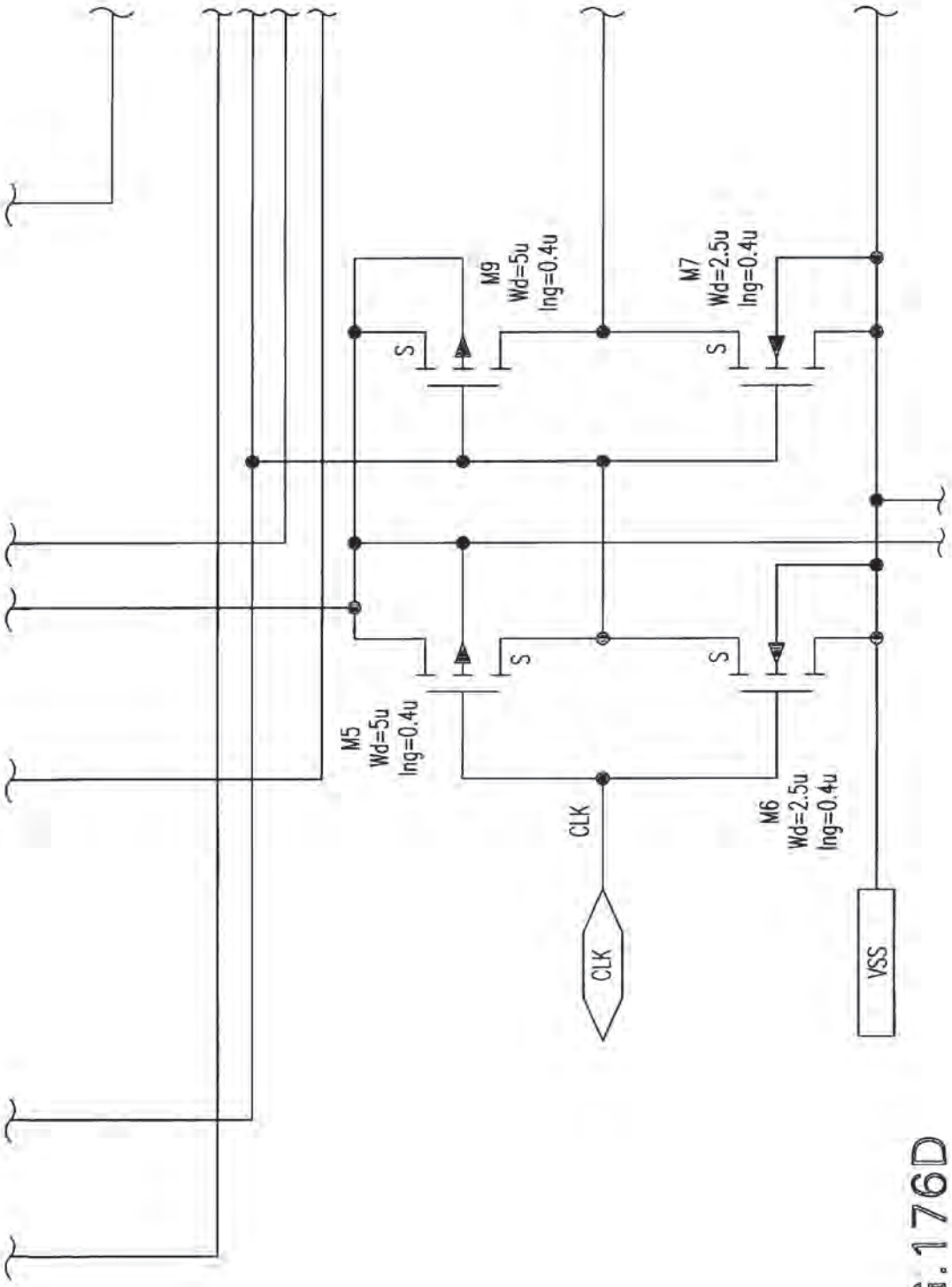

M9
Wd=5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
S
S
S
S
M5
Wd=5u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
CLK
CLK
VSS

FIG. 176D

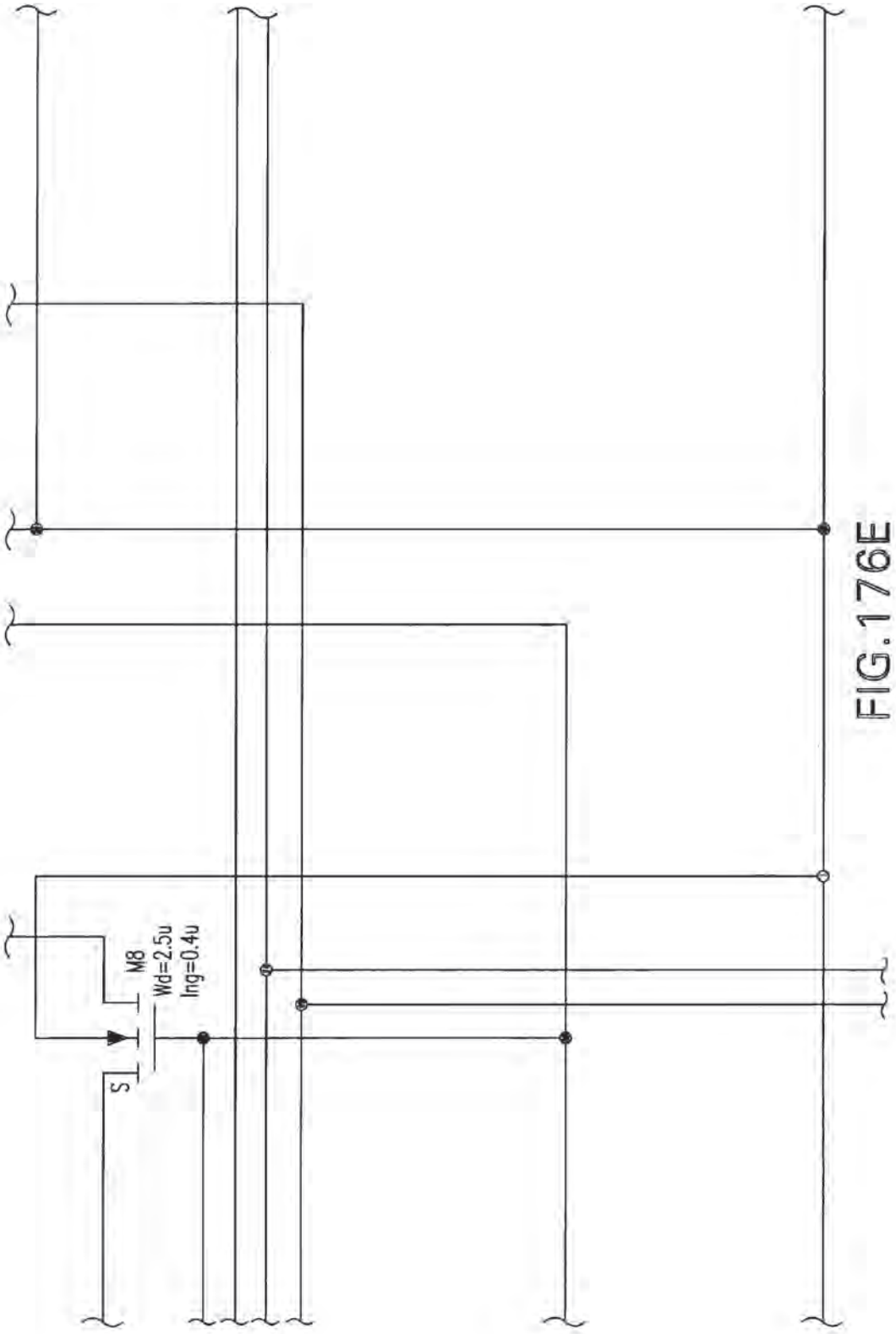


FIG. 176E

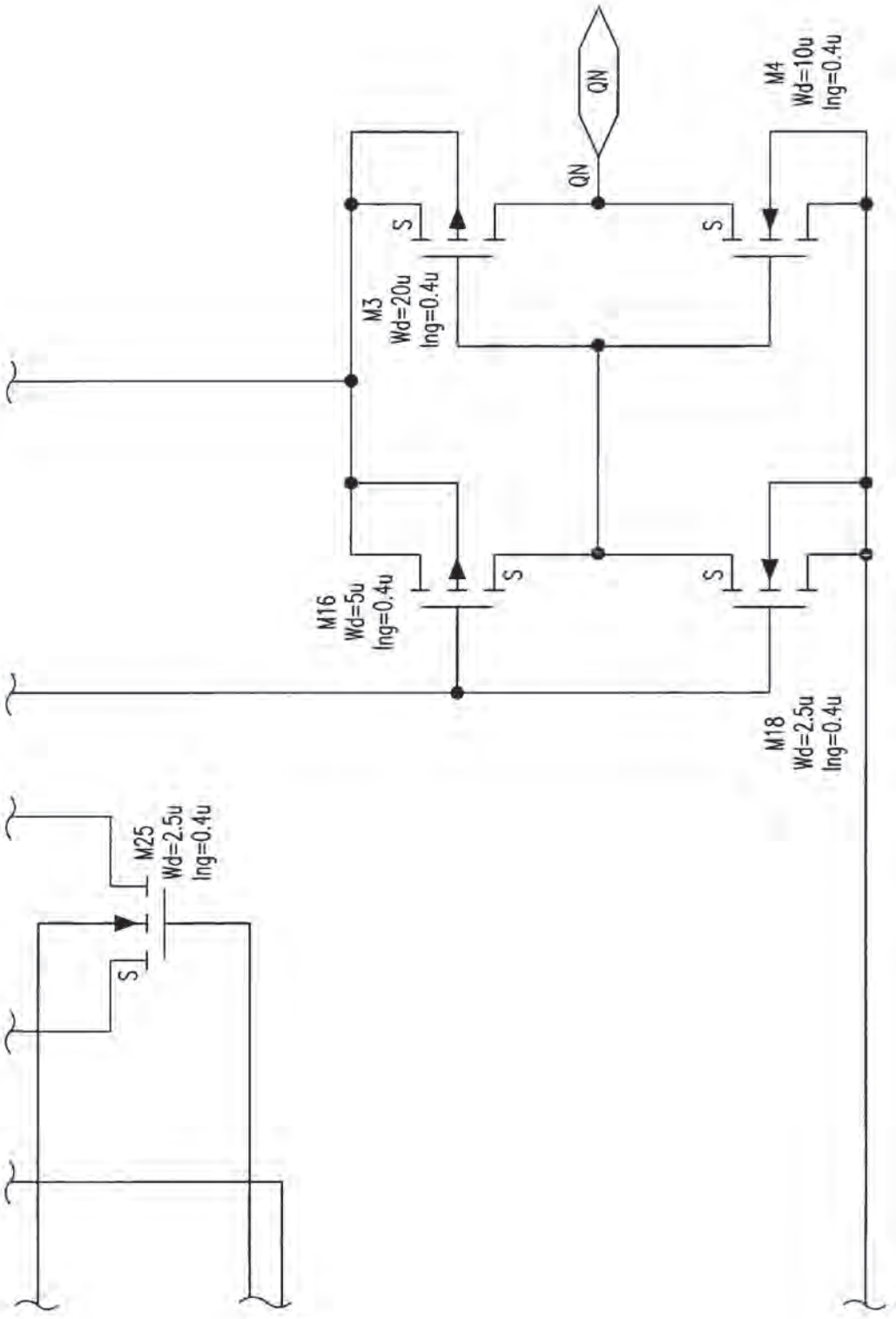

QN
QN
M4
Wd=10u
Lng=0.4u
M3
Wd=20u
Lng=0.4u
M16
Wd=5u
Lng=0.4u
M18
Wd=2.5u
Lng=0.4u
M25
Wd=2.5u
Lng=0.4u
S

