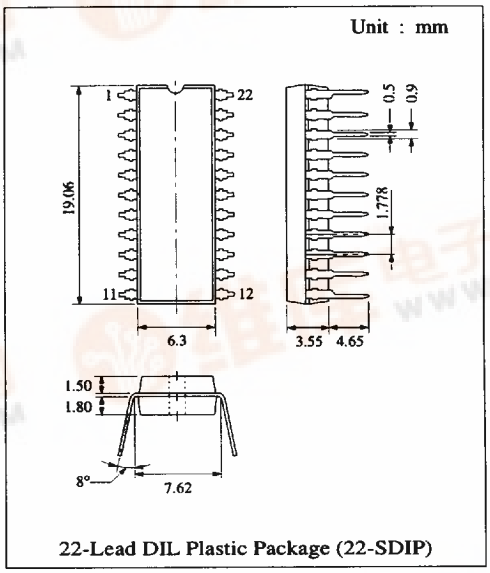
AN7338K

Preset IC For Portable Cassette Recorder

■ Description

The AN7338K is a monolithic IC developed for portable cassette recorder. It is placed in the stage between pre-amplifier and power amplifier and is operating as a preset graphic equaliser with 5 preset modes : Rock, Pops, Flat, Classic and Jazz. The boosting frequencies are 100Hz and 7kHz. There is a built-in LED indicator for every mode and FLAT will be the initial mode when power up.

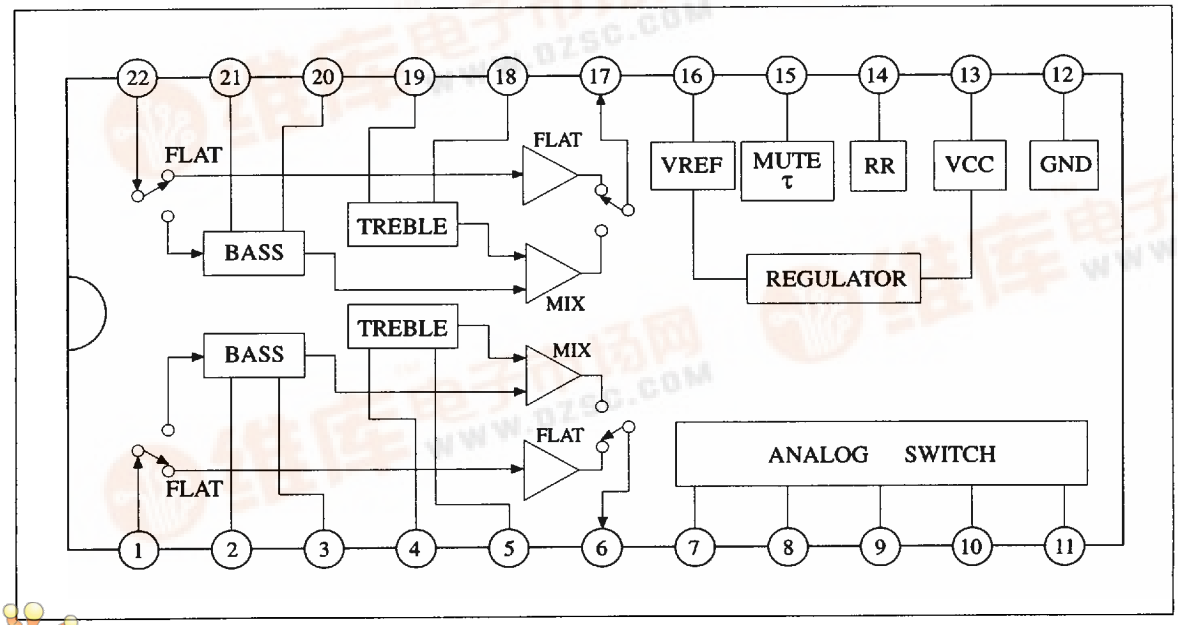


22-Lead DIL Plastic Package (22-SDIP)

■ Features

- Few external components.
- Selection modes : Rock, Pops, Flat, Classic and Jazz.
- Built-in switches can be controlled by microprocessor.
- Internal LED driver indicator for every mode.

