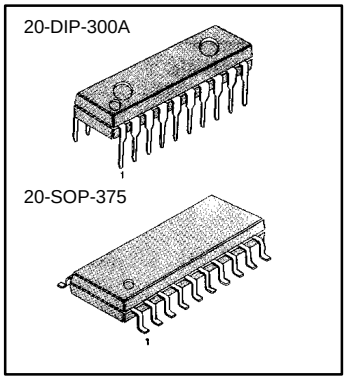
INTRODUCTION

The KA9270 is a monolithic integrated circuit designed for audio filter. It is used in compact disc player, digital audio tape recorder, etc.



FEATURES

- Functions: * Buffer for impedence matching
  * Low pass filter
  * De - emphasis control
  * Mute control
  * Reference voltage circuit (1/2 V_{CC} AMP)
- Gain adjustable of audio output
- Minimum number of external parts required
- Recommand operation supply voltage range : 5.0 ~ 12.0V

Device	Package	Operating Temperature
KA9270	20-DIP-300A	20°C ~ +75°C
KA9270D	20-SOP- 375	

BLOCK DIAGRAM

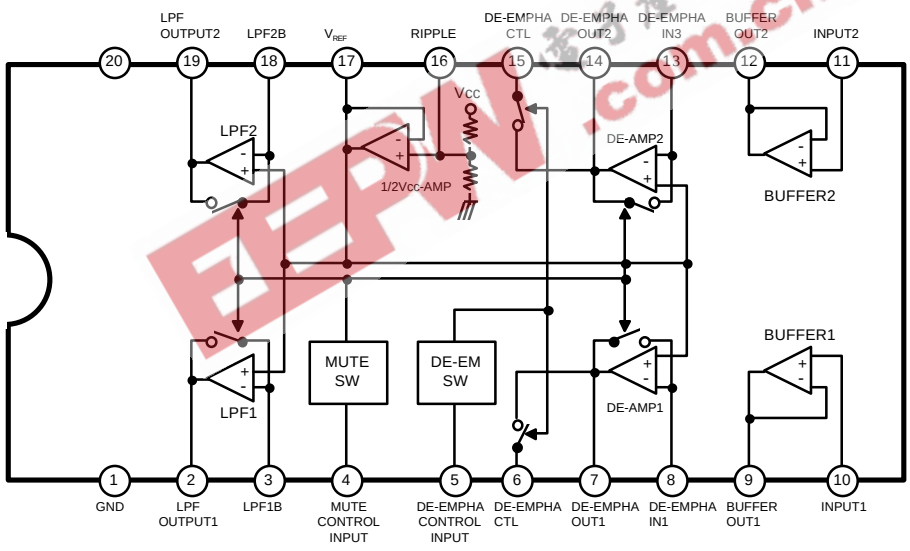


Fig. 1

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	16	V
Power Dissipation	P_D	550	μW
Operating Temperature	T_{OPR}	-20 ~ + 75	°C
Storage Temperature	T_{STG}	-45 ~ + 150	°C