FIG.176F

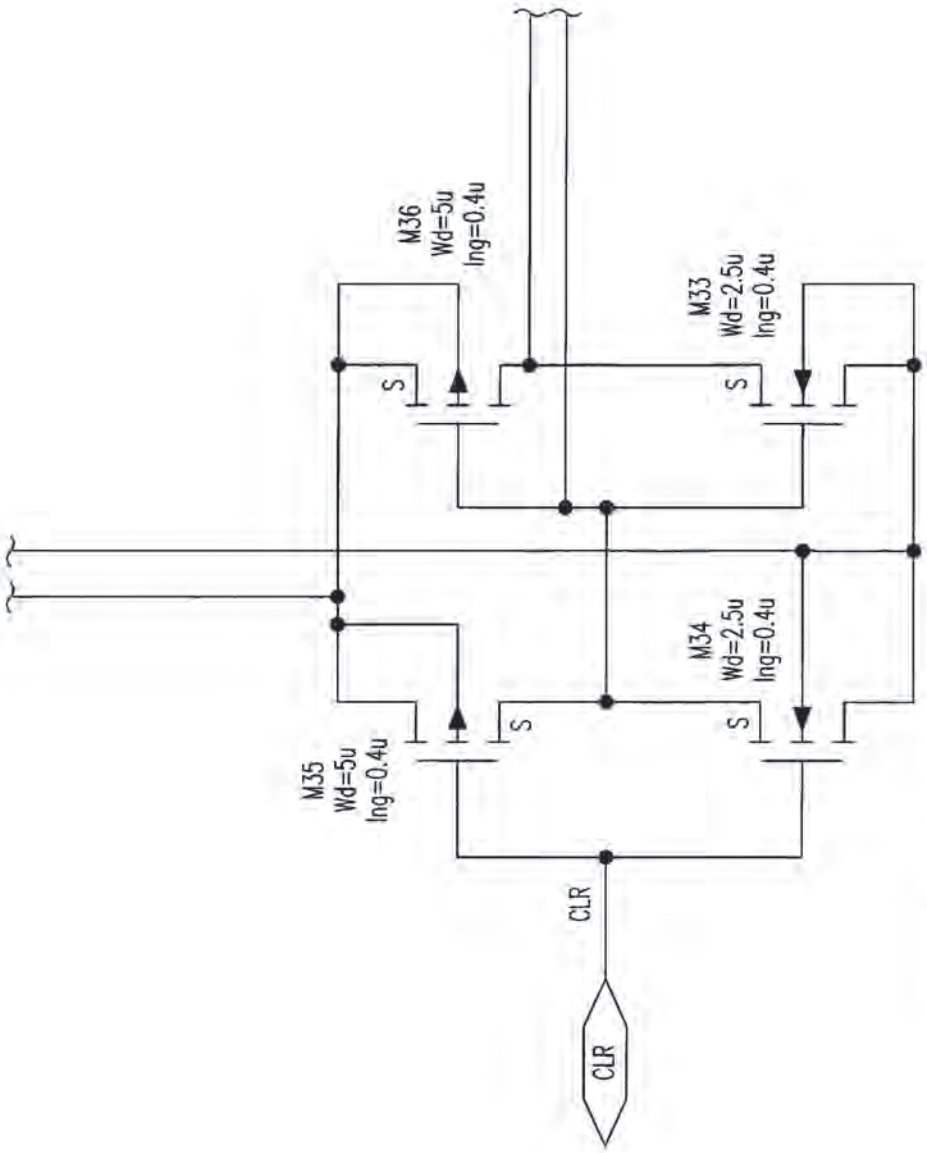
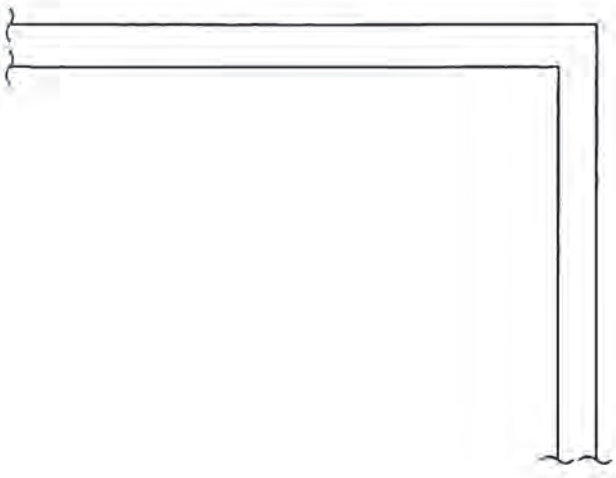

M36
Wd=5u
lng=0.4u
M33
Wd=2.5u
lng=0.4u
M34
Wd=2.5u
lng=0.4u
M35
Wd=5u
lng=0.4u
S
S
S
S
CLR
CLR

FIG.176G

FIG.176H



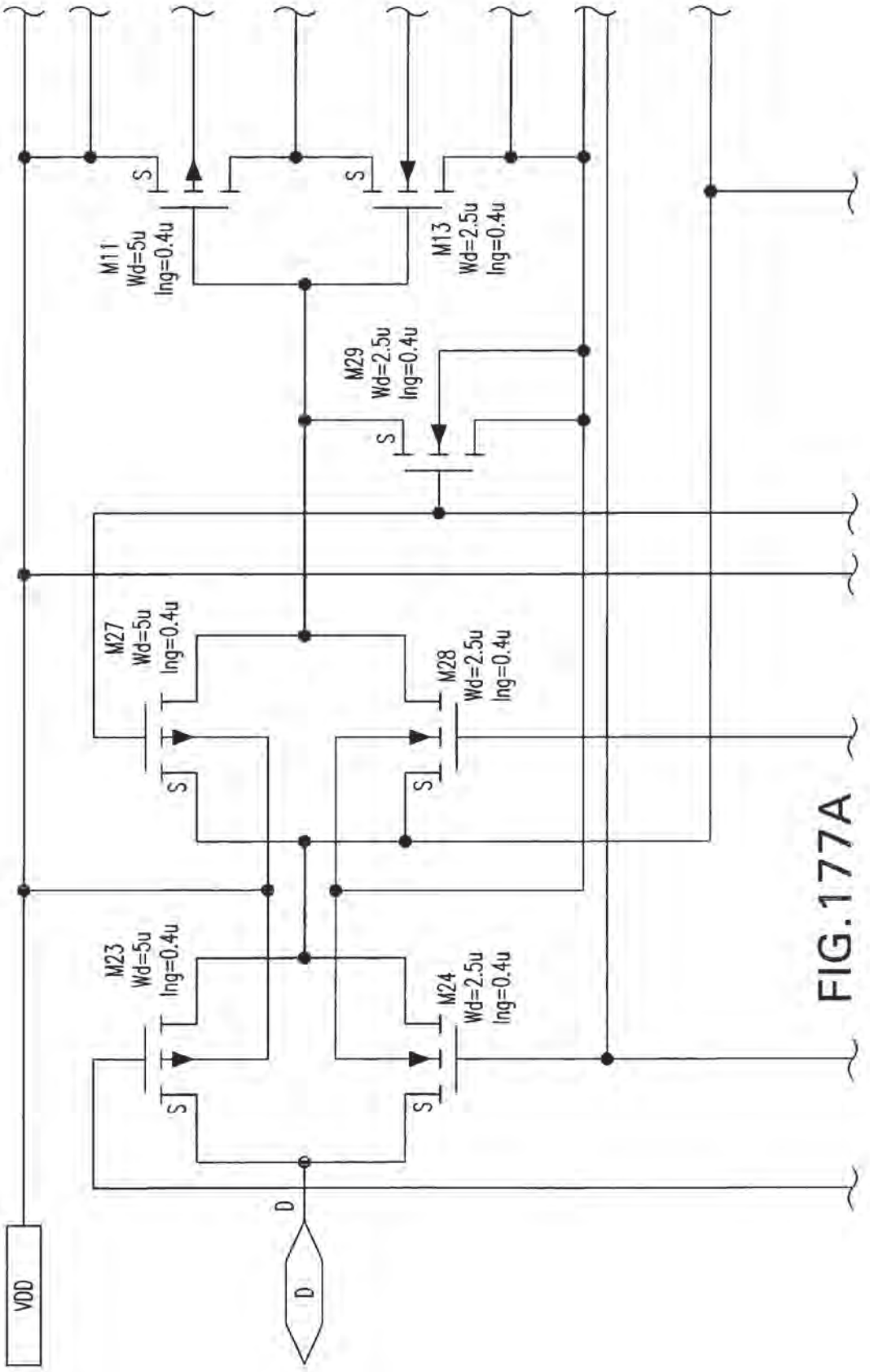

M11
Wd=5u
lng=0.4u
M13
Wd=2.5u
lng=0.4u
M29
Wd=2.5u
lng=0.4u
M27
Wd=5u
lng=0.4u
M28
Wd=2.5u
lng=0.4u
M23
Wd=5u
lng=0.4u
M24
Wd=2.5u
lng=0.4u
S
D
VDD

FIG.177A

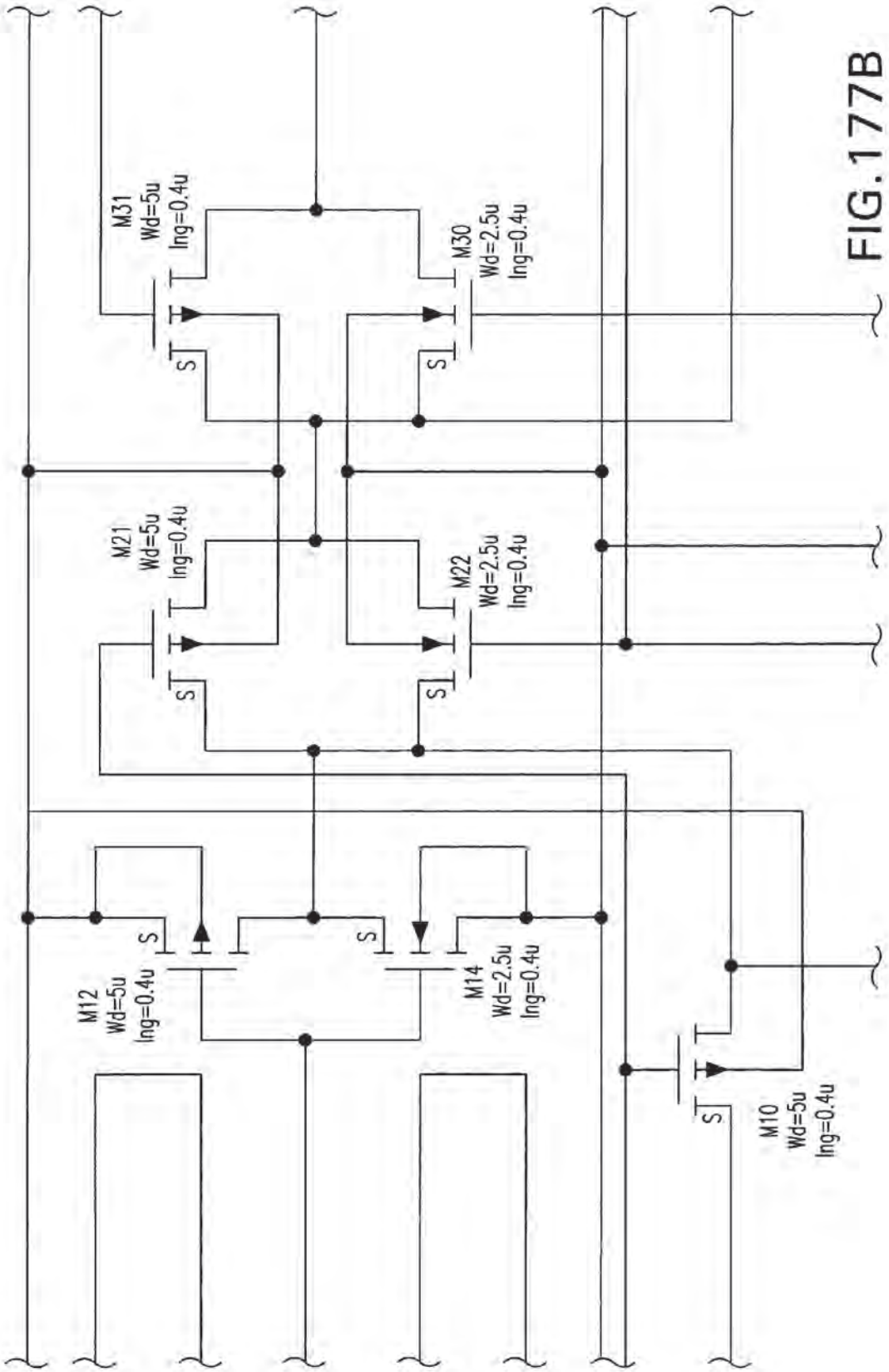

M31
Wd=5u
lng=0.4u
M30
Wd=2.5u
lng=0.4u
M21
Wd=5u
lng=0.4u
M22
Wd=2.5u
lng=0.4u
M12
Wd=5u
lng=0.4u
M14
Wd=2.5u
lng=0.4u
M10
Wd=5u
lng=0.4u
S

FIG. 177B

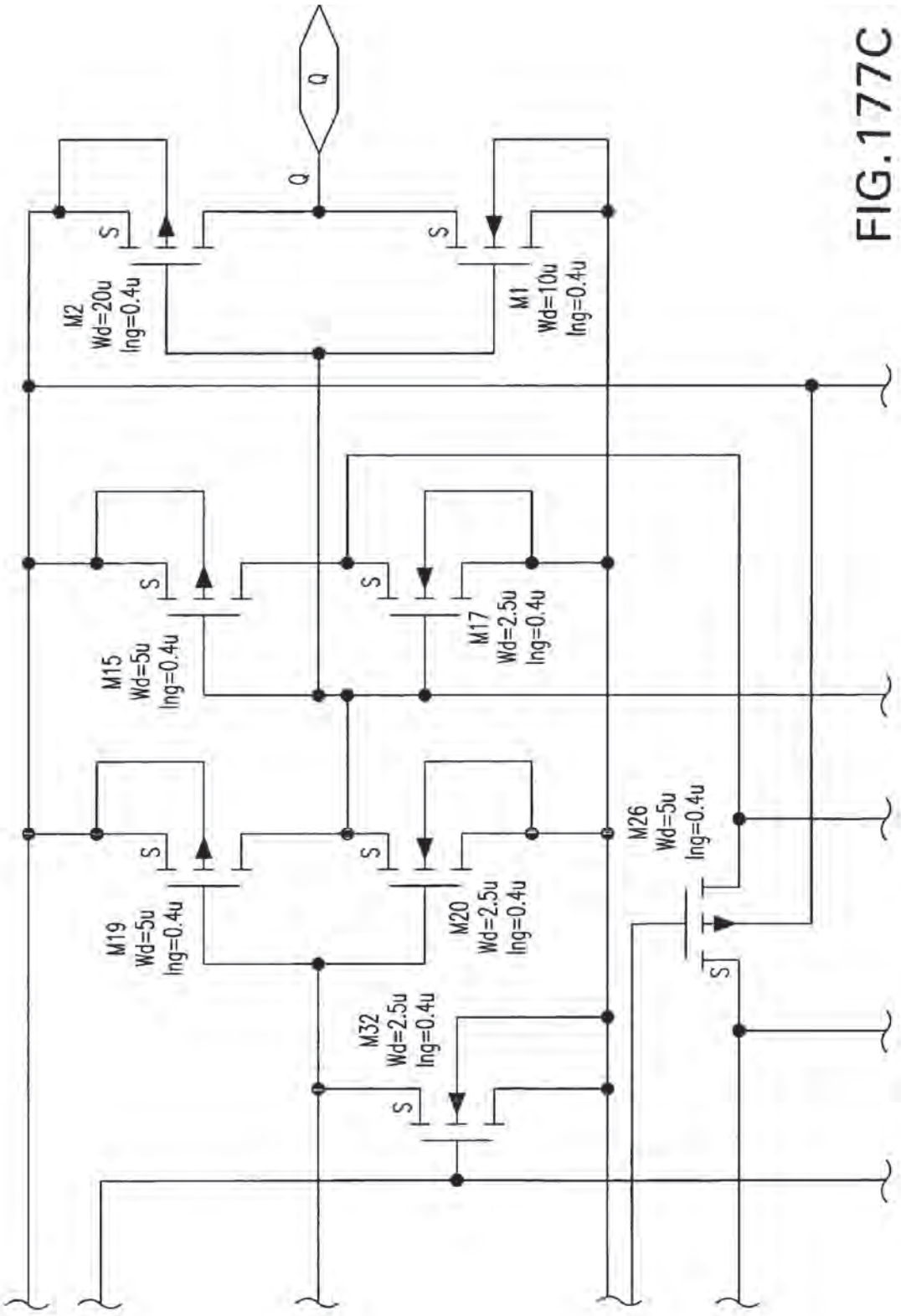

Q
Q
S
S
M2
Wd=20u
lng=0.4u
M1
Wd=10u
lng=0.4u
S
S
M15
Wd=5u
lng=0.4u
M17
Wd=2.5u
lng=0.4u
S
S
M19
Wd=5u
lng=0.4u
M20
Wd=2.5u
lng=0.4u
M26
Wd=5u
lng=0.4u
S
M32
Wd=2.5u
lng=0.4u
S

