

9097247 TOSHIBA. ELECTRONIC

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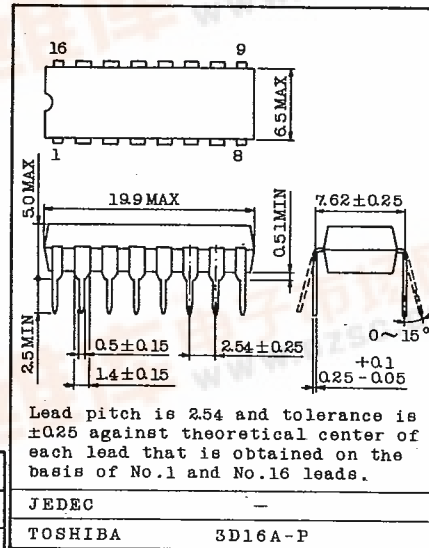
T-77-21

TA7738P

AMPLIFIER SYSTEM FOR CASSETTE TAPE RECORDER.

- . Recording Playback for Pre Amplifier
- . Buffer Amplifier (Recording Amplifier)
- . Power Amplifier
- . Maximum Output Power : $P_{OM}=2.0W$ (Typ.)
at $V_{CC}=9V$, $THD=10\%$, $R_L=4\Omega$, Attached P.C. Board
- . Low Distortion and Wide Dynamic Range
- . Without Turn-on "POP" for Muting Circuit
- . Operating Supply Voltage Range : $V_{CC}=3.5 \sim 9V$

Unit in mm

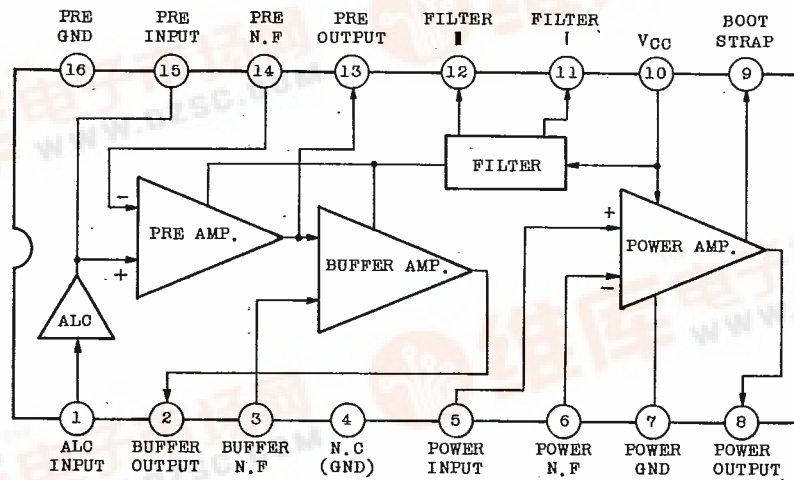


MAXIMUM RATINGS ($T_a=25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	14	V
Output Current	I_O (Peak)	1.5	A
Power Dissipation (Note)	P_D	1200	mW
Operating Temperature	T_{opr}	-20 ~ 75	$^\circ C$
Storage Temperature	T_{stg}	-55 ~ 150	$^\circ C$

Note : Derated above $T_a=25^\circ C$ in the proportion of 9.6mW/ $^\circ C$.

BLOCK DIAGRAM



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ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_{CC}=6V$, $f=1kHz$, $T_a=25^{\circ}C$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
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TOTAL

Quiescent Current	$I_{CCQ(1)}$	-	$V_{CC}=3.5V$	7.5	-	-	mA
	$I_{CCQ(2)}$	-	$V_{CC}=6V$	11	-	35	mA

PRE AMP.