ELECTRICAL CHARACTERISTICS

(Ta = 25°C, V_{CC} = 8V, f = 1KHz, R_L = 10KΩ, De-emphasis; off, Mute; off, S1 & S2; off, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Quiescent Circuit Current	I_{CC}	V_I = 0		1	4	6	mA
Maximum Output Voltage	V_{OM}	THD = 1%		1.8	2.1		Vrms
Total Harmonic Distortion	THD	V_O = 0dBm	f = 100Hz		0.01	0.05	%
			f = 1KHz		0.01	0.05	
			f = 10KHz		0.05	0.1	
			f = 16KHz		0.1	0.2	
			f = 20KHz		0.1	0.2	
Frequency Characteristics	fv	V_O = 6dBm	f = 100Hz	-0.1	0	0.1	dB
			f = 1KHz	0	0	0	
			f = 10KHz	-0.5	0	0.5	
			f = 16KHz	-1.0	0	1.0	
			f = 20KHz	-1.5	0	1.5	
Cross Talk	CT	V_O = 0dBm	f = 100Hz	70	80		dB
			f = 1KHz	65	75		
			f = 10KHz	60	65		
Signal to Noise Ratio	S/N	V_O = 0dBm, R_G = 600Ω 20KHz LPF		73	80		dB
Channel Balance	CB	V_O = 0dBm		-1.0	0	1.0	dB
Open Loop Gain	G_{VO}	V_I = 900mVrms		-2.6	-0.6	1.0	dB
Gain Adjusting Range	G_{VR}	V_I = 900mV, S1, S2; ON		4.5	6		dB
Mute Attenuation Ratio	ATT_{MUTE}	V_I = 900mV, Mute SW; ON		40	50		dB
De-emphasis	DE_{EMPH}	De-emphasis: ON	f = 1KHz	-0.87	-0.37	0.13	dB
			f = 5KHz	-6.03	-4.53	-3.03	
			f = 16KHz	-10.53	-9.03	-7.53	