FIG.177C

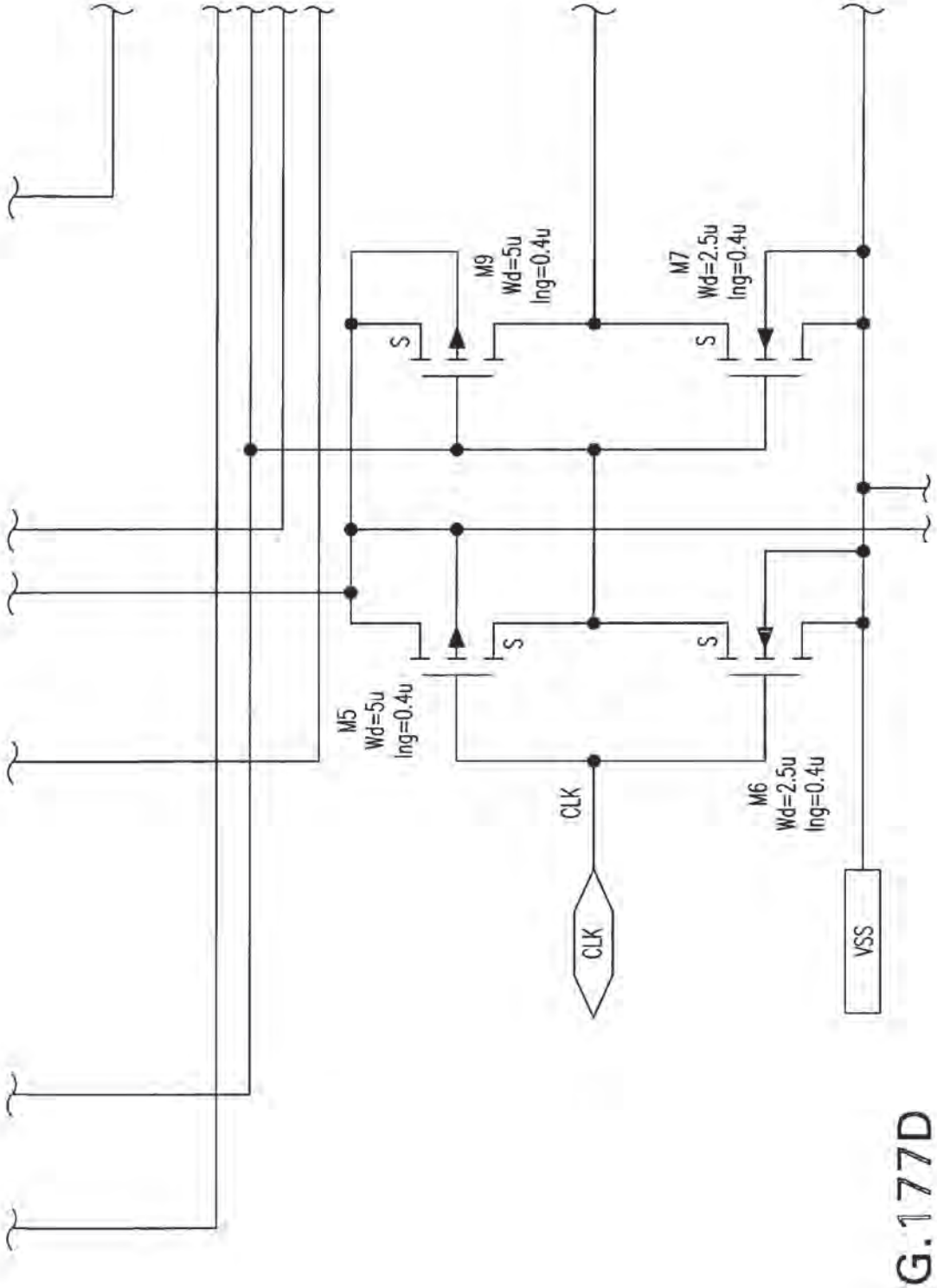

M9
Wd=5u
lng=0.4u
M7
Wd=2.5u
lng=0.4u
S
S
S
S
M5
Wd=5u
lng=0.4u
M6
Wd=2.5u
lng=0.4u
CLK
CLK
VSS

FIG. 177D

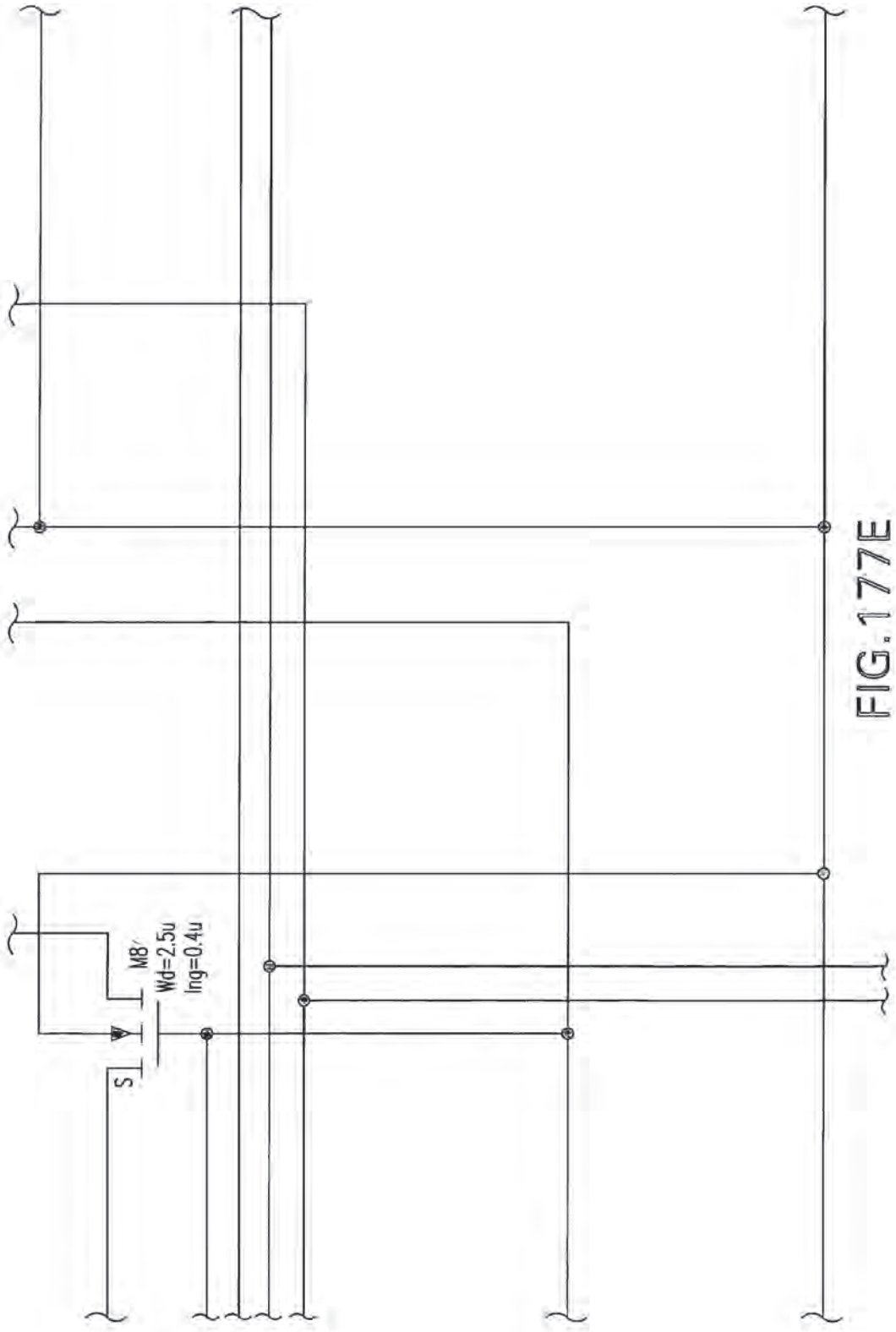


FIG. 17E

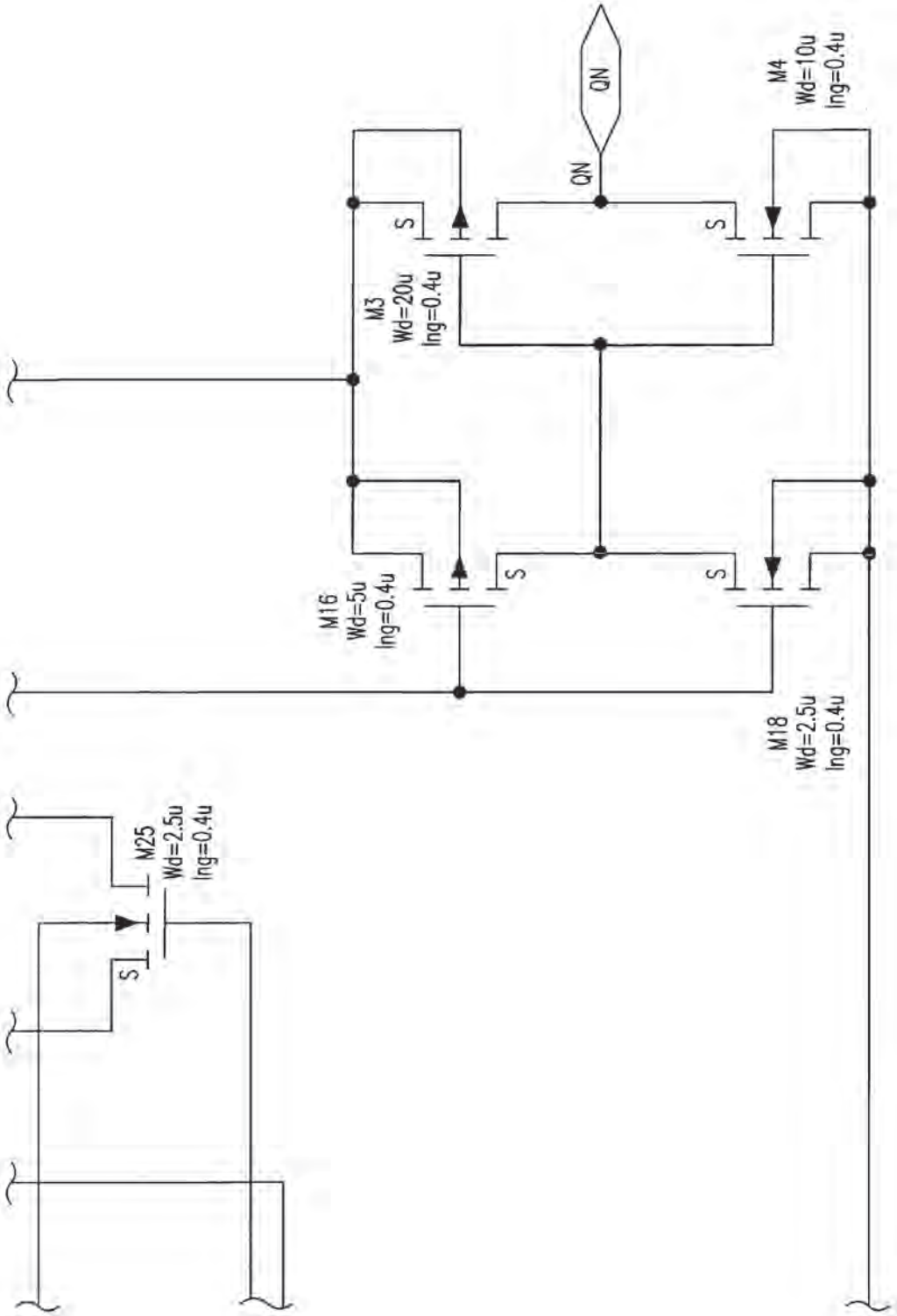

QN
QN
M4
Wd=10u
lng=0.4u
M3
Wd=20u
lng=0.4u
M16
Wd=5u
lng=0.4u
M18
Wd=2.5u
lng=0.4u
M25
Wd=2.5u
lng=0.4u
S
S
S
S
S