Open Loop Voltage Gain	G_{V01}	-	-	55	70	-	dB
Closed Loop Voltage Gain	G_{V1}	-	-	-	40	-	dB
Maximum Output Voltage	V_{OUT1}	-	THD $\leq 1\%$	-	0.7	-	V_{rms}
Input Resistance	R_{IN1}	-	-	-	30	-	k Ω
Equivalent Input Noise Voltage	V_{NI}	-	$R_g=0$	-	1.4	2.5	μV_{rms}

PRE AMP.+BUFFER AMP.

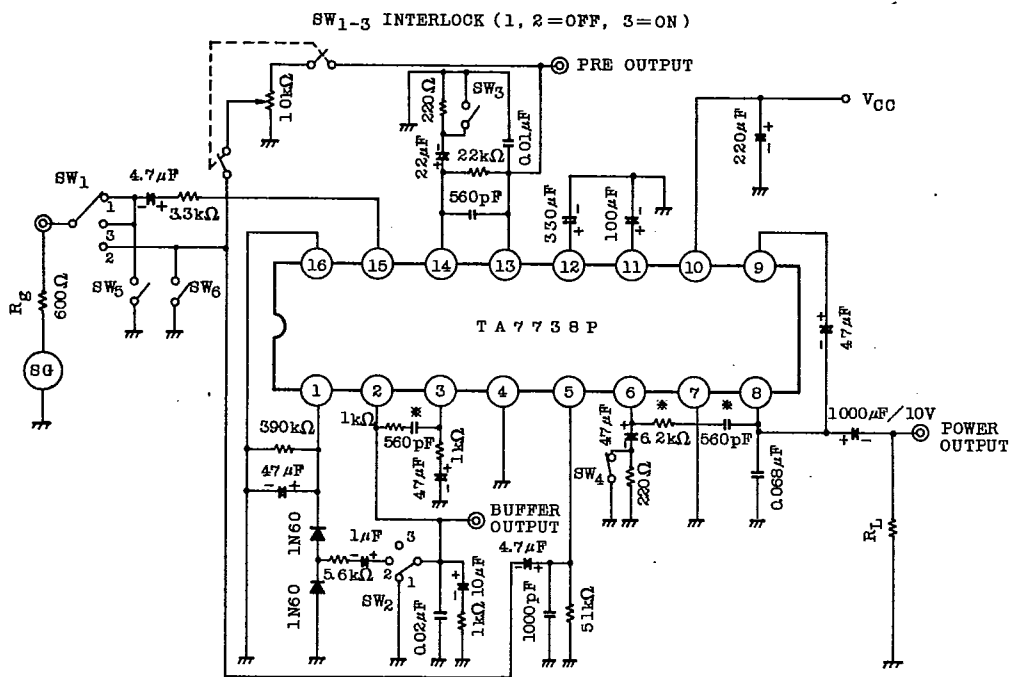
Closed Loop Voltage Gain	G_{V2}	-	PRE AMP. $G_V=40dB$ BUFFER AMP. $G_V=20dB$	-	60	-	dB
Maximum Output Voltage	V_{OUT2}	-	THD=3%	1.5	1.7	-	V_{rms}
Output Noise Voltage	V_{NO2}	-	$R_g=0$, $G_{V2}=60dB$	-	1.2	2.5	mV_{rms}
ALC Effect	ALC_1	-	$V_{IN}=-60dBm \sim -20dBm$	-	2	-	dB
ALC Range	ALC_2	-	RANGE OF THD $\leq 1\%$	-	60	-	dB

POWER AMP.