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	14	V
Supply Current	I_{CC}	50	mA
Power Dissipation	P_D	700	mW
Operating Ambient Temperature	Topr	-25 ~ +75	°C
Storage Temperature	Tstg	-55 ~ +150	°C

Operating Supply Voltage Range: V_{CC} = 3.6V ~ 12.0V

■ Electrical Characteristics (V_{CC}=6V, f=1kHz, Flat mode*1:Switch E is ON, Ta=25°C)

Item	Symbol	Condition	min.	typ.	max.	Unit
Quiescent Current	Icq1	No input	10.5	15.0	19.5	mA
Channel Balance	CB	VinL = 0.1V, VinR = 0.1V	-1	0	1	dB
Reference Voltage	Vref	No input	2.4	3.4	4.3	V
Ripple Rejection	RR	Vr= 0.1V, fr = 100Hz	35	40		dB
Channel Separation	CS	Vin=0.1V, Measure Vout	35	40		dB
Output Noise *2	Vno	Vin = 0V, Rg = 2.2kΩ		10	20	μV
THD (1 kHz) *2	THD1	Vin = 0.1V		0.1	0.3	%
Gain (100 Hz)	Gv1	Vin = 0.1V	-2.0	-0.5	2.0	dB
Gain (7 kHz)	Gv2	Vin = 0.1V	-2.0	0.5	2.0	dB
Vo,max	Vom	THD = 1%, RL = 10kΩ	0.6	1.0	1.4	Vrms
Channel (**Classic**)		Switch A is ON				
Quiescent Current	Icq2	No input	11.5	16.0	20.5	mA
Gain (100 Hz)	Gv3	Vin = 0.1V	2	4	6	dB
Gain (7 kHz)	Gv4	Vin = 0.1V	2	4	6	dB
Channel (**Rock**)		Switch B is ON				
Quiescent Current	Icq3	No input	10.5	14.5	19.0	mA
Gain (100 Hz)	Gv5	Vin = 0.1V	6	8	10	dB
Gain (7 kHz)	Gv6	Vin = 0.1V	6	8	10	dB
Channel (**Jazz**)		Switch C is ON				
Quiescent Current	Icq4	No input	10.5	14.5	19.0	mA
Gain (100 Hz)	Gv7	Vin = 0.1V	6	8	10	dB
Gain (7 kHz)	Gv8	Vin = 0.1V	2	4	6	dB
Channel (**Pops**)		Switch D is ON				
Quiescent Current	Icq5	No input	10.5	14.5	19.5	mA
Gain (100 Hz)	Gv9	Vin = 0.1V	2	4	6	dB
Gain (7 kHz)	Gv10	Vin = 0.1V	6	8	10	dB

*1 Switch E, as shown in Test Circuit, is ON.
*2 DIN AUDIO filter used.

■ Electrical Characteristics (Continue) (V_{CC}=6V, f=1kHz, Flat mode*1:Switch E is ON, Ta=25°C)

Item	Symbol	Condition	min.	typ.	max.	Unit
Channel (**Classic**)		Switch A is ON				
THD (1 kHz) *2	THD2	Vin = 0.1V		0.25	0.3	%
Channel (**Rock**)		Switch B is ON				
THD (1 kHz) *2	THD3	Vin = 0.1V		0.25	0.3	%
Channel (**Jazz**)		Switch C is ON				
THD (1 kHz) *2	THD4	Vin = 0.1V		0.25	0.3	%
Channel (**Pops**)		Switch D is ON				
THD (1 kHz) *2	THD5	Vin = 0.1V		0.25	0.3	%

*1 Switch E, as shown in Test Circuit, is ON.
*2 DIN AUDIO filter used.

