Ordering number: EN 3807B

Monolithic Linear IC

SANYO No.3807B

LA7456M

8-mm VCR stereo matrix IC

Overview

The LA7456M provides all matrix functions required by 8-mm VCR stereo application circuits. It has on-chip monoral/stereo and bilingual automatic detectors.

Features

- All stereo matrix switching functions
- Monoral detector circuit
- Bilingual detector circuit
- On-chip pulse generator circuit for bilingual pilot signal insertion
- Low current dissipation

Functions

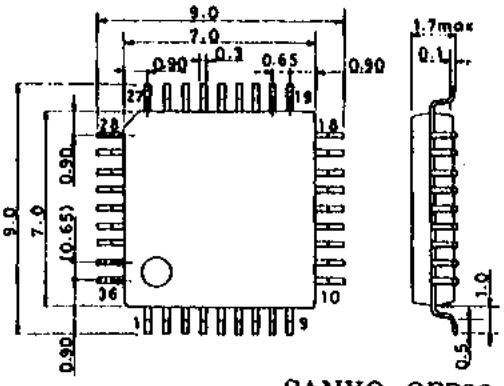
- Stereo matrix switching functions
- Monoral detect function
- Bilingual detect function
- Pulse generator circuit
- Logic control function

Maximum Ratings at Ta = 25°C				unit
Maximum Supply Voltage	V_{CC} max		7.0	V
Allowable Power Dissipation	Pd max	Ta ≤ 75°C	160	mW
Operating Temperature	Topr		−20 to +75	°C
Storage Temperature	Tstg		−40 to +125	°C

Operating Conditions at Ta = 25°C			unit
Recommended Supply Voltage	V_{CC}	4.75	V
Operating Voltage Range	V_{CC} op	4.5 to 5.5	V

Package Dimensions 3162B

(unit : mm)



SANYO : QFP36

SANYO Electric Co.,Ltd. Semiconductor Business Headquarters
TOKYO OFFICE Tokyo Bldg., 1-10,1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