Open Loop Voltage Gain	G_{V03}	-	-	60	70	-	dB
Closed Loop Voltage Gain	G_{V3}	-	-	-	40	-	dB
Maximum Output Power	P_{OM}	-	$R_L=4\Omega$, THD=10%	0.8	0.96	-	W
			$V_{CC}=9V$, $R_L=4\Omega$, THD=10%	-	2.0	-	
Output Noise Voltage	V_{NO3}	-	$R_g=0$, $G_V=40dB$	-	0.3	1.0	mV_{rms}

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TEST CIRCUIT

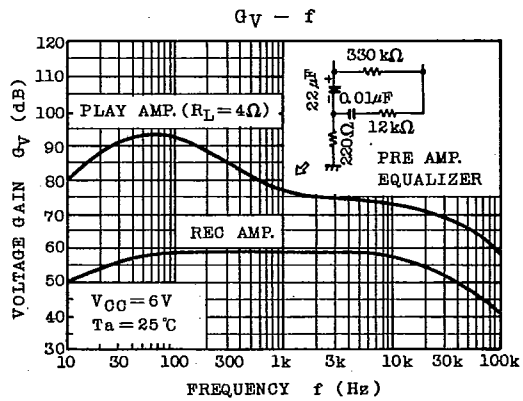
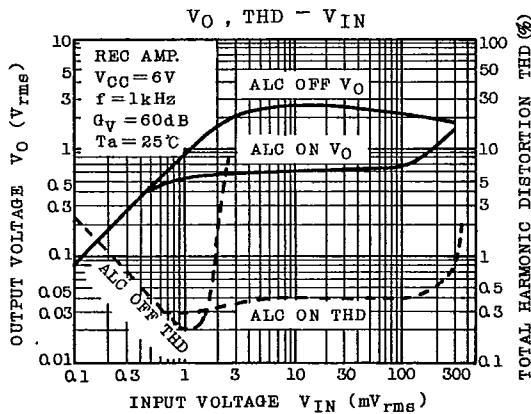
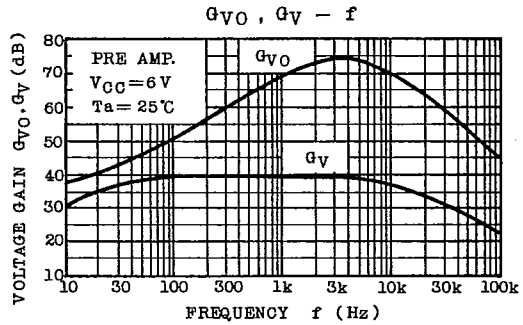
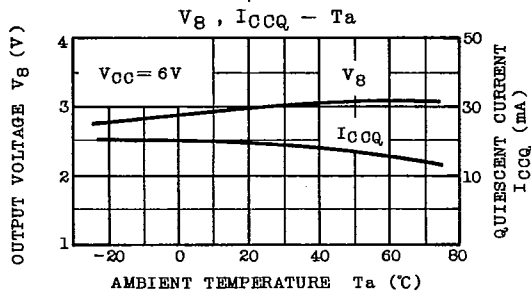
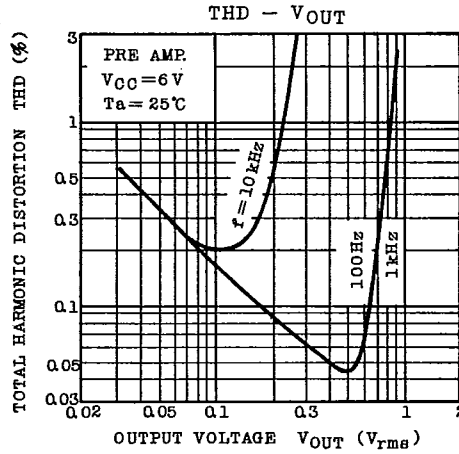
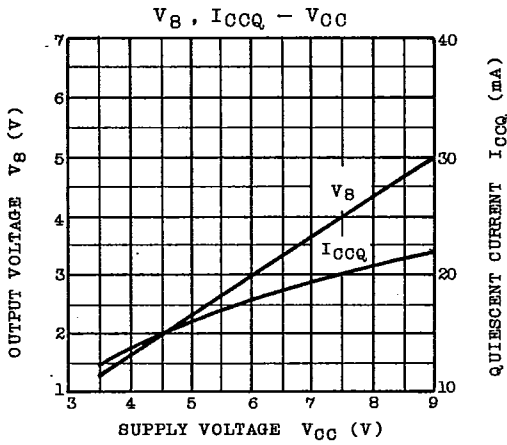


* Use in measuring the output noise voltage.