Test Circuit

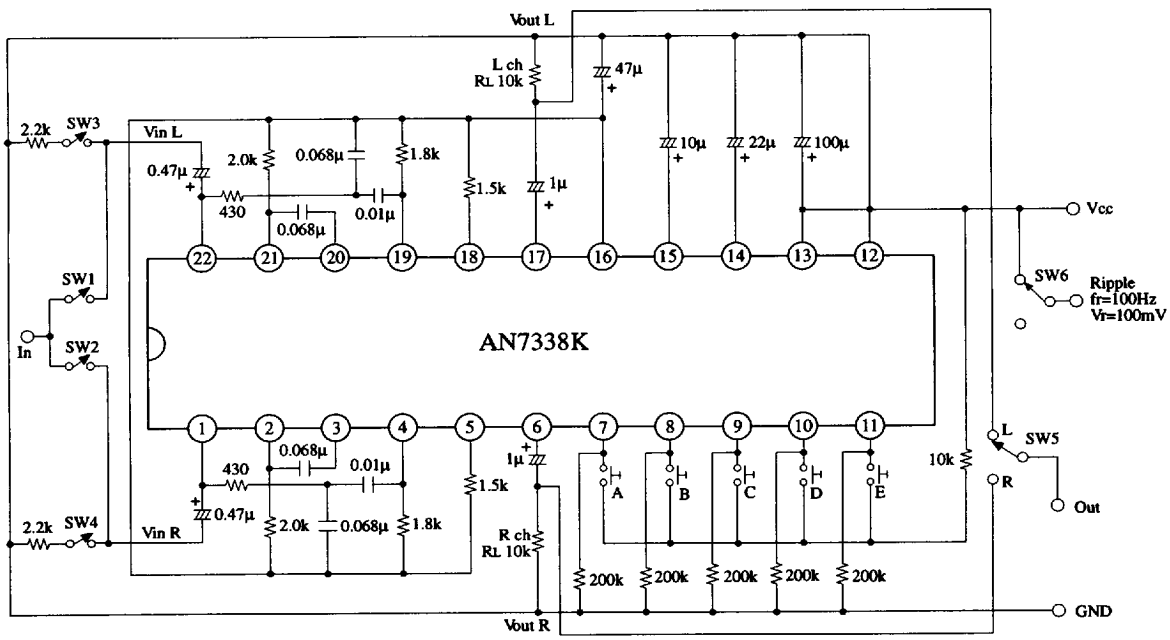
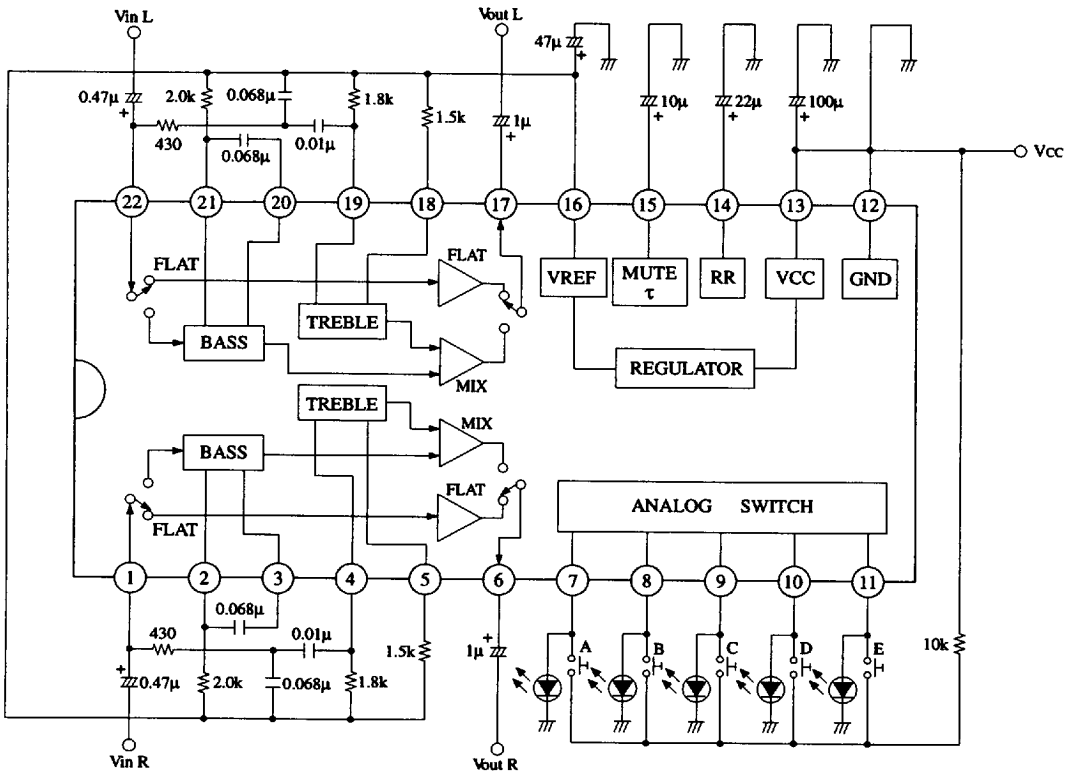


Table 1

Mode	Switch	Pin No.
Classic	A	7
Rock	B	8
Jazz	C	9
Pops	D	10
Flat	E	11

* Individual mode can be activated by pressing the respective switch as shown in Table 1.