Operating Characteristics at Ta = 25°C, V_{CC} = 4.75V

			Measurement point	min	typ	max	unit	Measurement program №
Current Dissipation REC	IccR		Icc	4.8	6.1	7.4	mA	1
Current Dissipation PB	IccP		Icc	6.0	7.6	9.2	mA	2
Reference Voltage	V_{REF}		TP11	2.300	2.375	2.450	V	3
REC matrix ON mode (Lch)								
Voltage Gain 1	G_{RML1}	400Hz, −15dBs	TP9	−0.2	0	+0.2	dB	4
Total Hormonic Distortion 1	THD_{RML1}	400Hz, −5dBs	TP9			0.1	%	5
Voltage Gain 2	G_{RML2}	400Hz, −15dBs	TP8	−0.4	0	+0.4	dB	6
Total Hormonic Distortion 2	THD_{RML2}	400Hz, −5dBs	TP8			0.1	%	7
Voltage Gain 3	G_{RML3}	400Hz, −15dBs	TP7	−0.1	0	+0.1	dB	8
Total Hormonic Distortion 3	THD_{RML3}	400Hz, −5dBs	TP7			0.1	%	9
Cross Talk	CT_{RML}	400Hz, −15dBs	TP1			−60	dB	10
Separation	SP_{RML}	400Hz, −15dBs, L/R antiphase input	TP8			−40	dB	11
REC matrix OFF mode (Lch)								
Voltage Gain 1	G_{RL1}	400Hz, −15dBs	TP9,TP1	−0.5	0	+0.5	dB	12
Total Hormonic Distortion 1	THD_{RL1}	400Hz, −5dBs	TP9,TP1			0.1	%	13
Voltage Gain 2	G_{RL2}	400Hz, −15dBs	TP8	−0.2	0	+0.2	dB	14
Total Hormonic Distortion 2	THD_{RL2}	400Hz, −5dBs	TP8			0.1	%	15
Cross Talk	CT_{RL}	400Hz, −15dBs	TP1			−60	dB	16
PB matrix ON mode (Lch)								
Voltage Gain 1	G_{PML1}	400Hz, −15dBs	TP7	−0.5	0	+0.5	dB	17
Total Hormonic Distortion 1	THD_{PML1}	400Hz, −5dBs	TP7			0.1	%	18
Voltage Gain 2	G_{PML2}	400Hz, −15dBs	TP9	−0.1	0	+0.1	dB	19
Total Hormonic Distortion 2	THD_{PML2}	400Hz, −5dBs	TP9			0.1	%	20
Cross Talk	CT_{PML}	400Hz, −15dBs	TP3			−60	dB	21
Separation	SP_{PML}	400Hz, −15dBs, L/R antiphase input	TP7			−40	dB	22
PB matrix OFF mode (Lch)								
Voltage Gain	G_{PL}	400Hz, −15dBs	TP7,TP3	−0.4	0	+0.4	dB	23
Total Hormonic Distortion	THD_{PL}	400Hz, −5dBs	TP7,TP3			0.1	%	24
Cross Talk	CT_{PL}	400Hz, −15dBs	TP3			−60	dB	25
REC matrix ON mode (Rch)								
Voltage Gain	G_{RMR}	400Hz, −15dBs	TP2	−0.5	0	+0.5	dB	26
Total Hormonic Distortion	THD_{RMR}	400Hz, −5dBs	TP2			0.3	%	27
Cross Talk	CT_{RMR}	400Hz, −15dBs	TP9			−60	dB	28
Separation	SP_{RMR}	400Hz, −15dBs, L/R inphase input	TP2			−40	dB	29
REC matrix OFF mode (Rch)								
Voltage Gain 1	G_{RR1}	400Hz, −15dBs	TP9,TP1	−0.5	0	+0.5	dB	30
Total Hormonic Distortion 1	THD_{PRRL1}	400Hz, −5dBs	TP9,TP1			0.1	%	31
Voltage Gain 2	G_{RR2}	400Hz, −15dBs	TP2	−0.3	0	+0.3	dB	32
Total Hormonic Distortion 2	THD_{RR2}	400Hz, −5dBs	TP2			0.1	%	33
Cross Talk	CT_{RR}	400Hz, −15dBs	TP9			−60	dB	34
PB matrix ON mode (Rch)								
Voltage Gain	G_{PMR}	400Hz, −15dBs	TP3	−0.5	0	+0.5	dB	35
Total Hormonic Distortion	THD_{PMR}	400Hz, −5dBs	TP3			0.4	%	36
Cross Talk	CT_{PMR}	400Hz, −15dBs	TP9			−60	dB	37
Separation	SP_{PMR}	400Hz, −15dBs, L/R inphase input	TP3			−40	dB	38
PB matrix OFF mode (Rch)								
Voltage Gain	G_{PR}	400Hz, −15dBs	TP3,TP7	−0.5	0	+0.5	dB	39
Total Hormonic Distortion	THD_{PR}	400Hz, −5dBs	TP3,TP7			0.1	%	40
Cross Talk	CT_{PR}	400Hz, −15dBs	TP7			−60	dB	41

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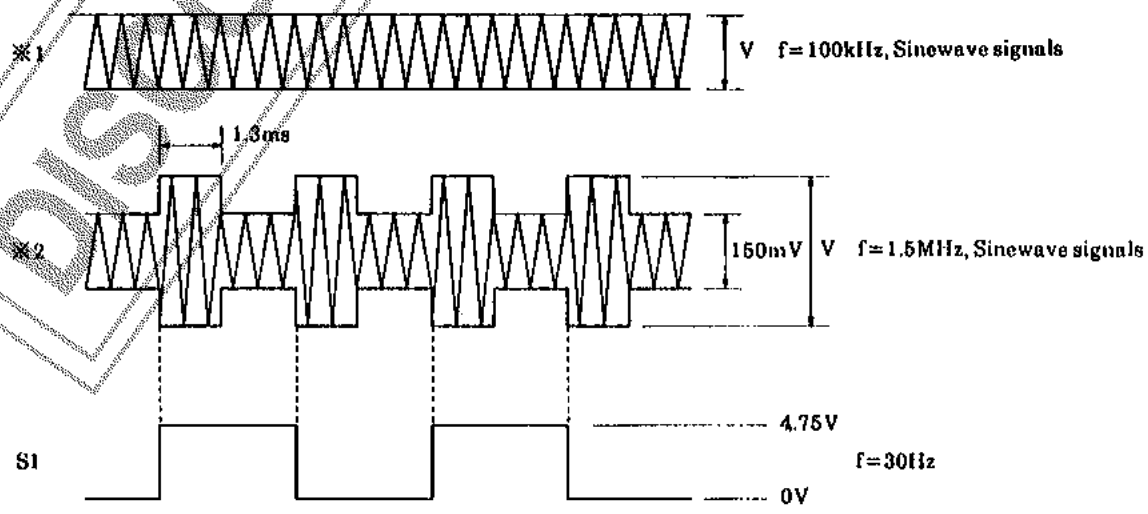
Operating Characteristics at Ta = 25°C, V_{CC} = 4.75V