FIG. 177F

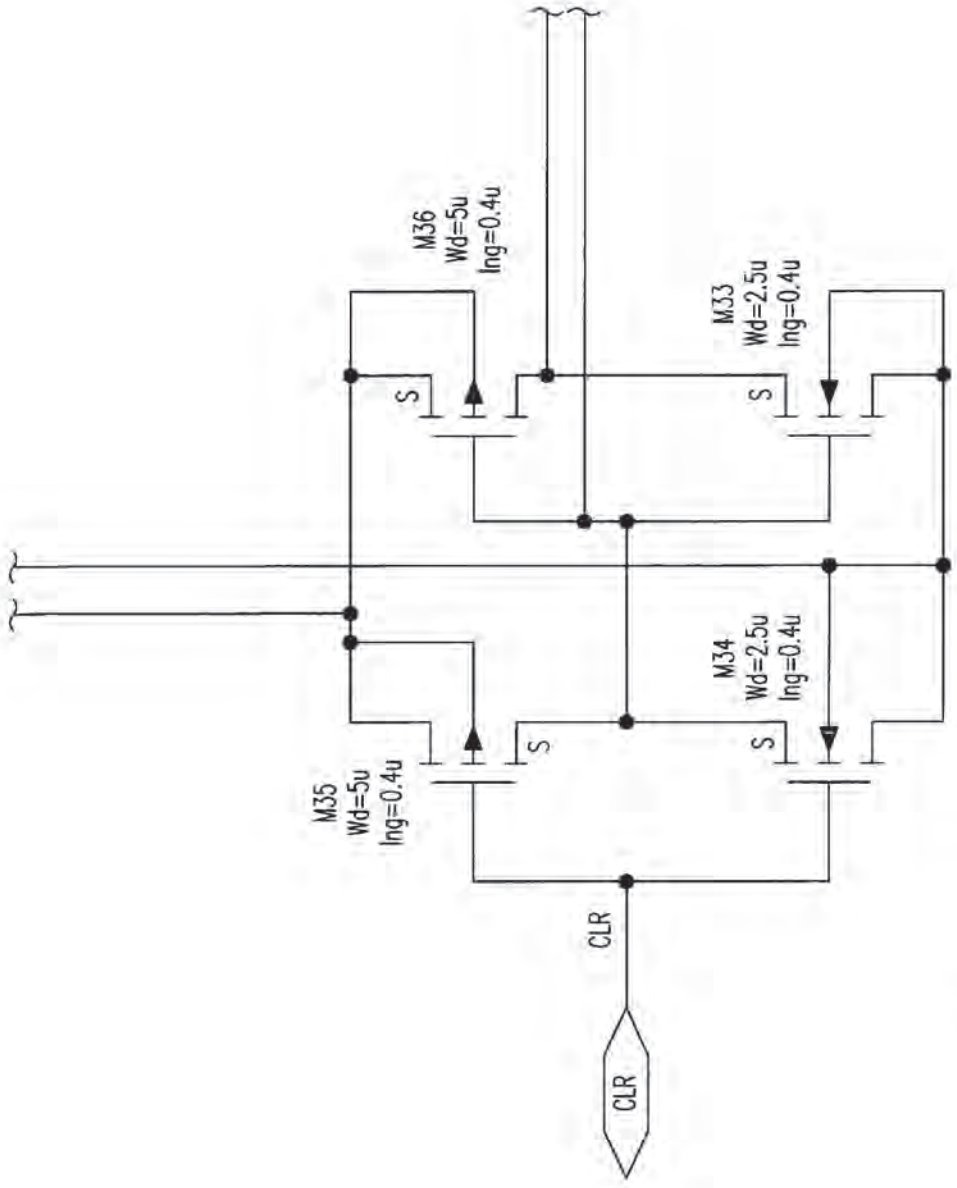
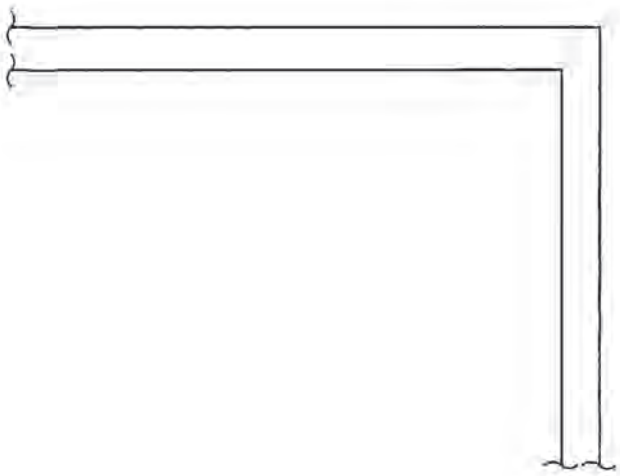

M36
Wd=5u
lng=0.4u
M33
Wd=2.5u
lng=0.4u
M34
Wd=2.5u
lng=0.4u
M35
Wd=5u
lng=0.4u
S
CLR
CLR

FIG. 177G

FIG. 177H



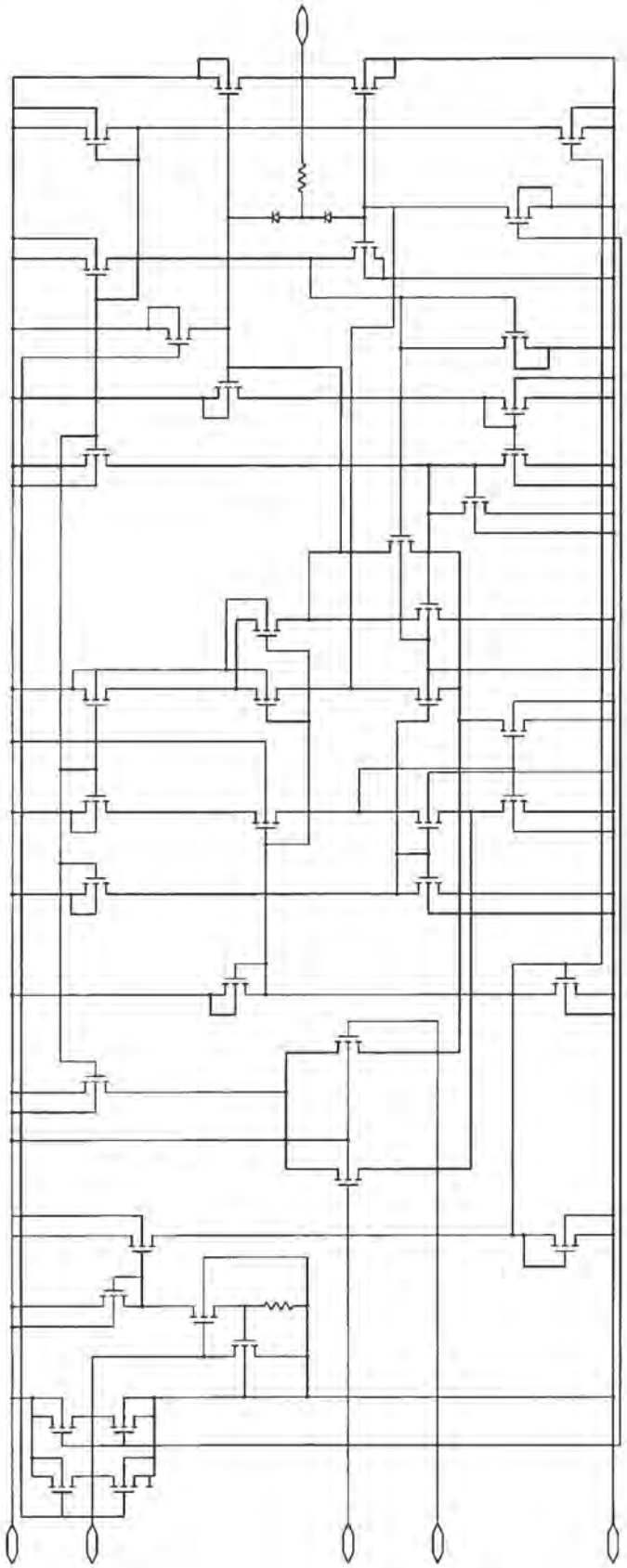


FIG. 178

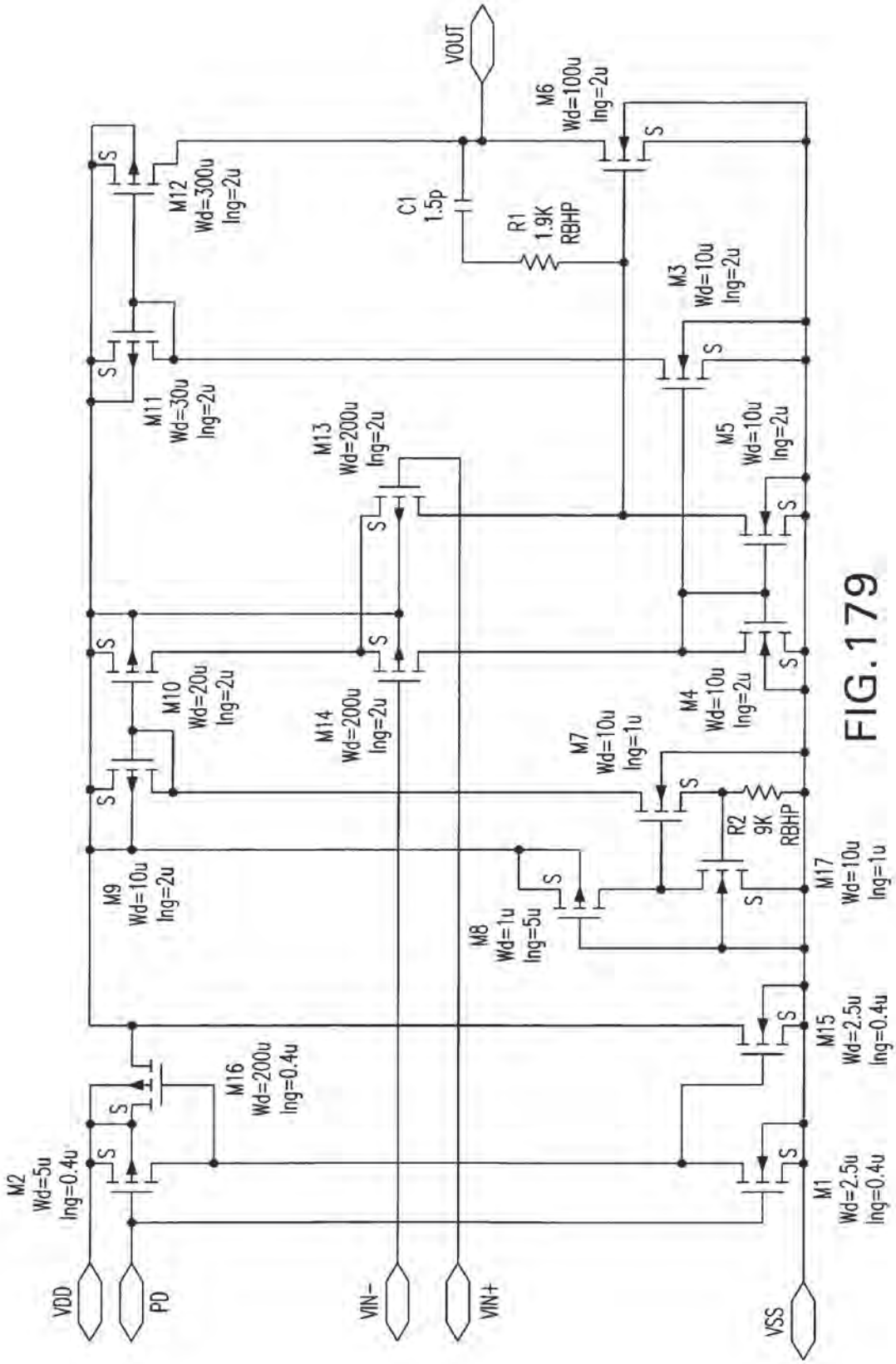

VOUT
M6 Wd=100u lng=2u
M12 Wd=300u lng=2u
C1 1.5p
R1 1.9K RBHP
M3 Wd=10u lng=2u
M11 Wd=30u lng=2u
M13 Wd=200u lng=2u
M5 Wd=10u lng=2u
M10 Wd=20u lng=2u
M14 Wd=200u lng=2u
M4 Wd=10u lng=2u
M7 Wd=10u lng=1u
R2 9K RBHP
M9 Wd=10u lng=2u
M8 Wd=1u lng=5u
M17 Wd=10u lng=1u
M15 Wd=2.5u lng=0.4u
M16 Wd=200u lng=0.4u
M2 Wd=5u lng=0.4u
M1 Wd=2.5u lng=0.4u
VDD
PD
VIN-
VIN+
VSS
S