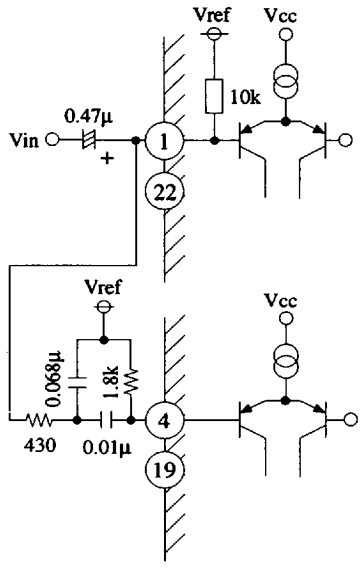
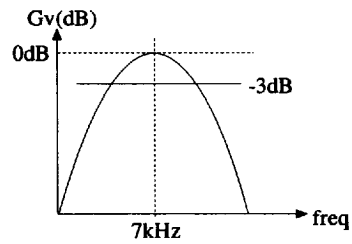
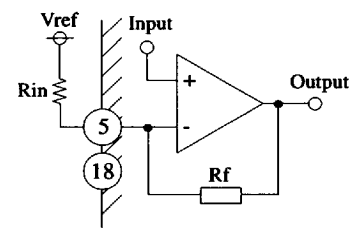
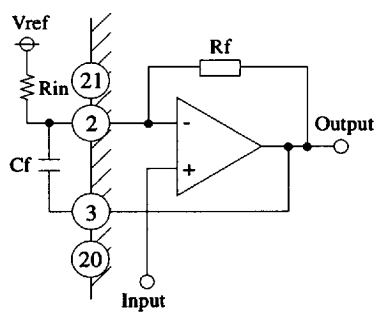
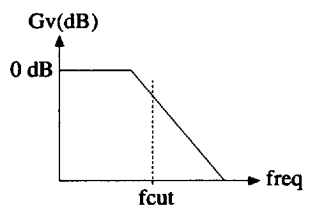
■ Application Circuit



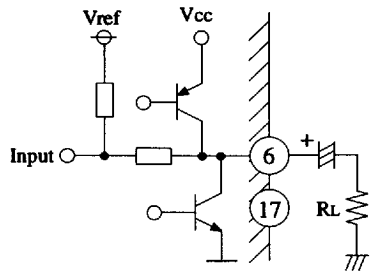
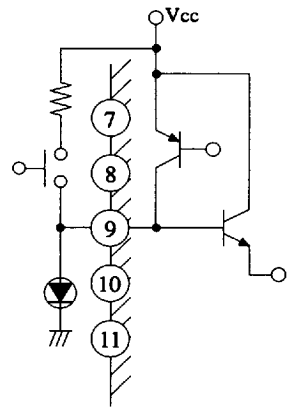
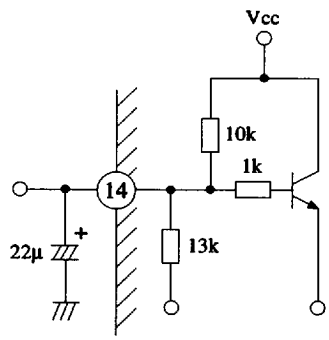
■ Pin

Pin No	Pin Name	Pin No	Pin Name
1	R-Ch Input	12	GND
2	R-Ch Negative Feedback 1	13	Vcc
3	R-Ch Bass	14	Ripple Rejection
4	R-Ch Treble	15	Mute τ
5	R-Ch Negative Feedback 2	16	Reference Voltage
6	R-Ch Output	17	L-Ch output
7	Classic	18	L-Ch Negative Feedback 2
8	Rock	19	L-Ch Treble
9	Jazz	20	L-Ch Bass
10	Pops	21	L-Ch Negative Feedback 1
11	Flat	22	L-Ch Input

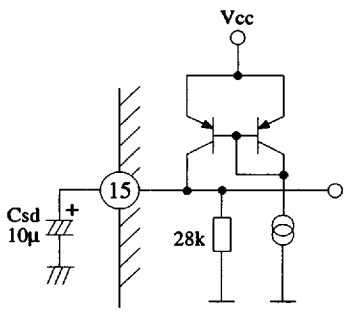
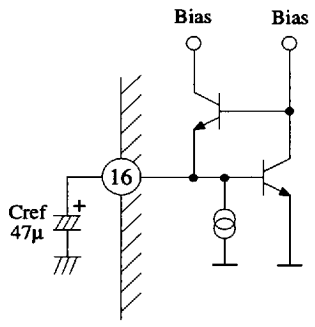
■ Pin Descriptions

