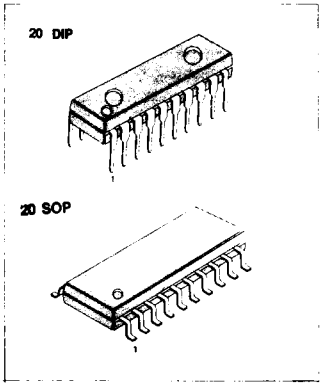
DUAL CHANNEL AUDIO FILTER FOR CDP

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 impedance matching
  *Low pass filter
  *De-emphasis control
  *Mute control
  *Reference voltage circuit (½ V_{CC} AMP)
- Gain adjustable of audio output
- Minimum number of external parts required
- Recommend operation supply voltage range: 5.0 ~ 12.0V
- Package type: 20 DIP

ORDERING INFORMATION

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

BLOCK DIAGRAM

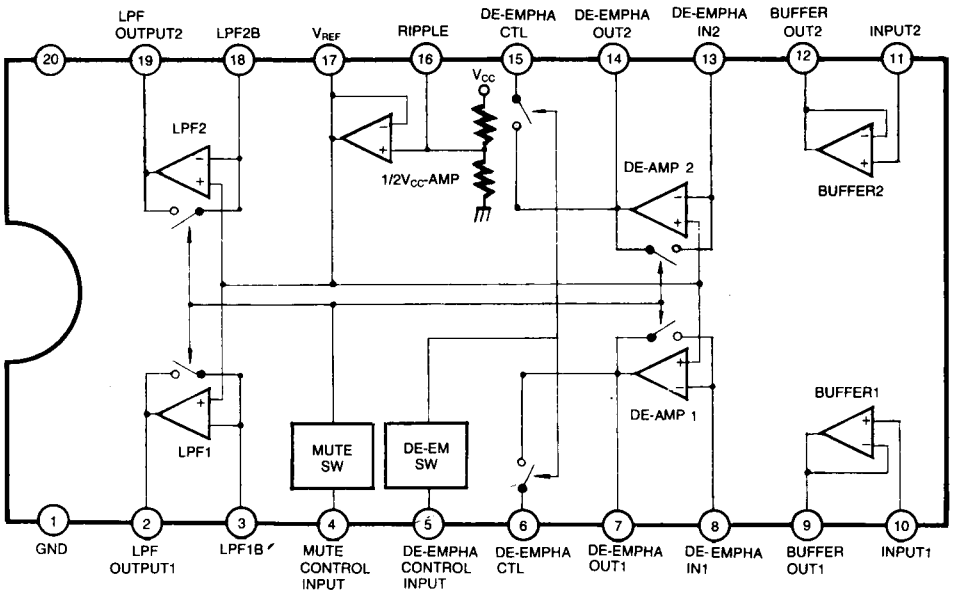


Fig. 1

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	f_V	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 = 120KHz	−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 = 1K	−0.87	−0.37	0.13	dB
			f = 5K	−6.03	−4.53	−3.03	
			f = 16K	−10.53	−9.03	−7.53	