FIG. 179

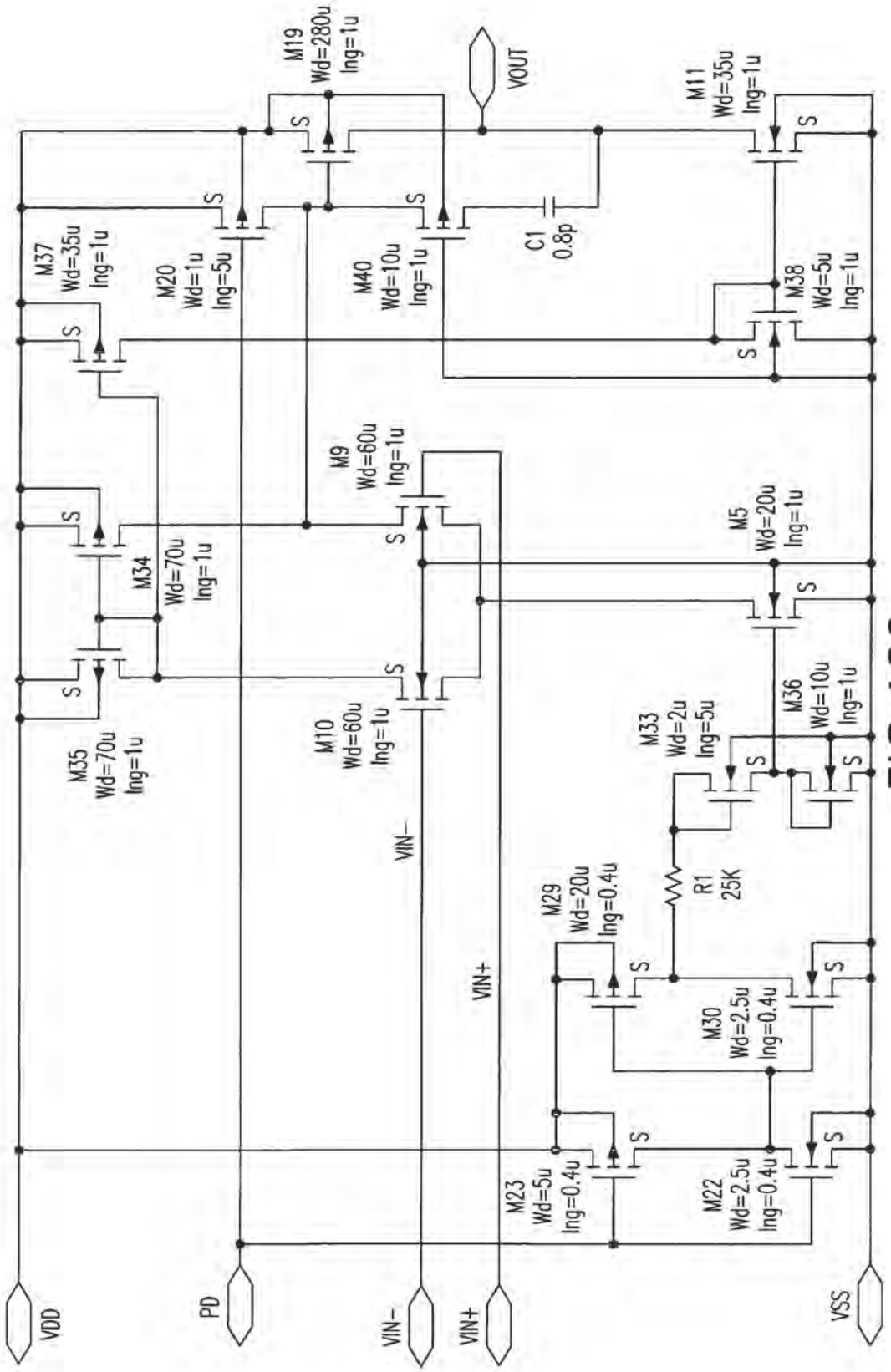

M19
Wd=280u
lng=1u
VOUT
M11
Wd=35u
lng=1u
M37
Wd=35u
lng=1u
M20
Wd=1u
lng=5u
M40
Wd=10u
lng=1u
C1
0.8p
M38
Wd=5u
lng=1u
M9
Wd=60u
lng=1u
M5
Wd=20u
lng=1u
M34
Wd=70u
lng=1u
M35
Wd=70u
lng=1u
M10
Wd=60u
lng=1u
M33
Wd=2u
lng=5u
M36
Wd=10u
lng=1u
VIN-
R1
25K
M29
Wd=20u
lng=0.4u
VIN+
M30
Wd=2.5u
lng=0.4u
M23
Wd=5u
lng=0.4u
M22
Wd=2.5u
lng=0.4u
VDD
PD
VIN-
VIN+
VSS

FIG. 180

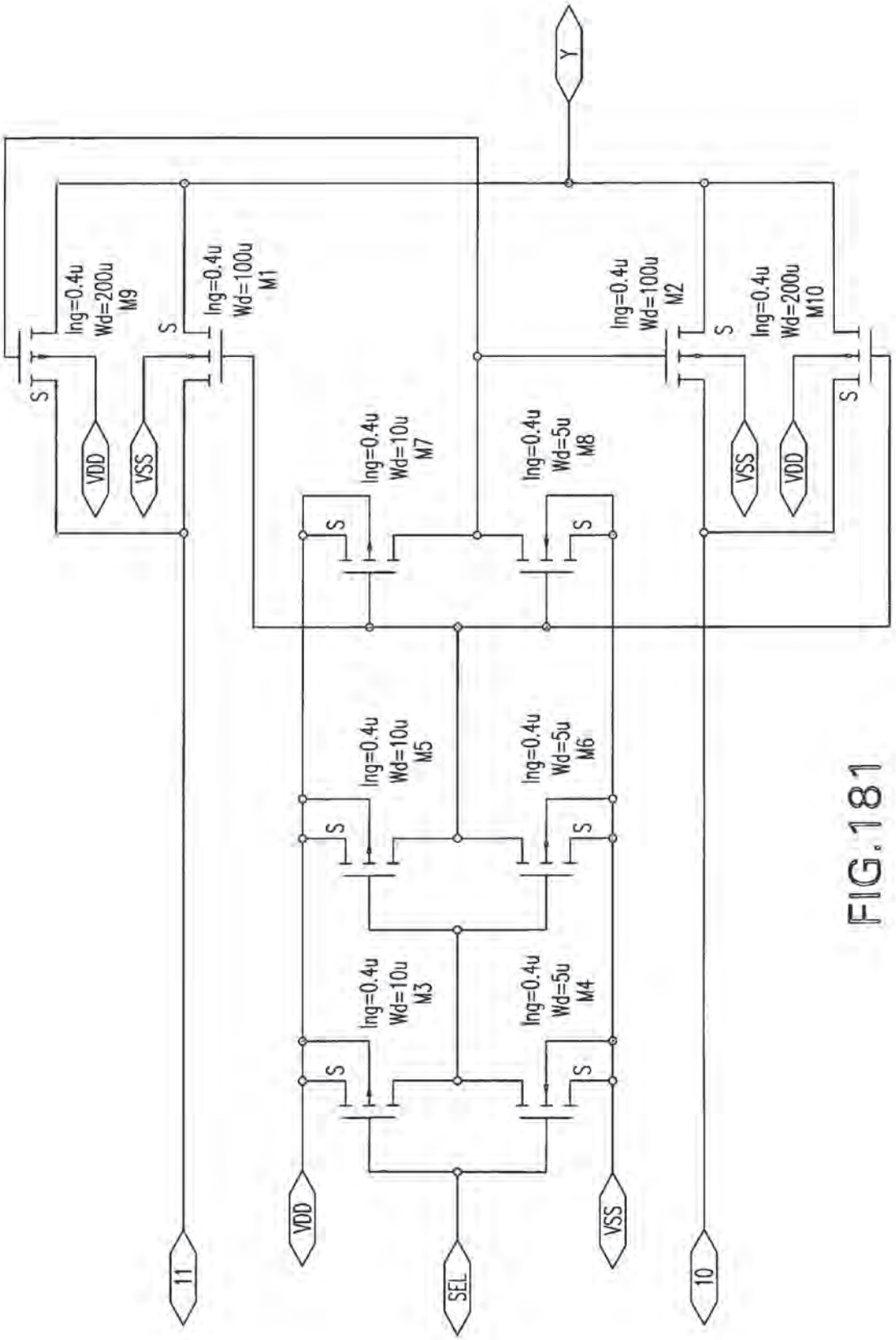

Y
lng=0.4u Wd=200u M9
lng=0.4u Wd=100u M1
lng=0.4u Wd=100u M2
lng=0.4u Wd=200u M10
lng=0.4u Wd=10u M7
lng=0.4u Wd=5u M8
lng=0.4u Wd=10u M5
lng=0.4u Wd=5u M6
lng=0.4u Wd=10u M3
lng=0.4u Wd=5u M4
S
VDD
VSS
11
SEL
10

FIG. 181

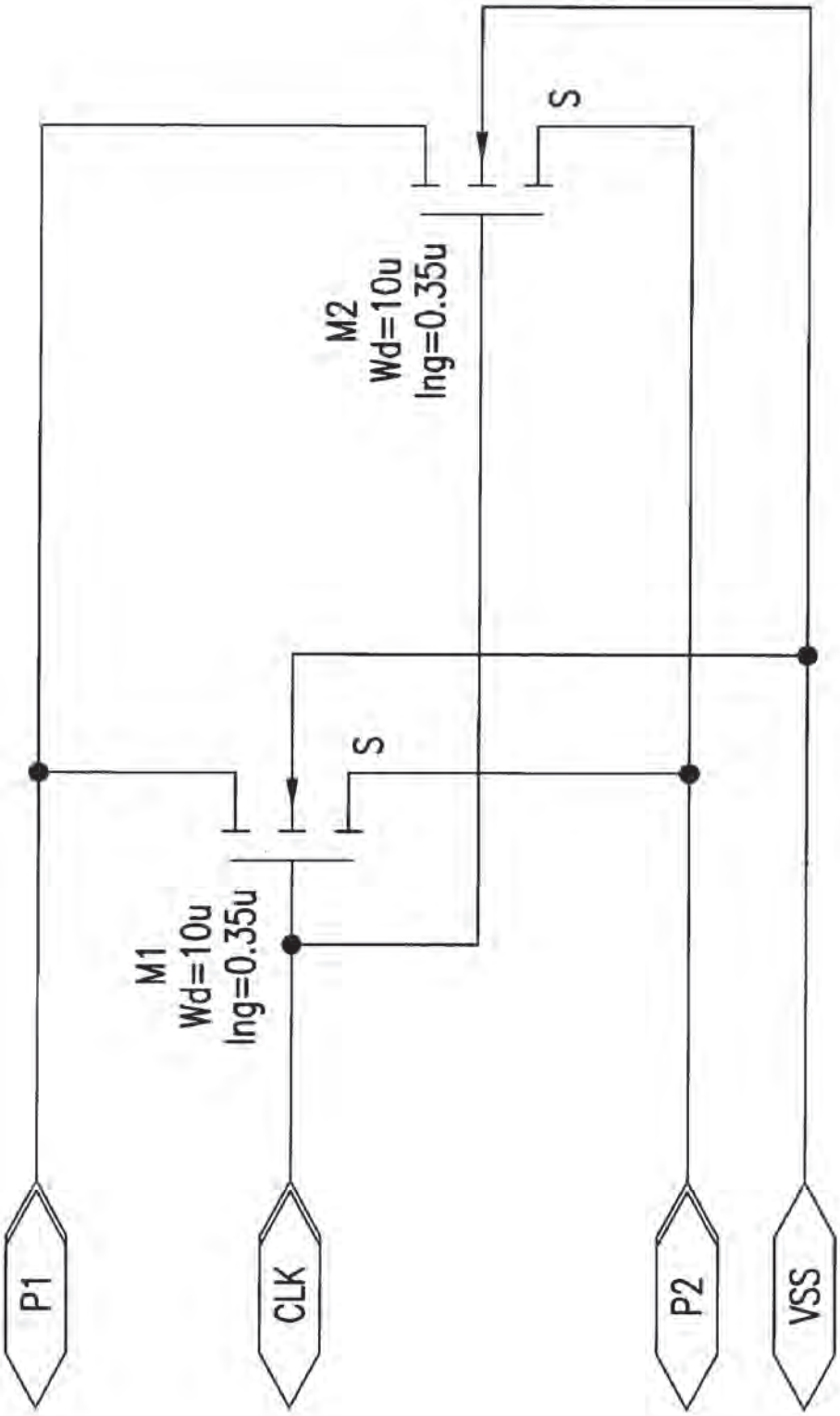


FIG.182

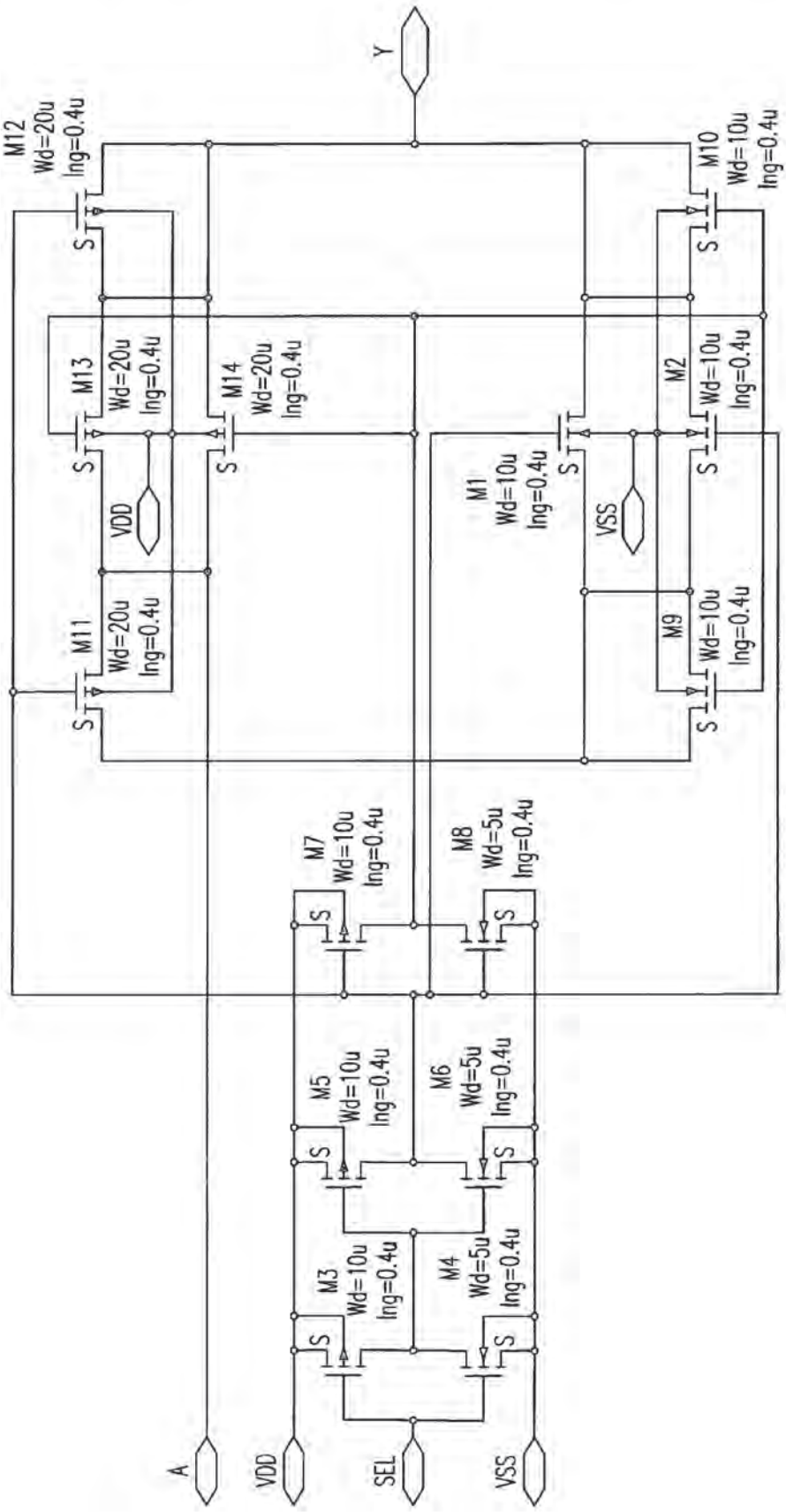

Y
M12 Wd=20u lng=0.4u
M10 Wd=10u lng=0.4u
M13 Wd=20u lng=0.4u
M14 Wd=20u lng=0.4u
M2 Wd=10u lng=0.4u
M1 Wd=10u lng=0.4u
VDD
VSS
M11 Wd=20u lng=0.4u
M9 Wd=10u lng=0.4u
M7 Wd=10u lng=0.4u
M8 Wd=5u lng=0.4u
M5 Wd=10u lng=0.4u
M6 Wd=5u lng=0.4u
M3 Wd=10u lng=0.4u
M4 Wd=5u lng=0.4u
A
VDD
SEL
VSS