			Measurement point	min	typ	max	unit	Measurement program №
Adjust Level								
REC Level ADJ Range	$V_{ADJ}R$	400Hz, −15dBs, Control with the IN 1 pin.	TP2	1.8	3.0	V_{CC}	V	42
PB Level ADJ Range	$V_{ADJ}P$	400Hz, −15dBs, Control with the IN 2 pin.	TP2	1.8	3.0	V_{CC}	V	43
MONO DET								
Detect Level	V_{MON}	※1	TP4			1.5	Vp-p	44
Output Level [L]	V_{MONL}	※1, V = 0dBs	TP4			1.0	V	45
Output Level [H]	V_{MONH}	※1, V = −15dBs	TP4	3.5			V	46
BILINGUAL DET								
Detect Level	V_R	※2	TP5	3.0	7.0		dB	47
Output Level [L]	V_{RL}	※2, V = 150mV	TP5			1.0	V	48
Output Level [H]	V_{RH}	※2, V = 300mV	TP5	3.5			V	49
Gate Pulse Width	T_P		TP6	1.2	1.3	1.4	ms	50
Gate Pulse Output Level [L]	V_{PL}		TP6			1.0	V	51
Gate Pulse Output Level [H]	V_{PH}		TP6	3.5			V	52
CONTROL LOGIC THRESHOLD								
PB/REC [L]	$V_{P/RL}$	400Hz, −15dBs	TP9			1.0	V	53
PB/REC [H]	$V_{P/RH}$	400Hz, −15dBs	TP9	3.5			V	54
Matrix ON/OFF [L]	V_{MATL}	400Hz, −15dBs	TP9			1.0	V	55
Matrix ON/OFF [H]	V_{MATH}	400Hz, −15dBs	TP9	4.2			V	56
Select 1 [L]	$V_{SIL}1$	400Hz, −15dBs	TP7			1.0	V	57
Select 1 [H]	$V_{SIH}1$	400Hz, −15dBs	TP7	3.5			V	58
Select 2 [L]	$V_{SIL}2$	400Hz, −15dBs	TP3			1.0	V	59
Select 2 [H]	$V_{SIH}2$	400Hz, −15dBs	TP3	3.5			V	60

Input Signals



Switch mode table

Mode \ Switches			PB /REC	Matrix ON/OFF	SELECT 1	SELECT 2
REC	Monoral		L	L	L	H
	Stereo		L	H	–	–
	Bilingual	MAIN/SUB	L	L	L	L
		MAIN/MAIN	L	L	L	H
		SUB/SUB	L	L	H	L
PB (AUTO)	Monoral		H	OPEN	L	H
	Stereo		H	OPEN	L	L
	Bilingual	MAIN/SUB	H	OPEN	L	L
		MAIN/MAIN	H	OPEN	L	H
		SUB/SUB	H	OPEN	H	L
PB (MANUAL)	Monoral		H	L	L	H
	Stereo		H	H	L	L
	Bilingual	MAIN/SUB	H	L	L	L
		MAIN/MAIN	H	L	L	H
		SUB/SUB	H	L	H	L

	PB/REC	Matrix ON/OFF	SELECT1	SELECT2
H	PB	ON	Rch output	Lch output
L	REC	OFF	Lch output	Rch output

Measurement program table

No.	Switch numbers				Input pins	Remarks
	SW1	SW2	SW3	SW4		
1	a	a	b	b		
2	a	a	b	a		
3	a	a	b	a		
4	b	b	a	b	IN5	Lch/Rch common
5	b	b	a	b	IN5	Lch/Rch common
6	b	b	a	b	IN5	
7	b	b	a	b	IN5	
8	b	b	a	b	IN4	REC matrix ON/OFF mode plus Lch/Rch common
9	b	b	a	b	IN4	REC matrix ON/OFF mode plus Lch/Rch common
10	b	b	a	b	IN5	
11	b	b	a	b	IN5, 6	IN5 and IN6 : antiphase input
12	b	a	b	b	IN5	
13	b	a	b	b	IN5	
14	b	b	b	b	IN5	
15	b	b	b	b	IN5	
16	b	b	b	b	IN5	
17	b	b	a	a	IN4	
18	b	b	a	a	IN4	
19	b	b	a	a	IN5	PB matrix ON/OFF mode plus Lch/Rch common
20	b	b	a	a	IN5	PB matrix ON/OFF mode plus Lch/Rch common