SWITCH OVER

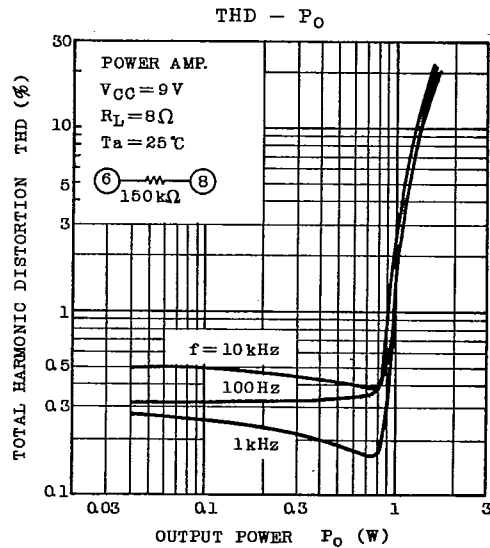
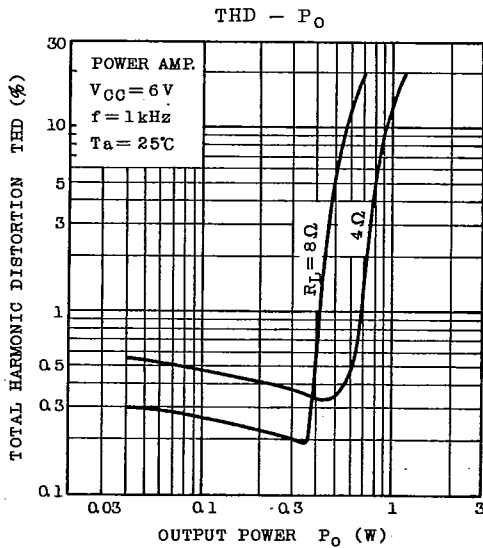
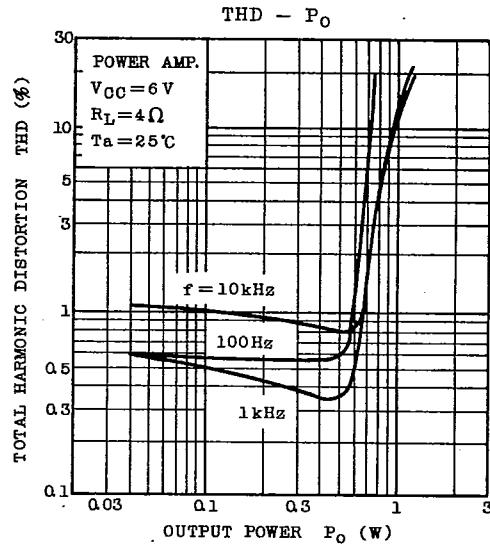
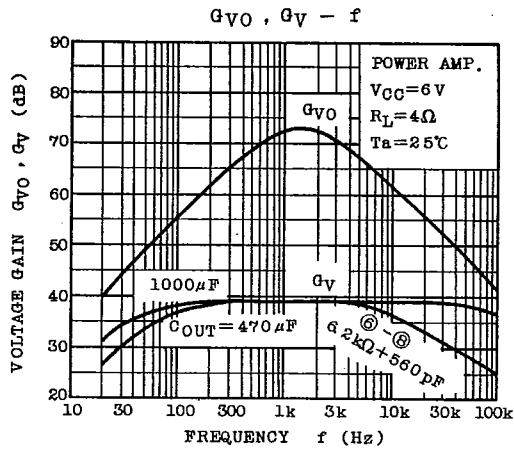
TEST ITEM	SW1	SW2	SW3	SW4	SW5	SW6
Gv01	1	1	ON	OFF	OFF	OFF
Gv1	1	1	OFF	OFF	OFF	OFF
VOUT1	1	1	OFF	OFF	OFF	OFF
Gv2	1	3	OFF	OFF	OFF	OFF
VOUT2	1	3	OFF	OFF	OFF	OFF
VNO2	1	3	OFF	OFF	ON	OFF
ALC	1	2	OFF	OFF	OFF	OFF
Gv03	2	1	OFF	ON	OFF	OFF
Gv3	2	1	OFF	OFF	OFF	OFF
Po	2	1	OFF	OFF	OFF	OFF
VNO3	2	1	OFF	OFF	OFF	ON