FIG. 183

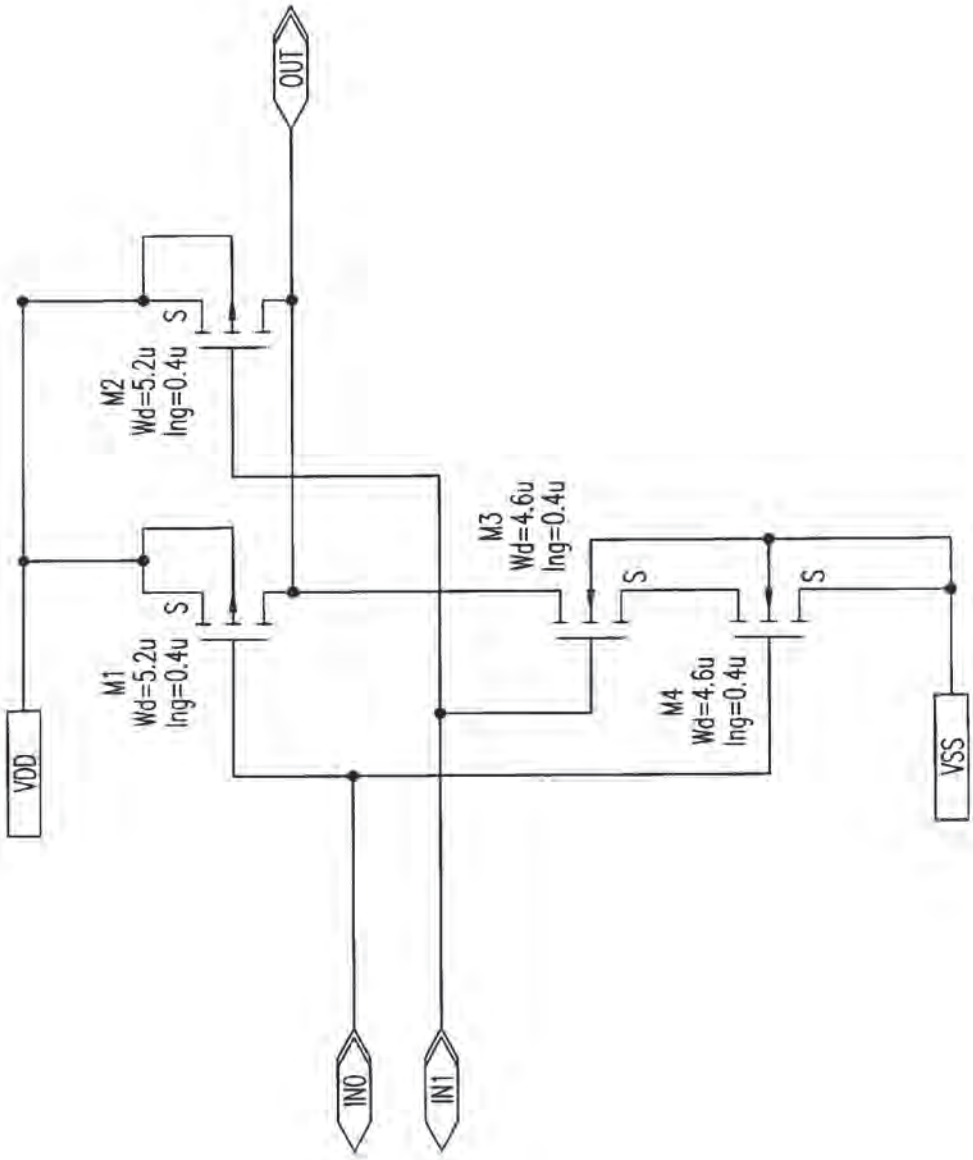

OUT
M2
Wd=5.2u
lng=0.4u
S
M3
Wd=4.6u
lng=0.4u
S
S
M1
Wd=5.2u
lng=0.4u
S
M4
Wd=4.6u
lng=0.4u
VDD
VSS
IN0
IN1

FIG.184

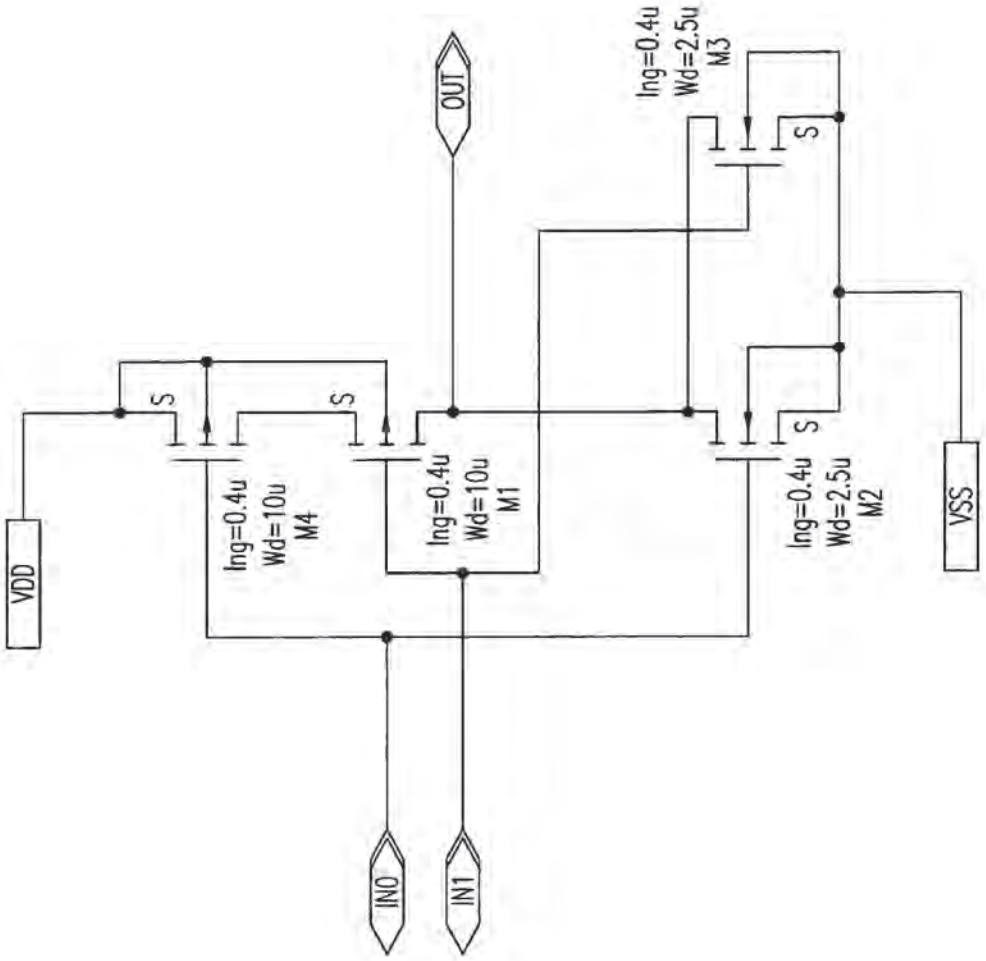

OUT
lng=0.4u
Wd=2.5u
M3
S
S
S
S
VDD
lng=0.4u
Wd=10u
M4
lng=0.4u
Wd=10u
M1
lng=0.4u
Wd=2.5u
M2
VSS
IN0
IN1