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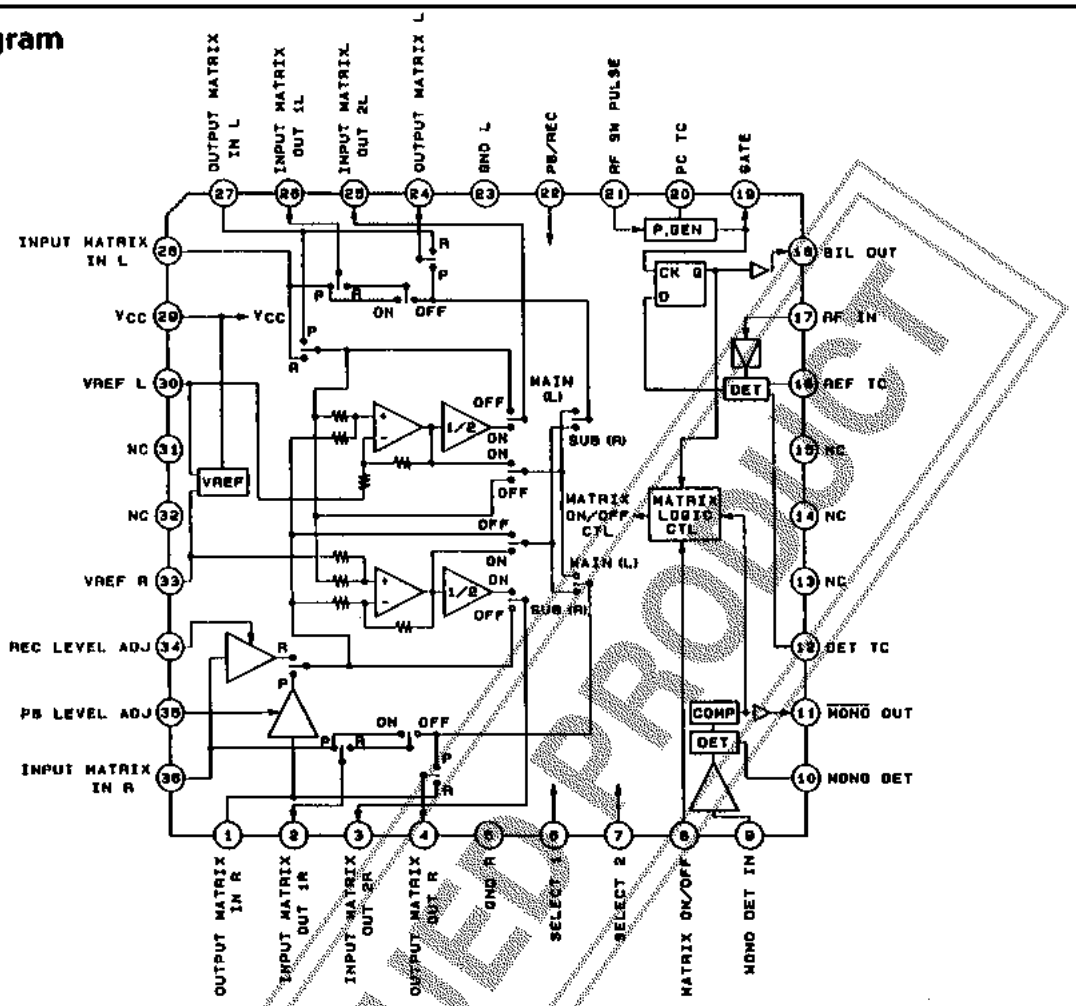
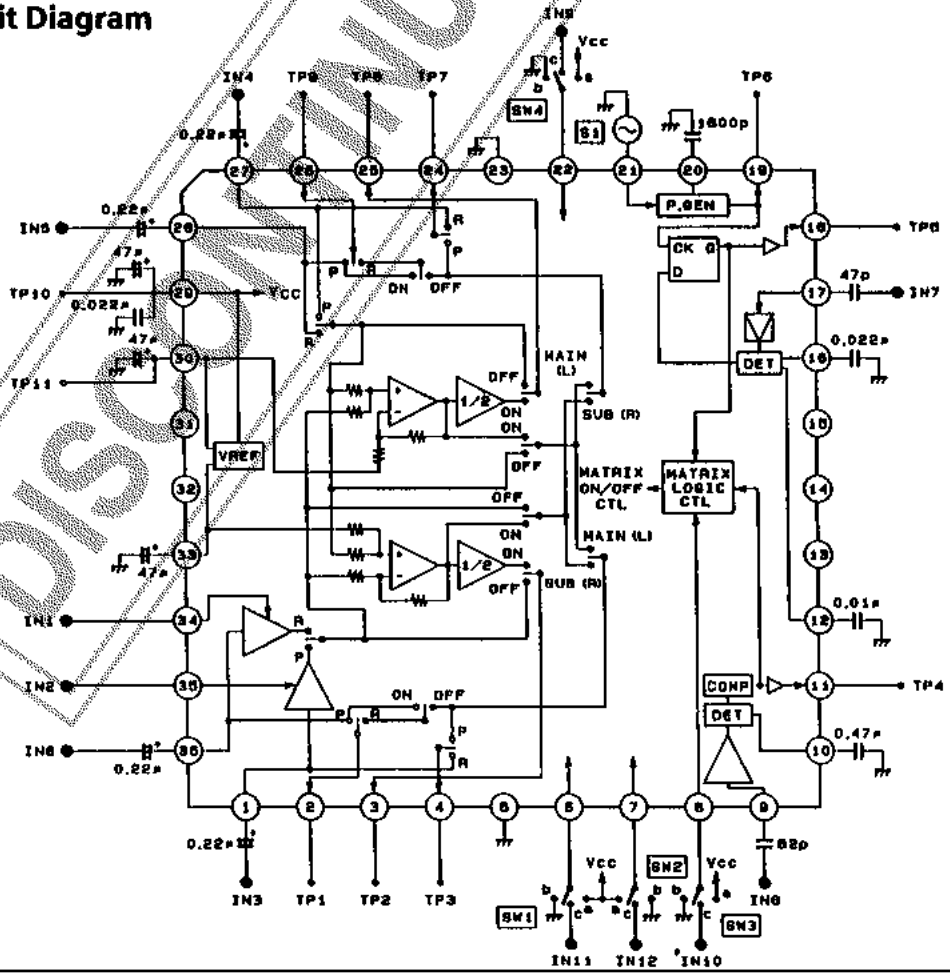
No.	Switch numbers				Input pins	Remarks
	SW1	SW2	SW3	SW4		
21	b	b	a	a	IN5	
22	b	b	a	a	IN3, 4	IN3 and IN4 : antiphase input
23	b	a	b	a	IN4	
24	b	a	b	a	IN4	
25	b	b	b	a	IN4	
26	b	b	a	b	IN6	
27	b	b	a	b	IN6	
28	b	b	a	b	IN6	
29	b	b	a	b	IN5, 6	IN5 and IN6 : inphase input
30	a	b	b	b	IN6	
31	a	b	b	b	IN6	
32	b	b	b	b	IN6	
33	b	b	b	b	IN6	
34	b	b	b	b	IN6	
35	b	b	a	a	IN3	
36	b	b	a	a	IN3	
37	b	b	a	a	IN6	
38	b	b	a	a	IN3, 4	IN3 and IN4 : inphase input
39	a	b	b	a	IN3	
40	a	b	b	a	IN3	
41	b	b	b	a	IN3	
42	b	b	b	b	IN6	DC voltage should be applied to the IN1 pin to allow the TP2 output to fluctuate in the ±3dB variable range.
43	b	b	b	a	IN3	DC voltage should be applied to the IN2 pin to allow the TP2 output to fluctuate in the ±3dB variable range.
44	b	b	b	a	IN8	Measure the IN8 input level that enables TP4 switching from 「H」 to 「L」.
45	b	b	b	a	IN8	
46	b	b	b	a	IN8	
47	b	b	b	a	IN7	Increase the IN7 pin voltage level from 0 until the TP5 output will reach the 「H」 level (150mV).
48	b	b	b	a	IN7	
49	b	b	b	a	IN7	
50	b	b	b	b		Measure the pulse width of the TP6 output signal.
51	b	b	b	b		Measure the TP6 「L」 level output.
52	b	b	b	b		Measure the TP6 「H」 level output.
53	a	b	b	c	IN5, 9	Increase the IN9 input voltage from 0 until the IN5 input will be output to the TP9.
54	a	b	b	c	IN5, 9	
55	a	b	c	b	IN5, 10	Increase the IN10 input voltage from 0 until the IN5 input will be output to the TP9.
56	a	b	c	b	IN5, 10	
57	c	b	b	a	IN4, 11	Increase the IN11 input voltage from 0 until the IN4 input will be output to the TP7.
58	c	b	b	a	IN4, 11	
59	b	c	b	a	IN3, 12	Increase the IN12 input voltage from 0 until the IN4 input will be output to the TP3.
60	b	c	b	a	IN3, 12	