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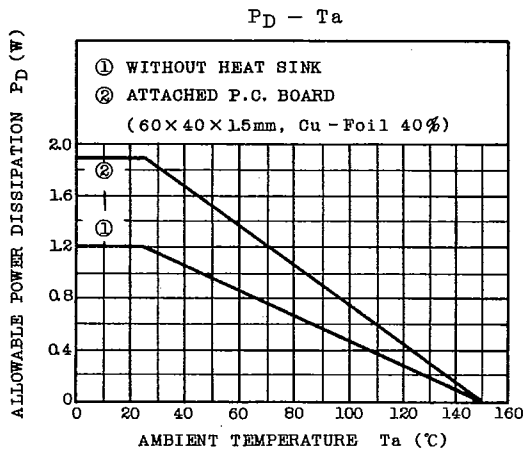
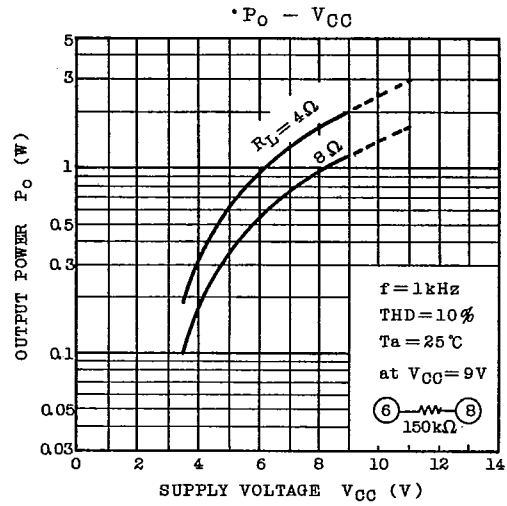
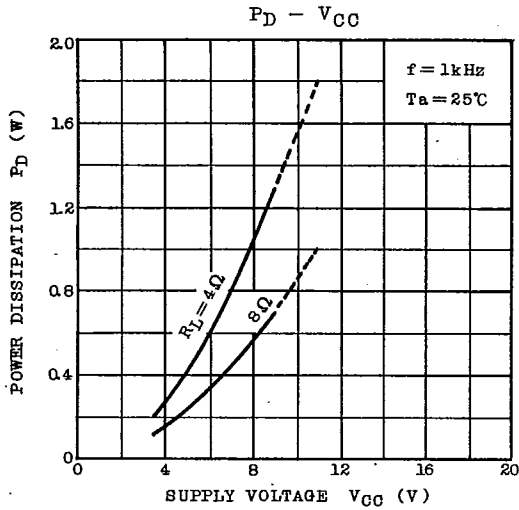