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

TEST CIRCUIT

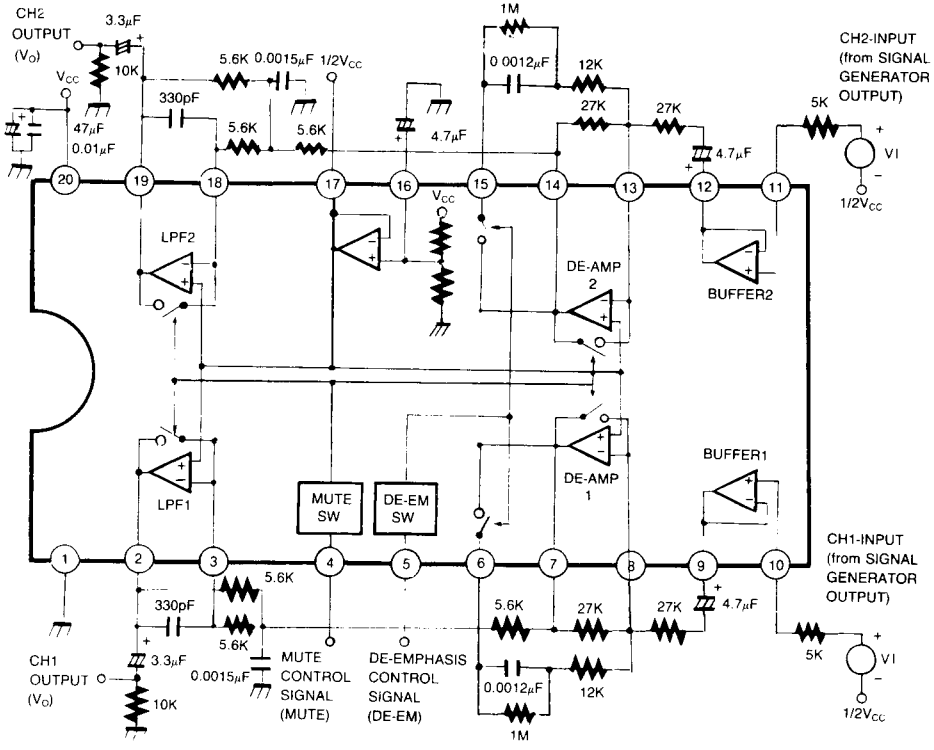


Fig. 2

APPLICATION INFORMATION

1. BUFFER

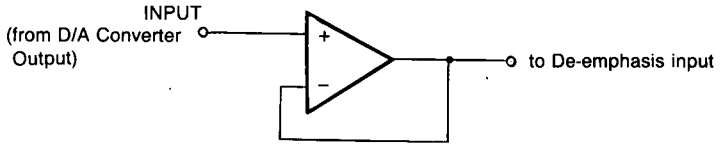


Fig. 3

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

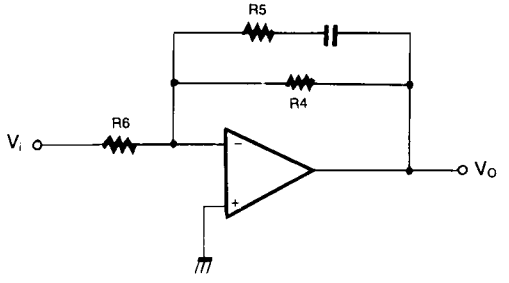


Fig. 4 Equivalent Circuit of De-emphasis ON Mode

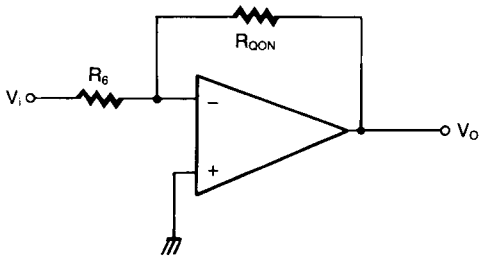
$Av \fallingdotseq R_4 / R_6$

$T_1 = C_1 (R_4 + R_5)$

$T_2 = C_1 \cdot R_5$

The de-emphasis characteristics 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;

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

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

4. LOW PASS FILTER

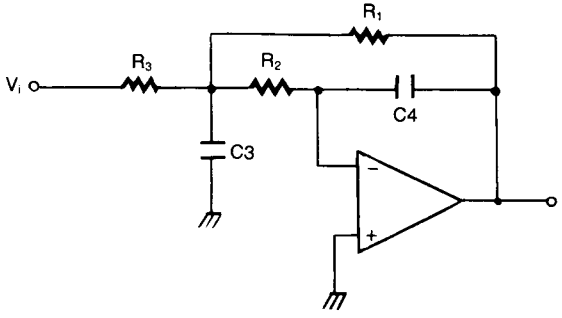


Fig. 6 Equivalent Circuit of LPF

Cutt off frequency (F_C) is as follow:

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

APPLICATION CIRCUIT

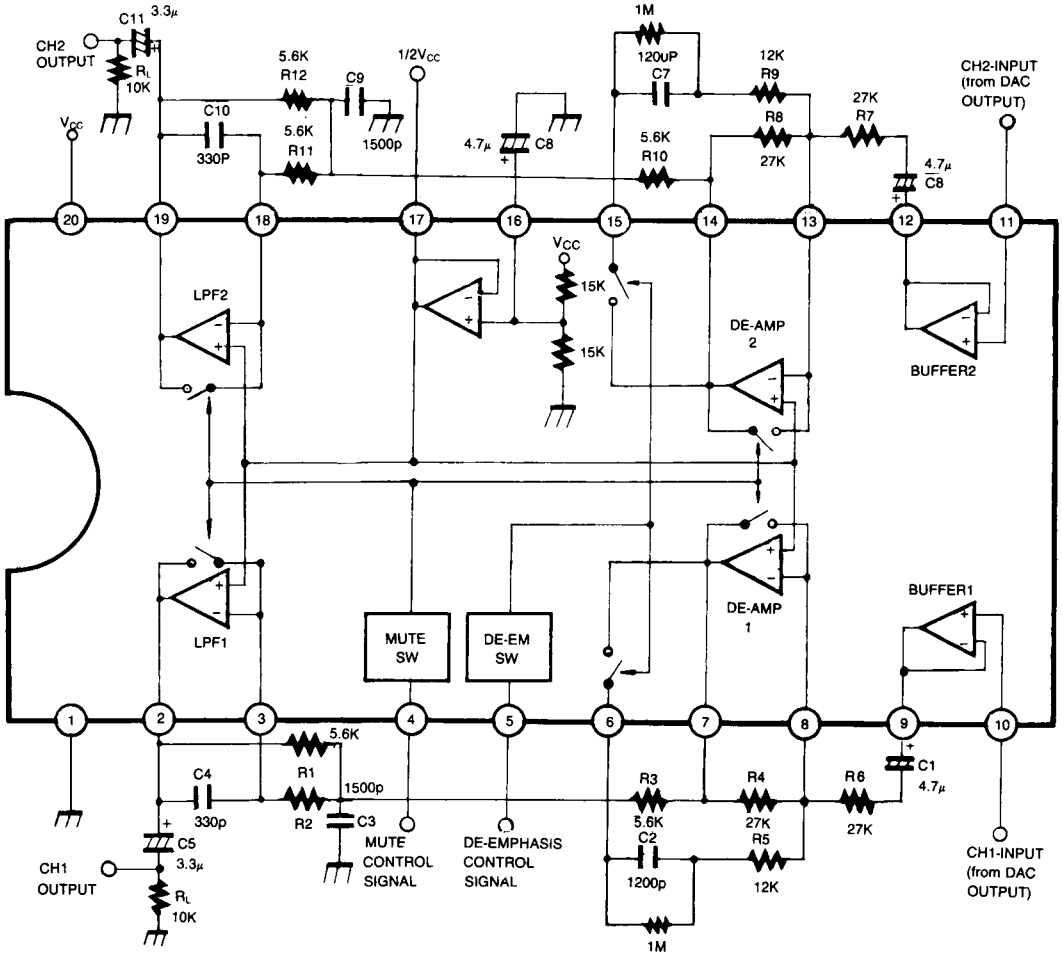
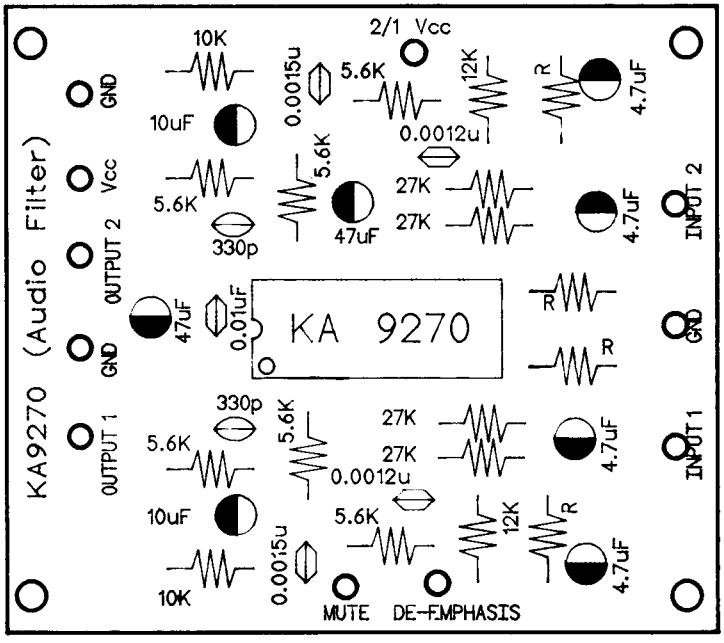


Fig. 7


KA9270 (Audio Filter)
GND
Vcc
OUTPUT 2
GND
OUTPUT 1
INPUT 2
GND
INPUT 1
MUTE
DE-EMPHASIS
KA 9270
2/1 Vcc
10K
10uF
5.6K
330p
47uF
0.01uF
0.0015u
0.0012u
12K
R
4.7uF
27K
27K
10K

(PCB PATTERN)