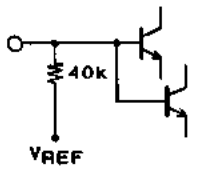
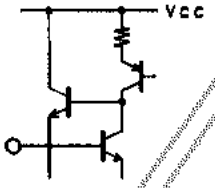
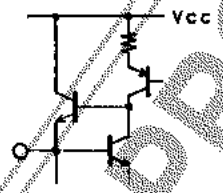
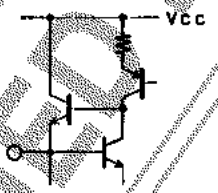
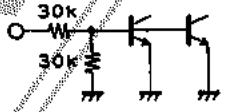
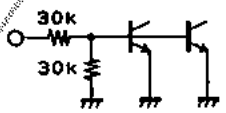
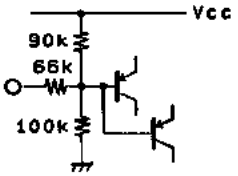
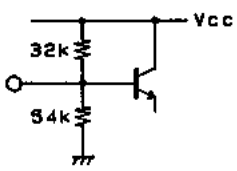
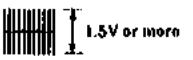
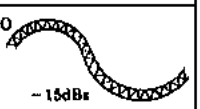
Block Diagram