Pin No.	Pin Name	DC Bias Voltage	Equivalent Circuit	Description
1, 22	Bass Input for CH 1 & CH 2	3.40		These are the inputs to the IC. These inputs can be from PRE or VOL. block, through a 0.47µF cap. I/P impedance ≈ 5.8kΩ
4, 19	Treble Input for CH 1 & CH 2	3.40		The output signal of previous stage will go through a filtering network before input to this pin. Impedance ≈ decided by the filter network. NB : Peak frequency can be changed by varying capacitor value. 
5, 18	Negative Feedback pin for Treble	3.40		Gv can be changed by varying Rin externally.
2, 21 3, 20	Negative Feedback pin & Pass filter pin	3.40		Cf and Rin forms a low pass filter and its cutoff frequency can be changed by varying Cf.  Gv can be changed by varying Rin externally.

■ Pin Descriptions (Continue)

Pin No.	Pin Name	DC Bias Voltage	Equivalent Circuit	Description
6, 17	Output pin for CH 1 & CH 2	3.40		Pushpull output pin for connecting to the next stage through a coupling capacitor. Zout ≈ 75Ω
7 8 9 10 11	Analog Switch	2.45 or 0		Switch pin for Rock, Pops, Jazz, Classic & Flat with initial mode set at flat mode. Each pin has a LED indicator internally. Selected mode has a bias of 2.45V & other pins have a bias of 0V.
12	GND	0		
13	Vcc	6.00		
14	Ripple Rejection	5.00		To connect with a capacitor to minimize ripple generated from Vcc source.

■ Pin Descriptions (Continue)

Pin No.	Pin Name	DC Bias Voltage	Equivalent Circuit	Description
15	Mute τ	1.60		To connect with a capacitor to mute pop noise. The time constant of the mute pulse may be changed by varying Csd.
16	Reference Voltage	3.40		Provide a fixed DC bias, which is slightly above 1/2 Vcc to allow for bigger dynamic range.

■ Supplementary Explanation

● Application Notes

• Preset Graphic Equaliser

This IC provides 5 preset modes by means of 5 push button switches, with built-in LED indicator. The boosting frequencies are 100Hz and 7kHz.

A) Rock
By pressing this switch, both 100Hz and 7kHz signal are boosted by 8dB.

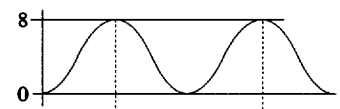
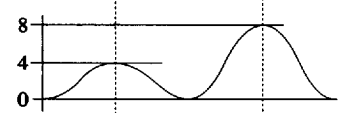
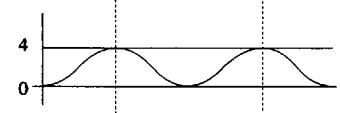
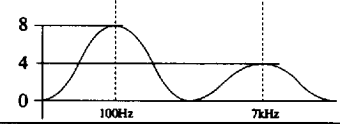
B) Pops
This preset mode will boost 100Hz signal by 4dB and 7kHz signal by 8dB.

C) Flat
This is the initial preset mode, ie. when Vcc is turn ON, this mode will be ON automatically. There is a built-in buffer for this mode to pass the signal directly to output without processing.

D) Classic
This mode will boost both 100Hz and 7kHz signal by 4dB.

E) Jazz
This preset mode will boost 100Hz signal by 8dB and 7kHz signal by 4dB.

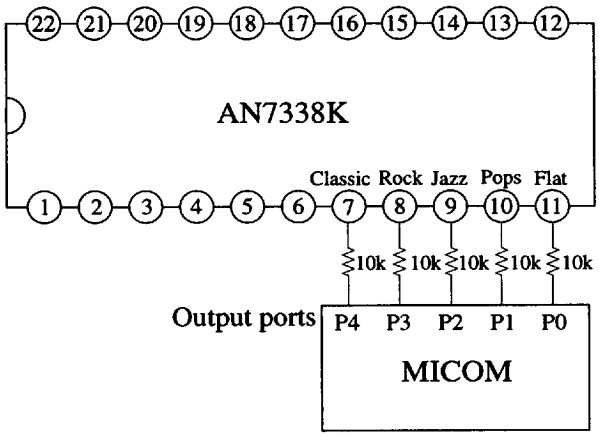
Frequency Response curve

Freq. / Mode	100Hz	7kHz	Response Curve
ROCK	+8dB	+8dB	
POPS	+4dB	+8dB	
FLAT	-	-	
CLASSIC	+4dB	4dB	
JAZZ	+8dB	+4dB	