FIG.185

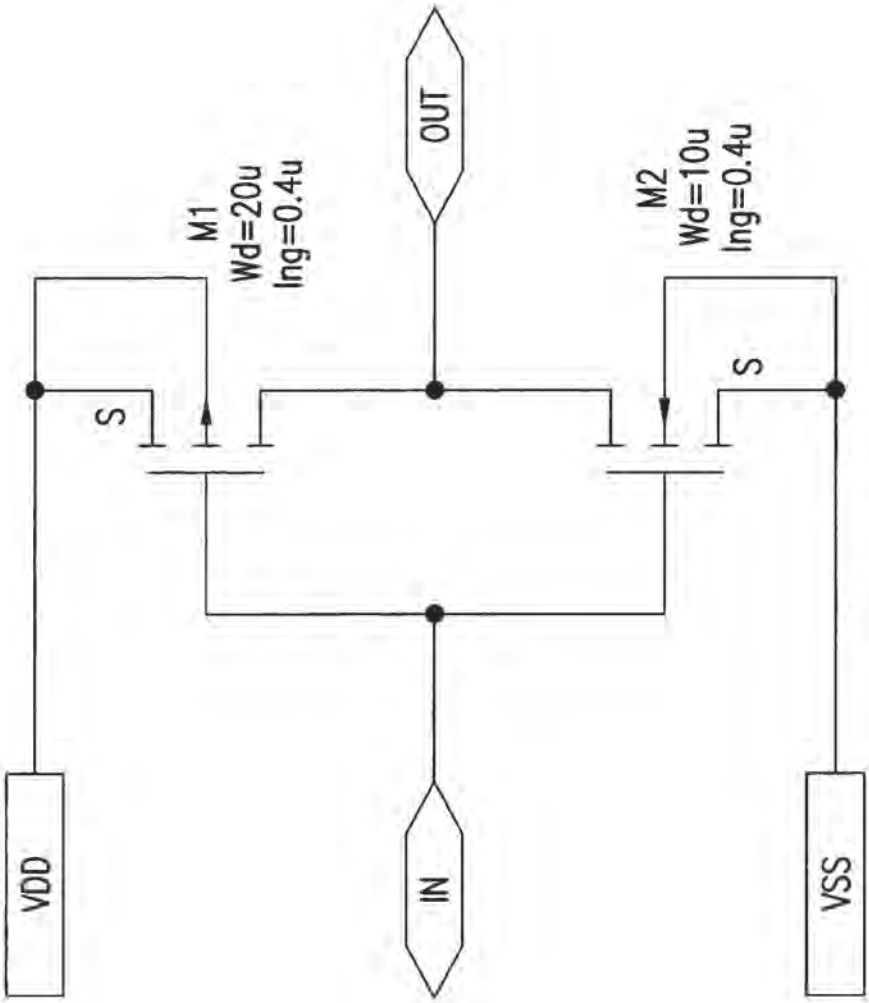


FIG. 186

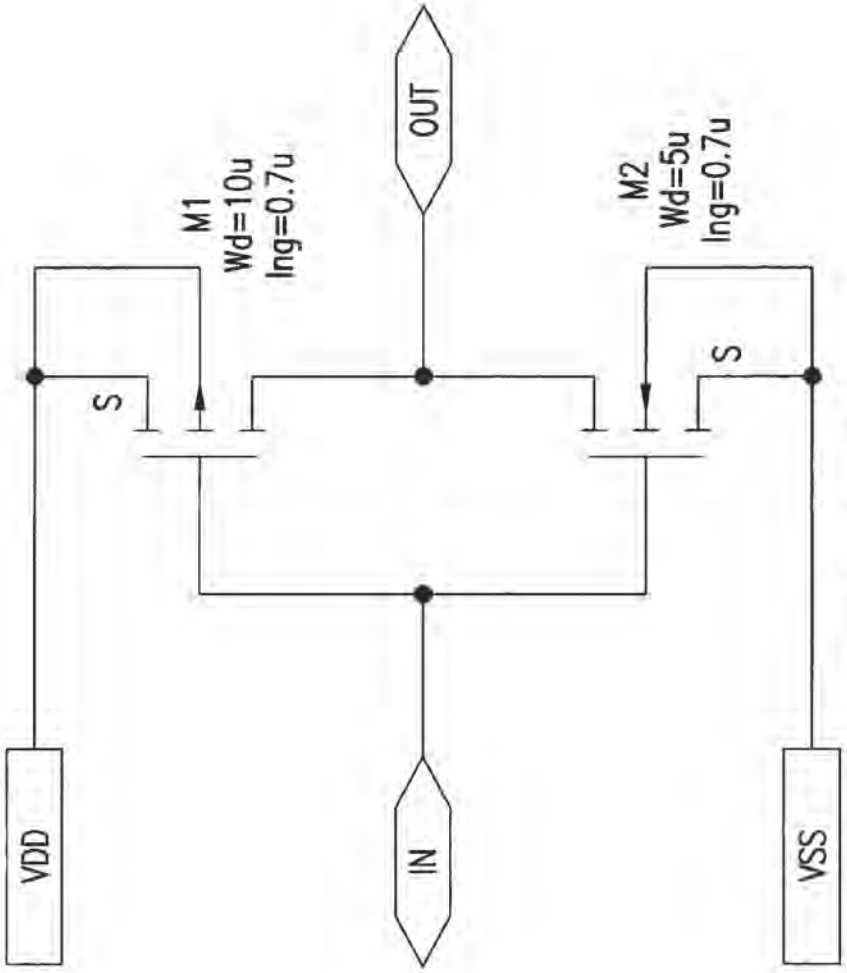


FIG.187

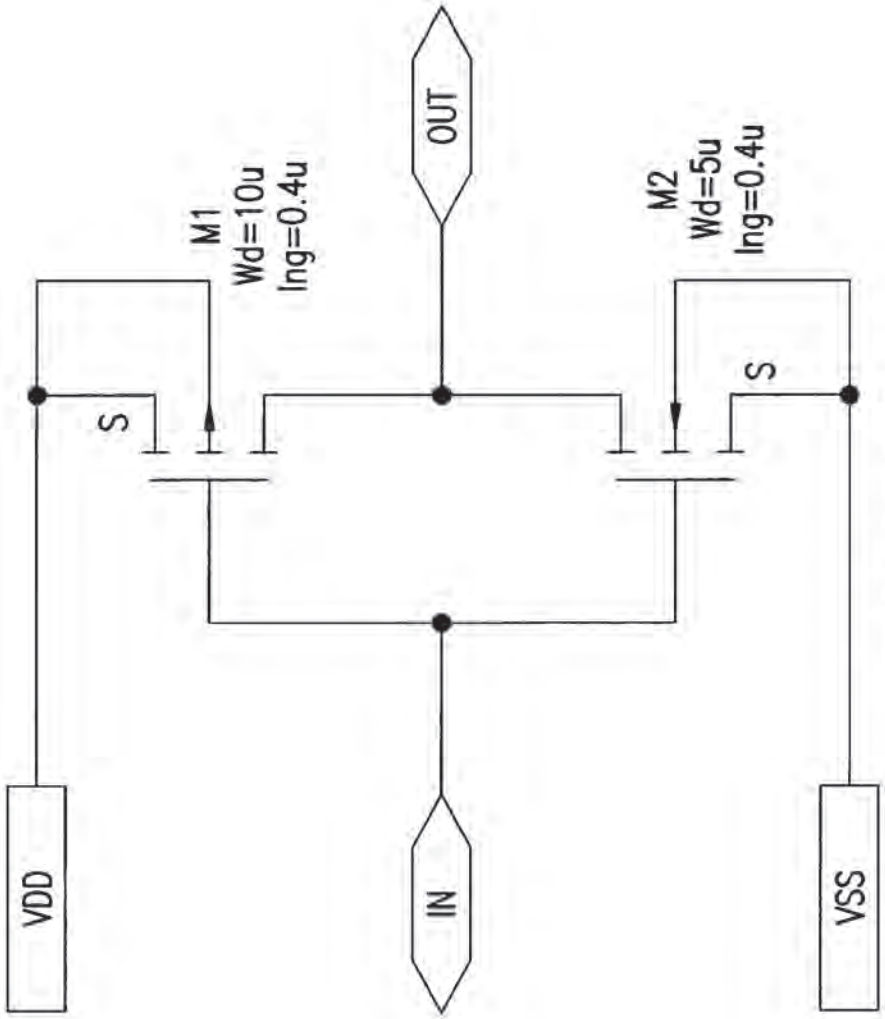


FIG.188

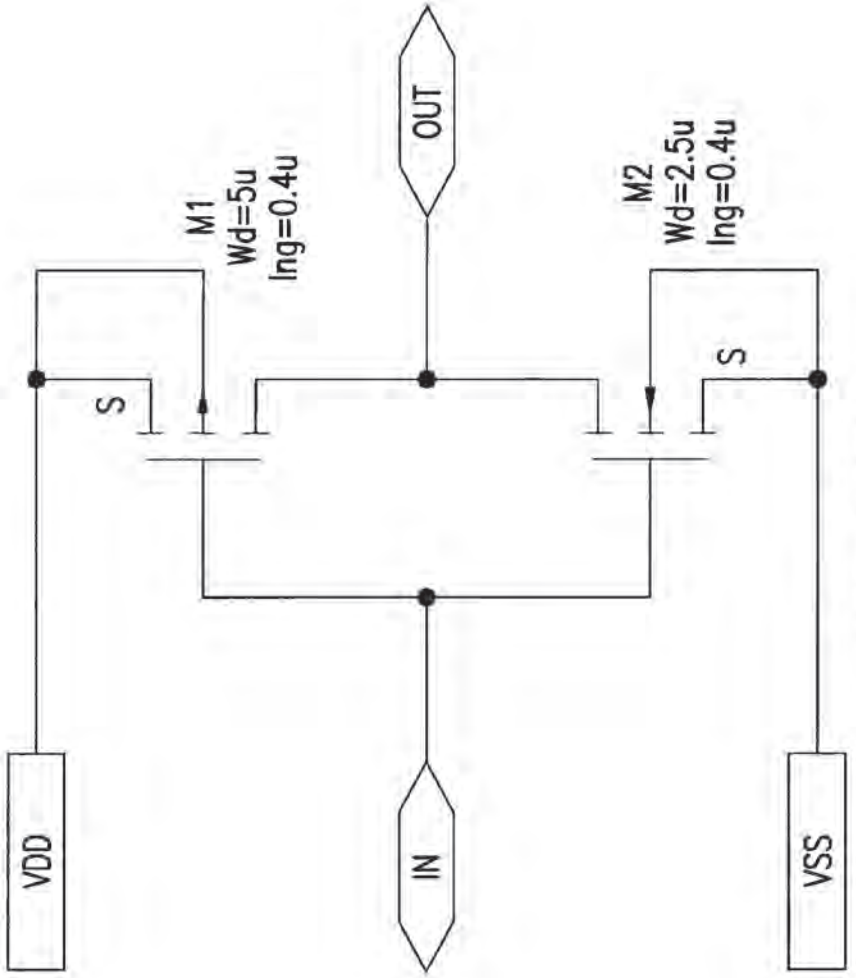


FIG.189

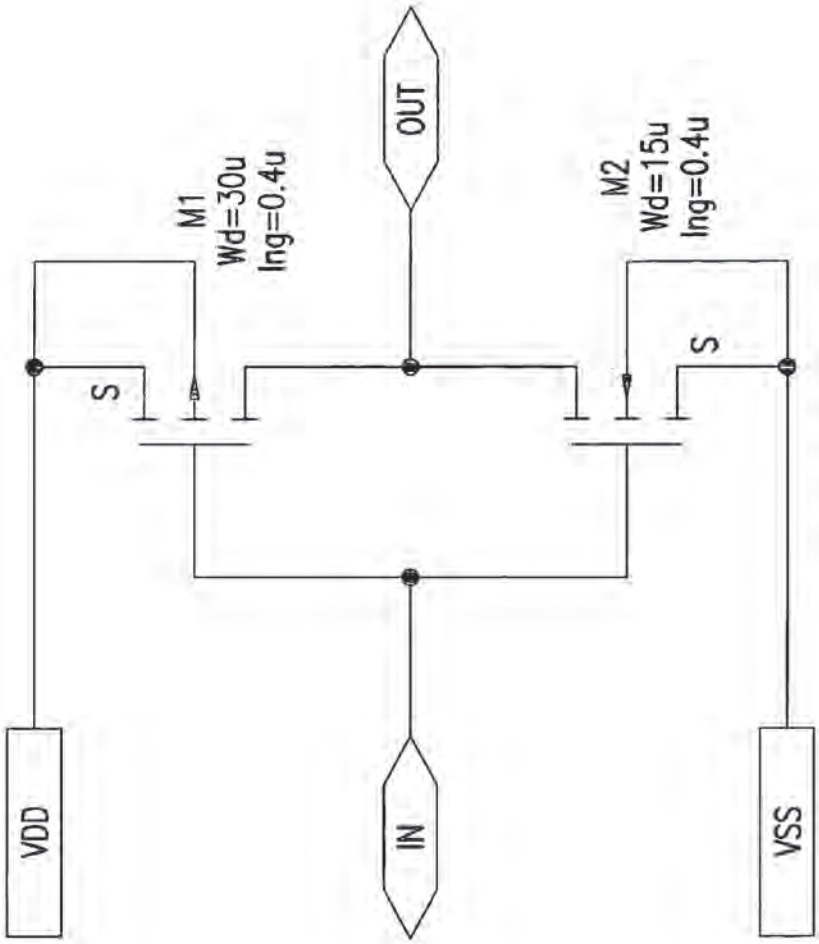


FIG. 190

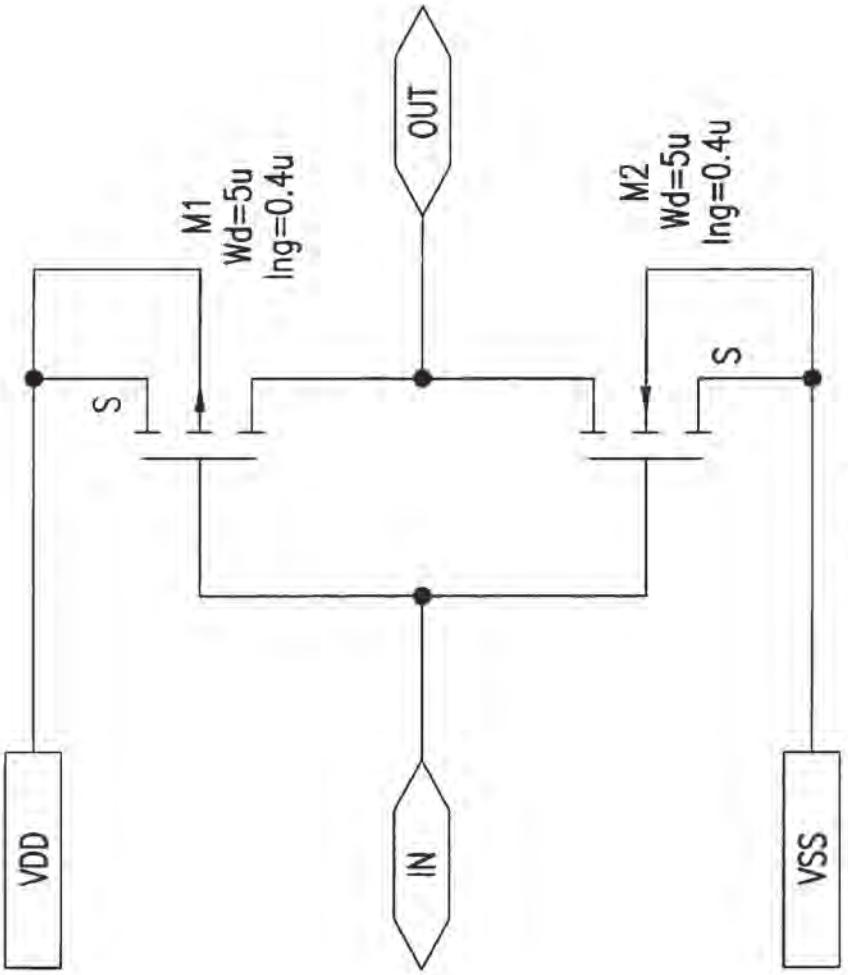


FIG. 191

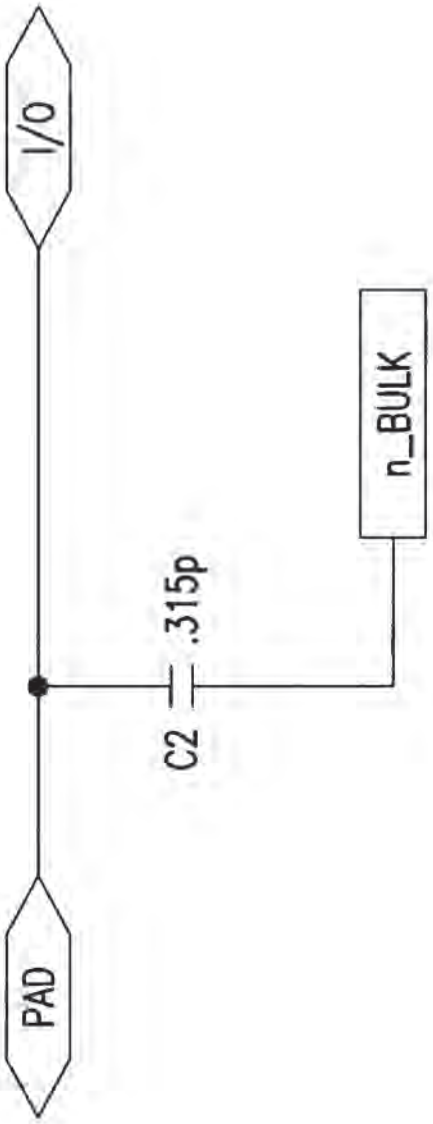


FIG.192

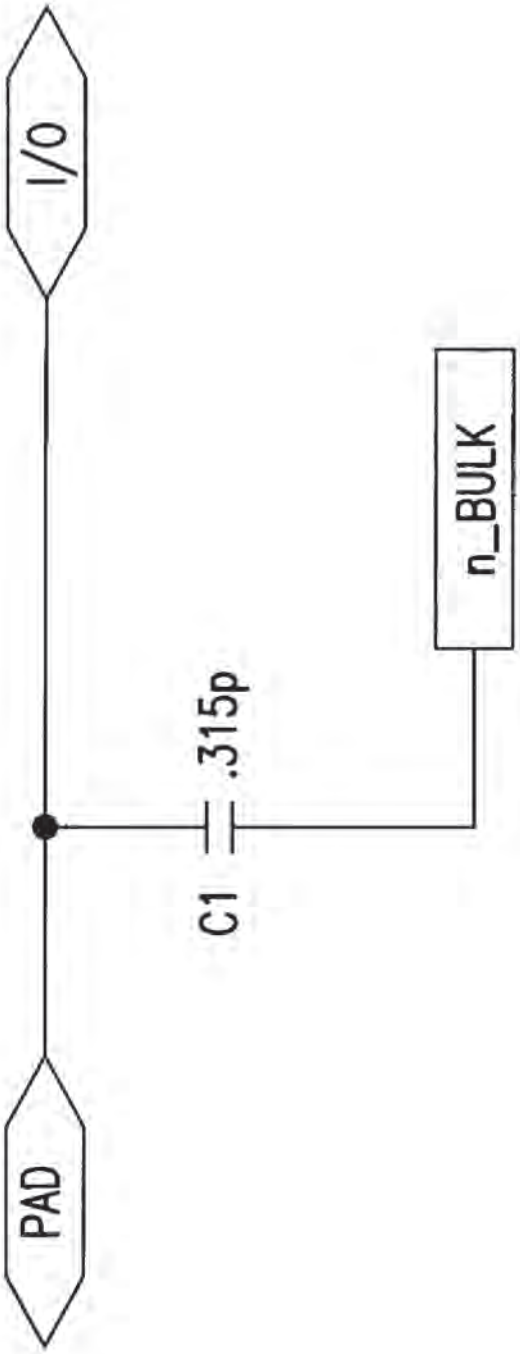


FIG. 193

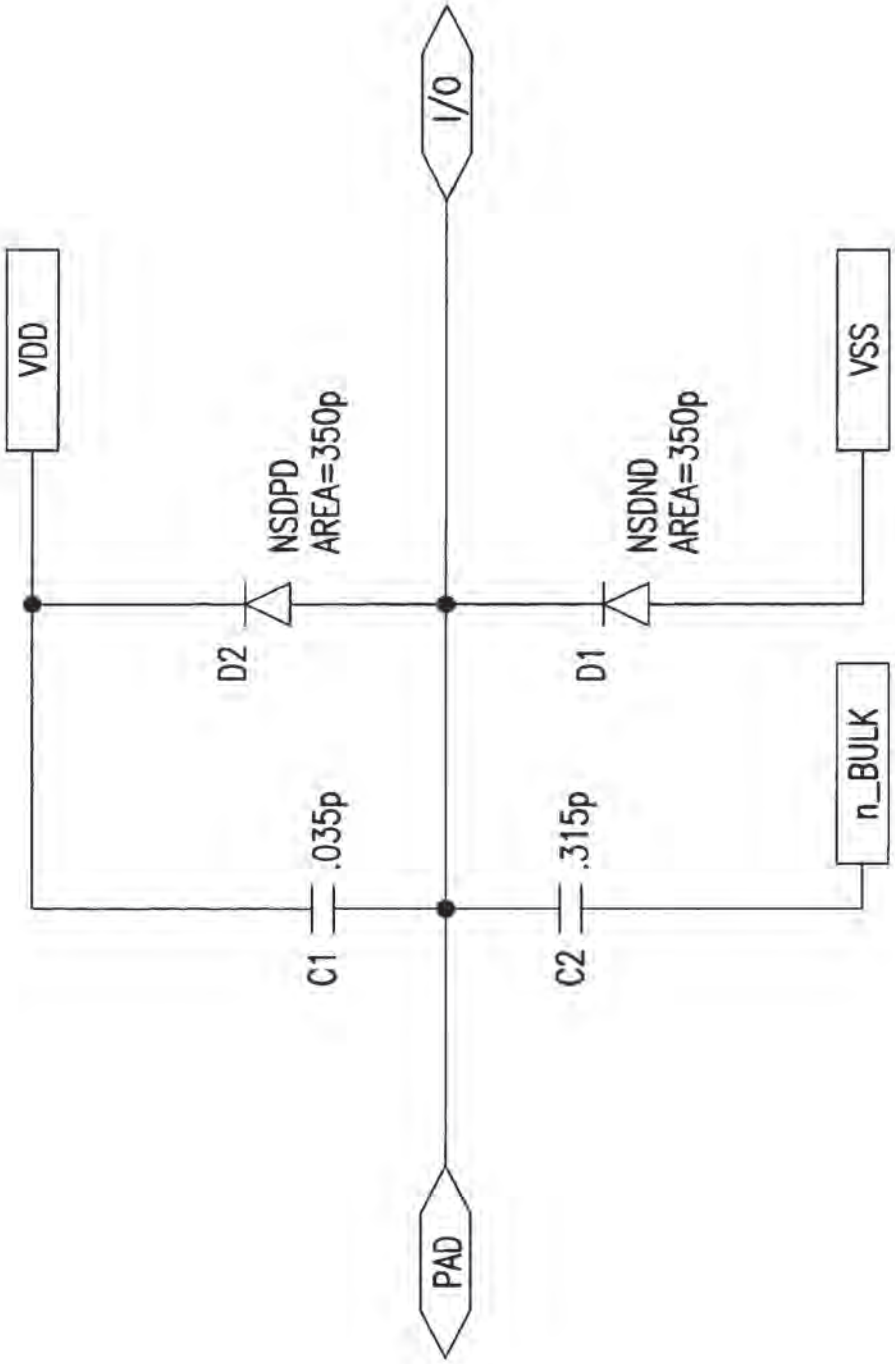

I/O
VDD
VSS
NSDPD
AREA=350p
NSDND
AREA=350p
D2
D1
n_BULK
.035p
.315p
C1
C2
PAD

FIG. 194

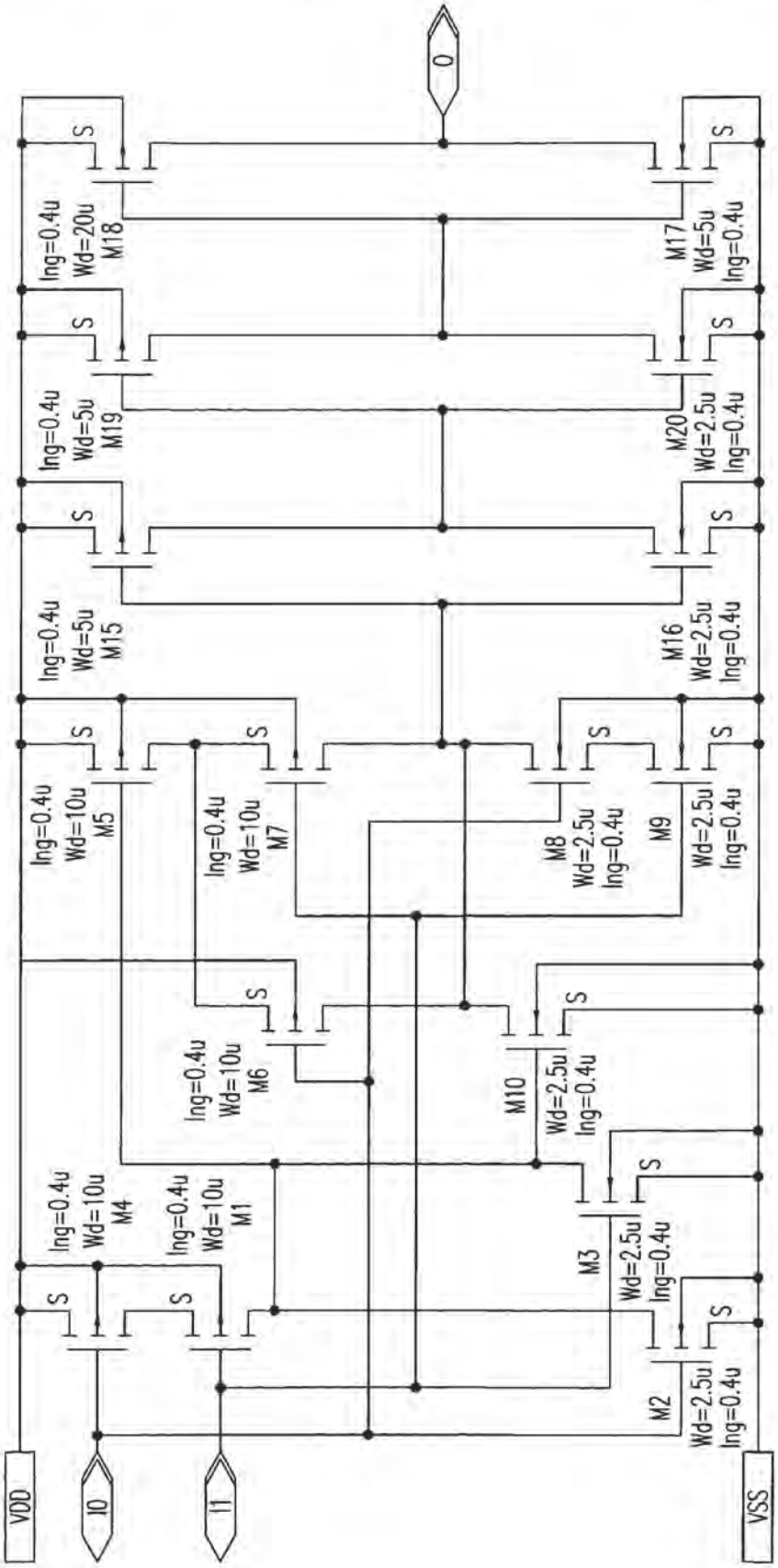