Test Circuit Diagram



Pin I/O circuit type Unit (resistance : Ω)

Pin No.	Pin Name	Standard DC Voltage	Standard AC Voltage	I/O circuit type	Remarks	
1	OUTPUT MATRIX IN R	2.375V			Reference input – 15dBs	
2	INPUT MATRIX OUT 1R	2.375V	– 15dBs		At reference input mode	
3	INPUT MATRIX OUT 2R	2.375V	0V		At reference input mode	REC STEREO
			– 15dBs			Non-REC STEREO mode
4	OUTPUT MATRIX OUT R	2.375V	0V		At reference input mode	PB STEREO
			– 15dBs			Non-PB STEREO mode
5	GND					
6	SELECT 1				⌈ H ⌋ = Rch output ⌈ L ⌋ = Lch output	
7	SELECT 2				⌈ H ⌋ = Lch output ⌈ L ⌋ = Rch output	
8	MATRIX ON/OFF	2.5V			⌈ H ⌋ = MATRIX ON OPEN = PB auto detection ⌈ L ⌋ = MATRIX OFF	
9	MONO DET IN	3V			Reference input mode	MONO 
						STEREO 

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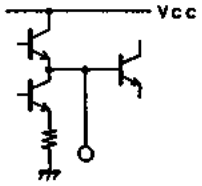
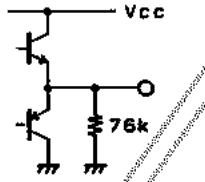
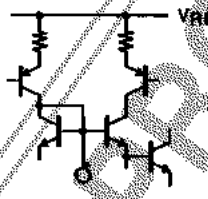
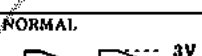
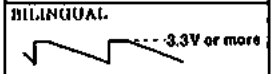
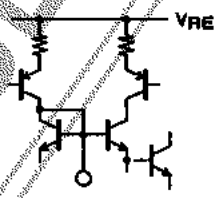
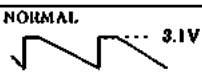
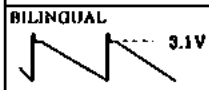
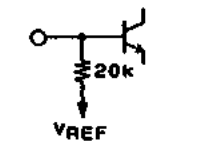
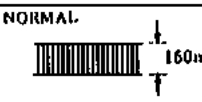
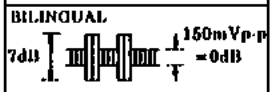
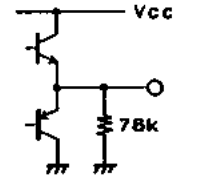
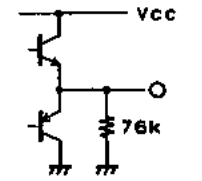
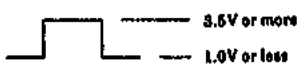
Unit (resistance : Ω)