AUDIO LINEAR IC

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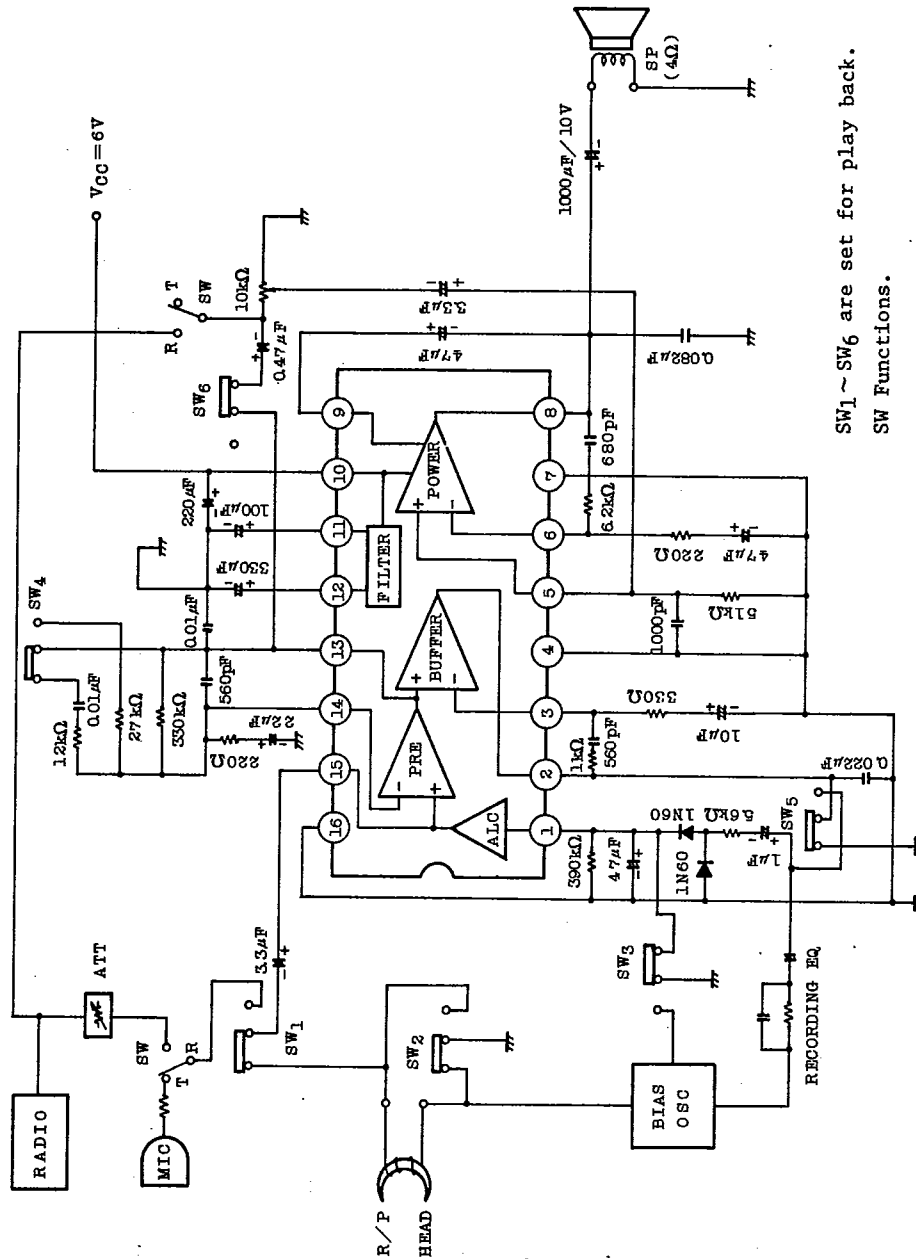


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APPLICATION CIRCUIT

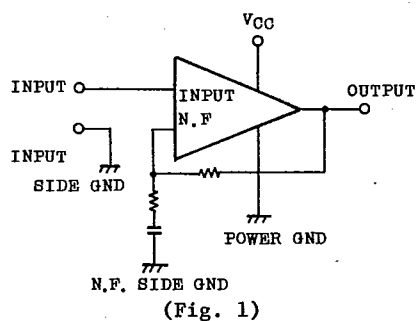


SW1 ~ SW6 are set for play back.
SW Functions.