0
lng=0.4u Wd=20u M18
M17 Wd=5u lng=0.4u
lng=0.4u Wd=5u M19
M20 Wd=2.5u lng=0.4u
lng=0.4u Wd=5u M15
M16 Wd=2.5u lng=0.4u
lng=0.4u Wd=10u M5
lng=0.4u Wd=10u M7
M8 Wd=2.5u lng=0.4u
M9 Wd=2.5u lng=0.4u
lng=0.4u Wd=10u M6
M10 Wd=2.5u lng=0.4u
lng=0.4u Wd=10u M4
lng=0.4u Wd=10u M1
M3 Wd=2.5u lng=0.4u
M2 Wd=2.5u lng=0.4u
VDD
I0
I1
VSS

FIG. 195

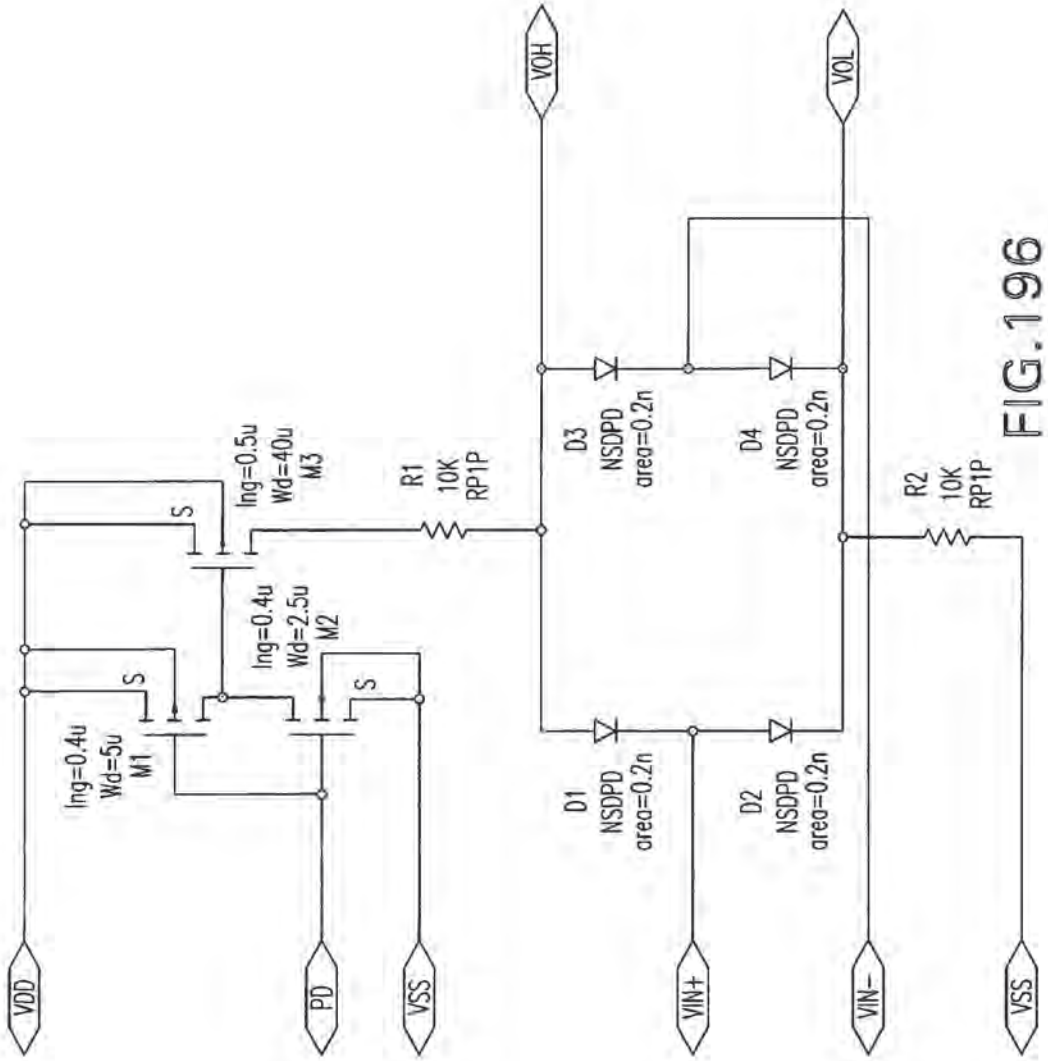

VOH
VOL
D3
NSDPD
area=0.2n
D4
NSDPD
area=0.2n
R1
10K
RP1P
R2
10K
RP1P
lng=0.5u
Wd=40u
M3
S
lng=0.4u
Wd=2.5u
M2
S
lng=0.4u
Wd=5u
M1
S
D1
NSDPD
area=0.2n
D2
NSDPD
area=0.2n
VDD
PD
VSS
VIN+
VIN-
VSS

FIG. 196