Pin No.	Pin Name	Standard DC Voltage	Standard AC Voltage	I/O circuit type	Remarks	
10	MONO DET	2.2V or more			At reference input mode	MONO
		1.8V or less				STEREO
11	$\overline{\text{MONO}}$ OUT	1V or less			At reference input mode	MONO
		3.5V or more				STEREO
12	DET TC				At reference input mode	NORMAL 
						BILINGUAL 
13	NC					
14	NC					
15	NC					
16	REF TC				At reference input mode	NORMAL 
						BILINGUAL 
17	RF IN	2.375V			Reference input mode	NORMAL 
						BILINGUAL 
18	BIL OUT	1V or less			At reference input mode	NORMAL
		3.5V or more				BILINGUAL
19	GATE OUT					

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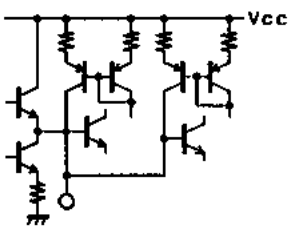
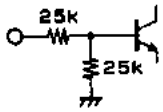
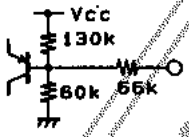
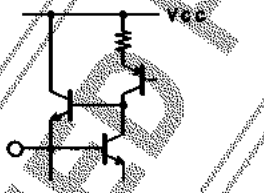
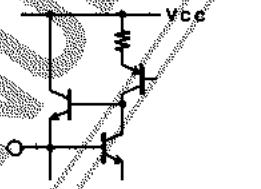
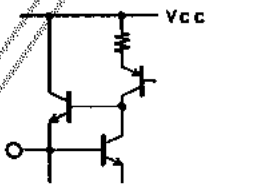
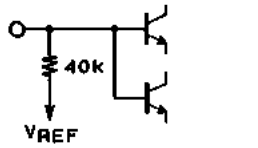
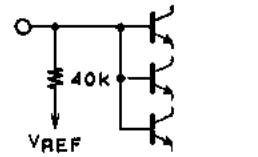
Unit (resistance : Ω)

Pin No.	Pin Name	Standard DC Voltage	Standard AC Voltage	I/O circuit type	Remarks
20	PC TC				
21	RF SW PULSE				
22	PB/REC	1.5V			「H」=PB OPEN/「L」=REC
23	GND				
24	OUTPUT MATRIX OUT L	2.375V	−9dB −15dBs		At reference input mode: PB STEREO; Non-PB STEREO mode
25	INPUT MATRIX OUT 2L	2.375V	−15dBs		At reference input mode
26	INPUT MATRIX OUT 1L	2.375V	−15dBs		At reference input mode
27	OUTPUT MATRIX IN L	2.375V			At reference input mode −15dBs
28	INPUT MATRIX IN L	2.375V			At reference input mode −15dBs
29	V_{CC}				
30	V_{REFL}	2.375V			
31	NC				