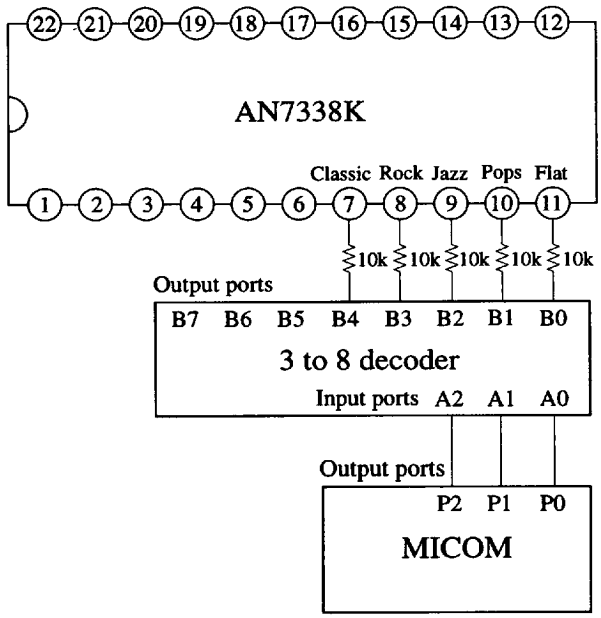
■ Supplementary Explanation (Continue)

● Application Circuit

• Interfacing with Micro-computer



MICOM O/P					SELECTED MODE
P4	P3	P2	P1	P0	
L	L	L	L	H	FLAT
L	L	L	H	L	POPS
L	L	H	L	L	JAZZ
L	H	L	L	L	ROCK
H	L	L	L	L	CLASSIC



MICOM O/P			DECODER O/P					SELECTED MODE
P2	P1	P0	B4	B3	B2	B1	B0	
L	L	L	L	L	L	L	H	FLAT
L	L	H	L	L	L	L	L	POPS
L	H	L	L	L	H	L	L	JAZZ
L	H	H	L	H	L	H	L	ROCK
H	L	L	H	L	L	L	L	CLASSIC

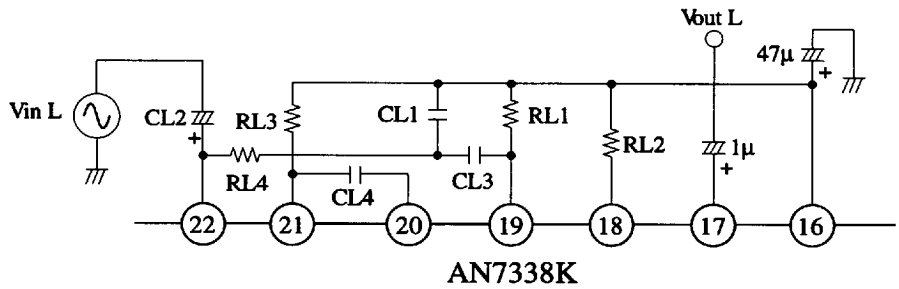
■ Supplementary Explanation (Continue)

● Application Notes

1. This IC has two peak frequencies (100Hz & 7kHz) which can be adjusted by varying external component value.
   Below is a table of Gain, frequency shift vs external component value.

	Peak Frequency (100Hz)		Peak Frequency (7kHz)		Low Frequency Gain		High Frequency Gain	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
RL1	----	----	↓	↑	----	----	↑	↓
RL2	----	----	----	----	----	----	↓	↑
RL3	----	----	----	----	↓	↑	----	----
RL4	----	----	↓	↑	----	----	↓	↑
CL1	----	----	↓	↑	----	----	↓	↑
CL2	----	----	----	----	↑	↓	----	----
CL3	----	----	↓	↑	----	----	↑	↓
CL4	↓	↑	----	----	----	----	----	----

↑ Increase component value and ↓ Decrease component value



2. If the previous stage has high output impedance (Z_{out}), this may cause the output drop at high frequency. In this situation, the following circuit is recommended to improve the high frequency performance.