* Note: De-emphasis input conditions: V_O = 0dBm
De-emphasis off position

TEST CIRCUIT

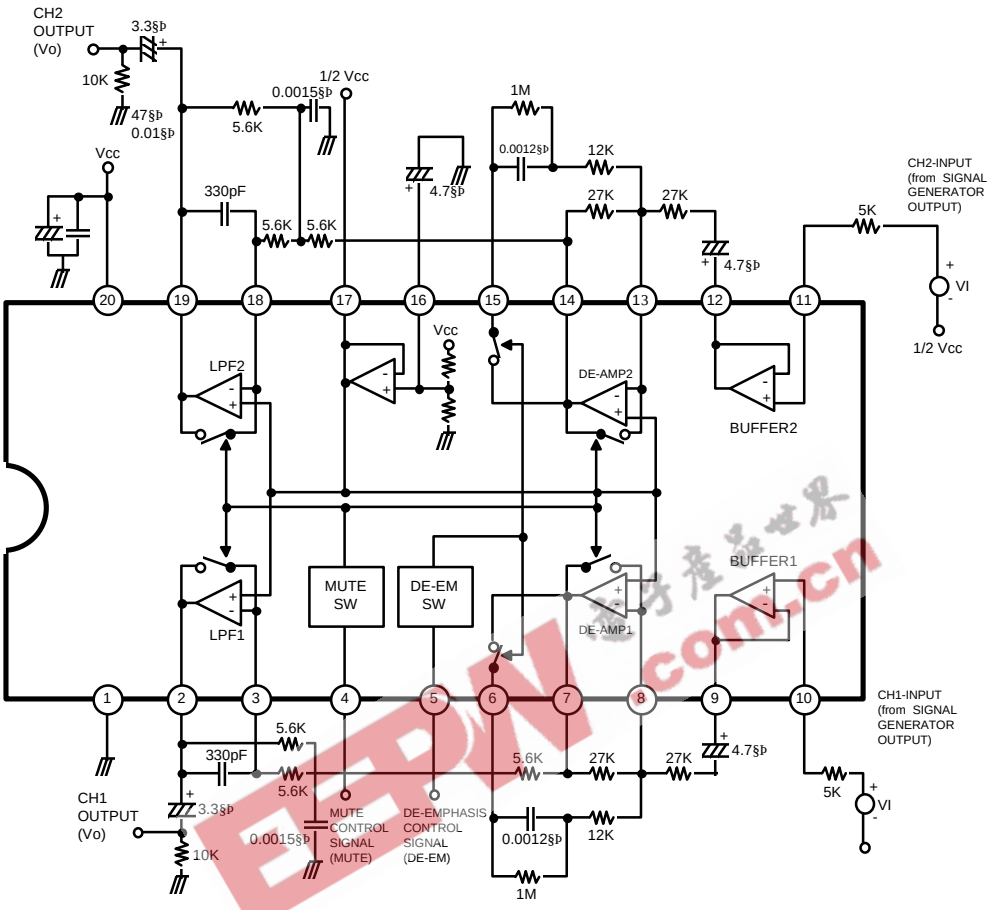


Fig. 2

APPLICATION INFORMATION

1. BUFFER

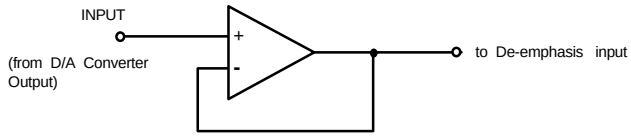


Fig. 3

It is used for impedance matching, between D/A converter output and de-emphasis input.

2. DE-EMPHASIS

a) De-emphasis operation condition

Control Input	De-emphasis Operation
High	ON
Low	OFF

b) De-emphasis characteristic at the de-emphasis ON

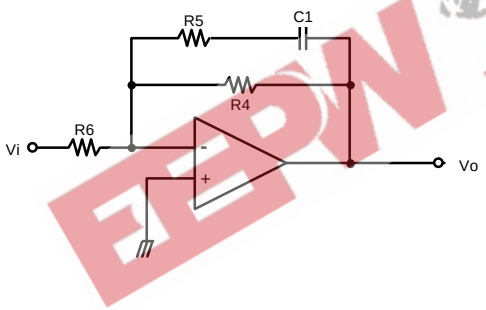


Fig. 4 Equevalent Circuit of De-emphasis ON Mode

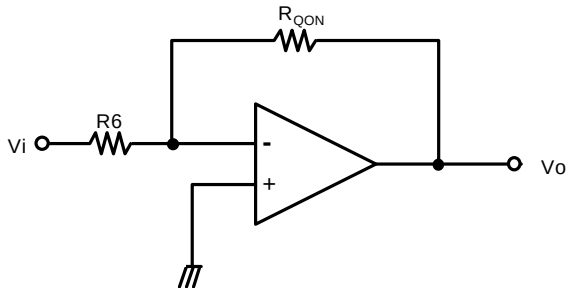
$Av \fallingdotseq R_4 / R_6$

$T1 = C1 (R_4 + R_5)$

$T2 = C_1 \times R_5$

The de-emphasis charcteristics is dependent on the external parts value.

3. MUTE



* Where:
R_{QON} = internal TR ON resistance

Fig. 5 Equivalent Circuit of Mute Switch ON Mode

Mute attenuation [M (att)] ratio is as follow;

$$M(att) = 20 \log \frac{V_O}{V_I}$$

$$= 20 \log \frac{R_{QON}}{R_6} \text{ (dB)}$$

4. LOW PASS FILTER

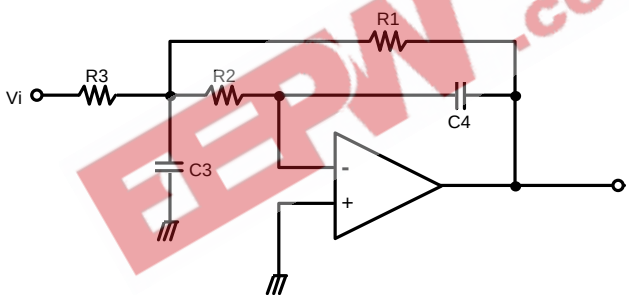


Fig. 6 Equivalent Circuit of LPF

Cut off frequency (F_C) is as follow:

$$f_C = \frac{1}{2\pi\sqrt{R_2 R_1 C_3 C_4}} \text{ (Hz)}$$

APPLICATION CIRCUIT

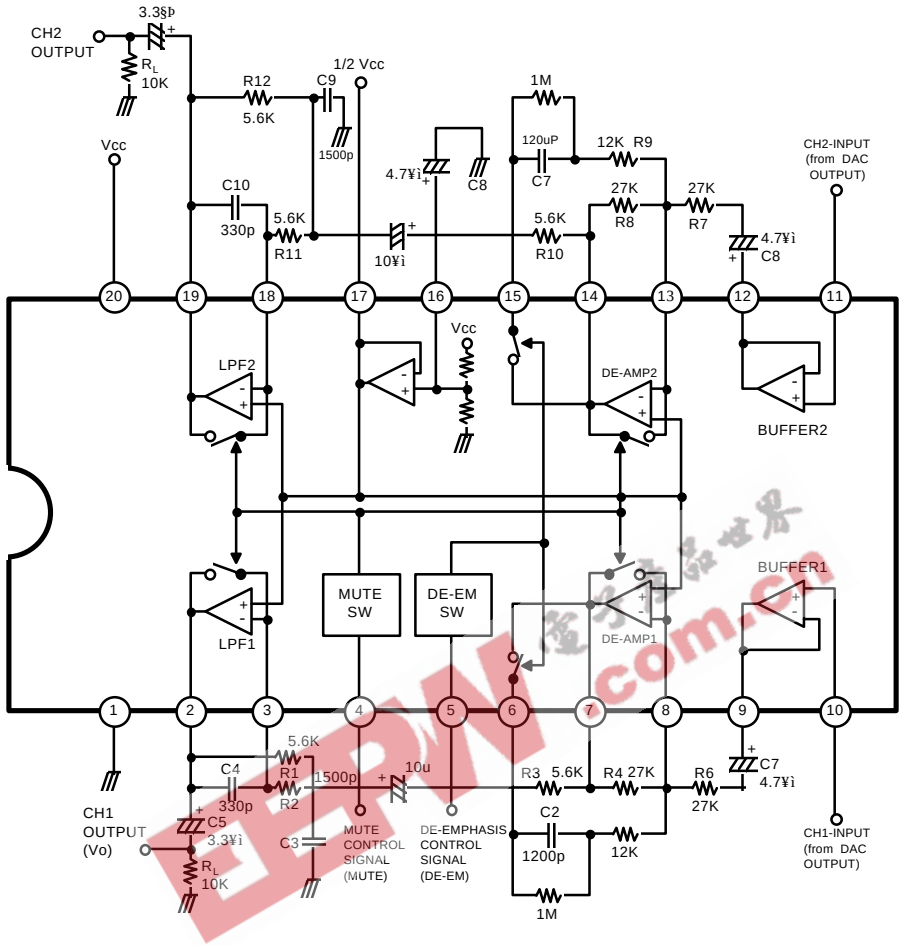
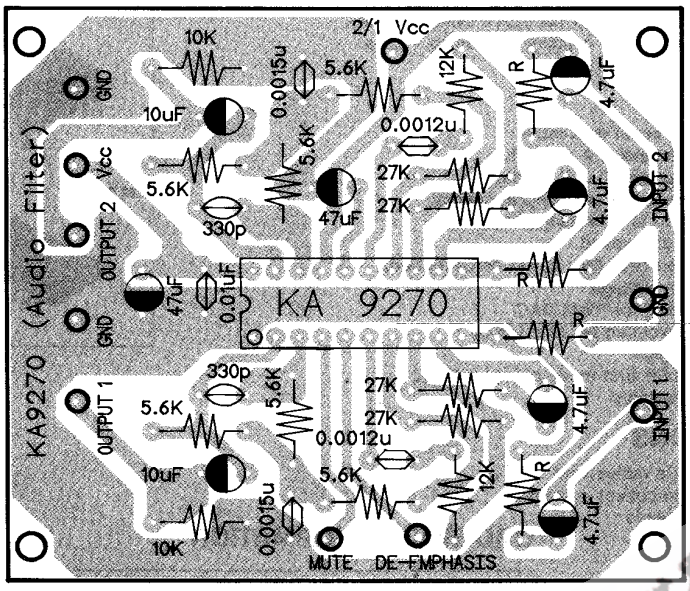


Fig. 7



(PCB PATTERN)