TA7738P**PRECAUTION FOR USE****1. Precaution of GND Line**

The GND points of input side GND and N.F. side GND in each amplifier must be arranged at the preamplifier side. (Fig.1)

The input side GND point and the N.F. side GND point must be arranged near each other to have no impedance.

**2. About Radiation**

- 1) The capacitance between the output and GND in preamplifier, buffer amplifier and power amplifier must be arranged near to this IC. The radiation loop must be as small as possible.
- 2) The voltage gain of high frequency in each amplifier must be reduced to reduce the noise with high frequency component. (In the application circuit, the feed back capacitor is used).
A 1000pF or same order capacitor must be connected from the input terminal of preamplifier and power amplifier to GND to prevent the interference of radiation.
- 3) It is better for this IC to separate adequately from the antenna in the radio cassette tape recorder applications.
- 4) The electrolytic capacitance 100 μ F ~ 220 μ F between VCC and GND must be arranged near to this IC.

3. To Prevent the Oscillation

- 1) The output terminal of preamplifier must be terminated to GND by the capacitance more than 5600pF. (The recommended value : C=0.01 μ F)
- 2) The output terminal of buffer amplifier must be terminated to GND by the capacitance more than 0.01 μ F. (The recommended value : C=0.01 μ F)

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- 3) The output terminal of power amplifier must be terminated to GND by the good temperature characteristic capacitance of 1~2.2 μ F.
The bootstrap terminal must be terminated to GND with the capacitance more than 0.47 μ F.

4. Precaution of Preamplicifier

- 1) It is better that the coupling capacitor between the volume and the output of preamplicifier is small.

Recommended value : C=0.47 μ F

- 2) In recording mode, the signal source resistance must be more than 1k Ω for ALC (Automatic Level Control) operation. When this resistance is small, the ALC range becomes narrow.

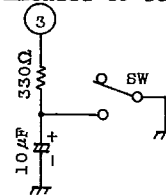
5. Buffer Amplifier

When the output signal is clipped in the buffer amplifier, this signal returns to preamplicifier and influences to make THD bad.

To prevent this, in playback mode, the buffer amplifier is recommended to be cut-off by terminating the output terminal to GND

directly or by terminating the feedback terminal to GND through 330 Ω or less than this shown in

Fig. 2.



(Fig. 2)

6. Power Amplifier

- 1) In case of the battery use ($V_{CC} \leq 6V$), this IC is happen to oscillate (blocking oscillation) when the impedance of power supply is high.

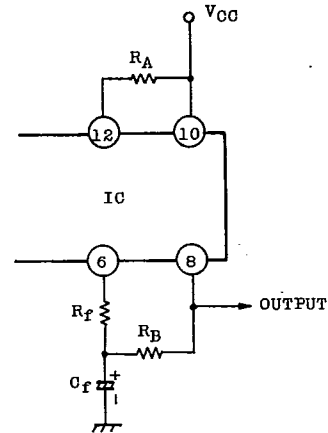
In this case, it is recommended to insert the resistance R_A of 500 Ω ~ 1k Ω between 10 pin and 12 pin (V_{CC} -Filter II). By this method, this IC becomes very stable. But the output DC voltage is not center by the influence of R_A . Then the output wave shape is not symmetrical clipping wave and the maximum output voltage is reduced. So we recommend to insert the other resistance R_B between 6 pin and 8 pin for compensating the output DC voltage.

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- 2) When you use the IC at the supply voltage of more than 6V, it is better to insert the resistance R_B for compensating output DC voltage. (Fig. 3)

The recommended value : $\begin{cases} R_B=220k\Omega & \text{at } V_{CC}=7.5V \\ R_B=150k\Omega & \text{at } V_{CC}=9V \end{cases}$

- 3) The output coupling capacitance and bootstrap capacitance is better to be large because of getting the maximum output power.
- 4) On the PC board, the interval between V_{CC} and GND is better to be large.



(Fig. 3)