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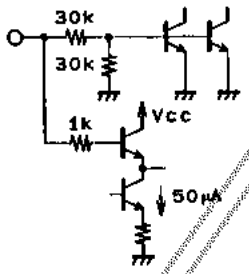
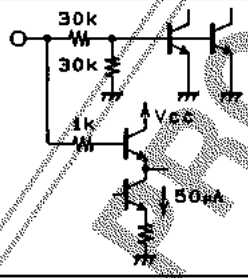
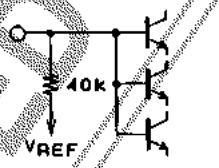
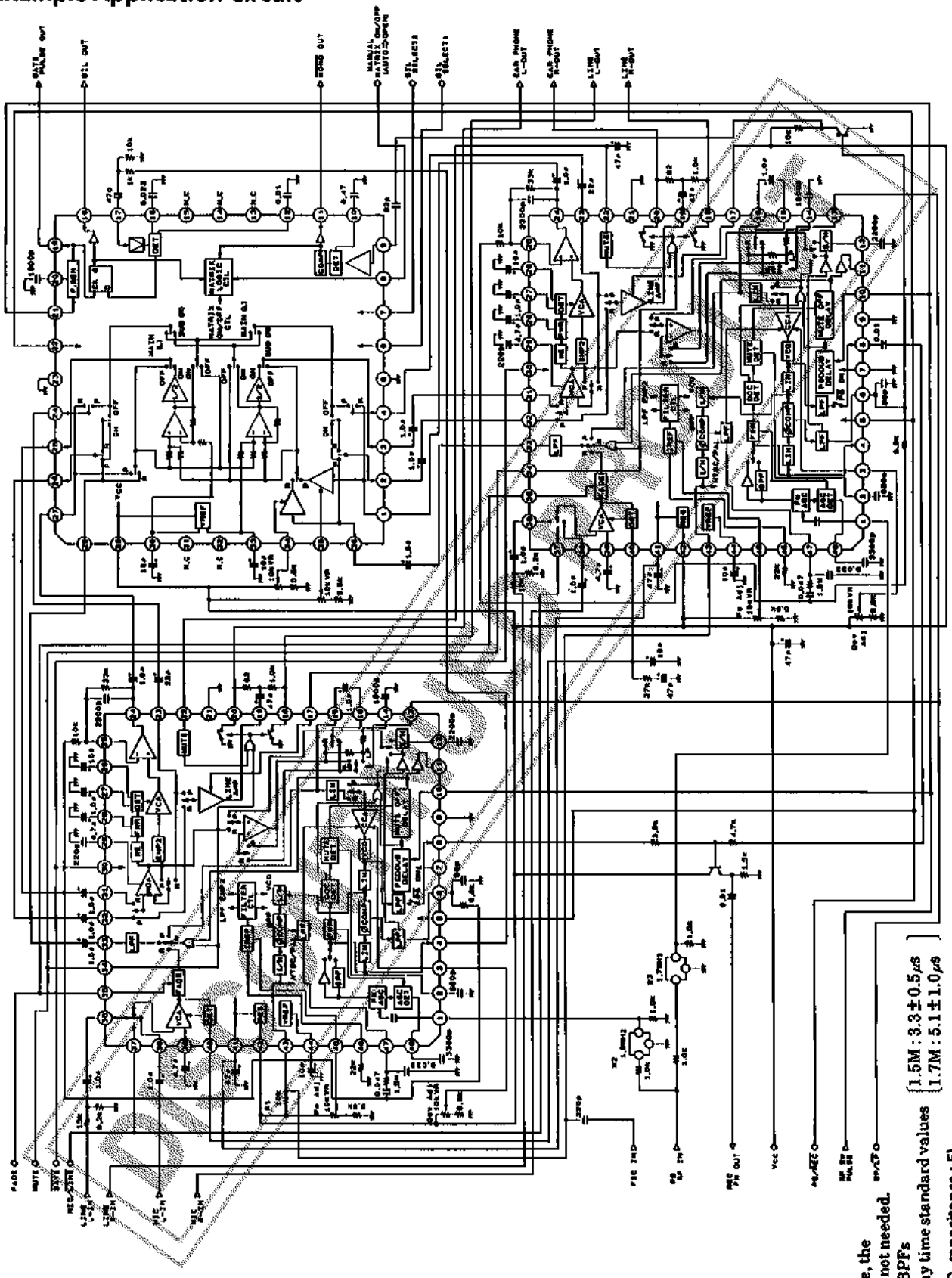
Unit (resistance : Ω)

Pin No.	Pin Name	Standard DC Voltage	Standard AC Voltage	I/O circuit type	Remarks
32	NC				
33	V_{REFR}	2.375V			
34	REC LEVEL ADJ				Input voltage 1.8V to V_{CC} : ±3dB variable 1V or less : through
35	PB LEVEL ADJ				Input voltage 1.8V to V_{CC} : ±3dB variable 1V or less : through
36	INPUT MATRIX IN R	2.375V			Reference input −15dBs

Example Application Circuit



*1 : In the PAL mode, the 10kΩ resistor is not needed.
*2 and *3 : 3-series BPFs
Delay time standard values {1.5M : 3.3±0.5μs / 1.7M : 5.1±1.0μs}
Unit (resistance : Ω, capacitance : F)