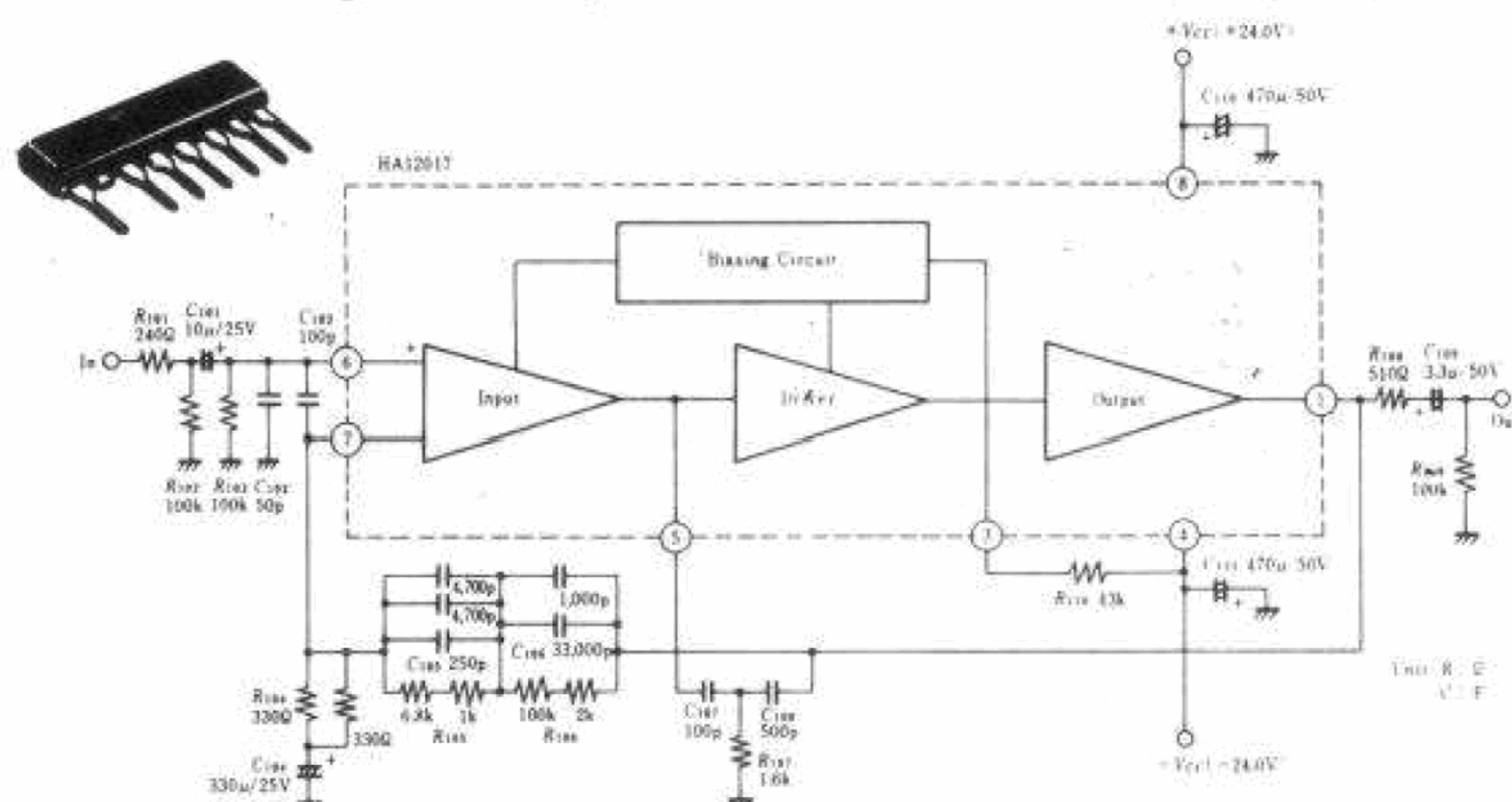
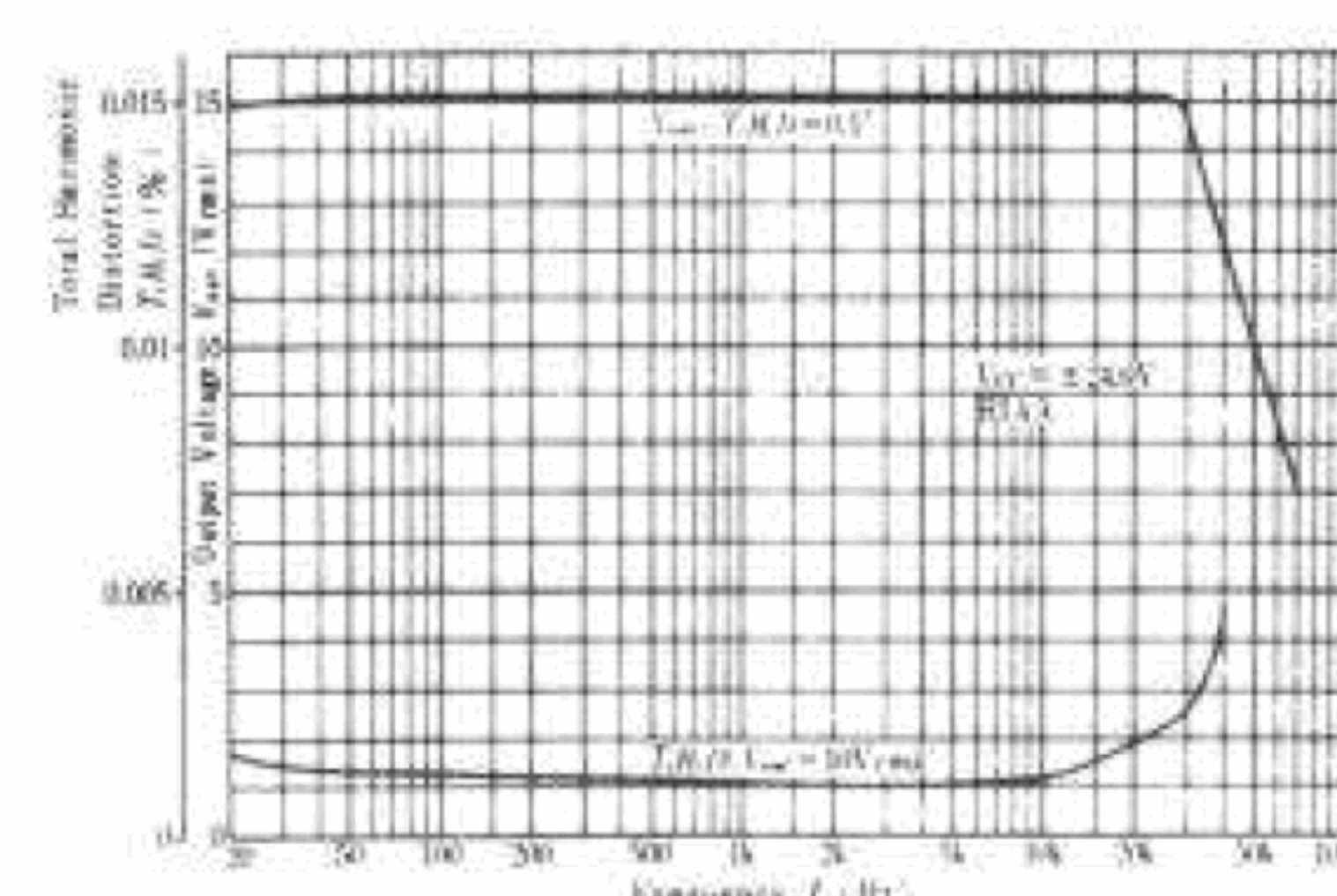


At the risk of being contradicted, the HA12017 is the best audio preamp IC yet. Certainly it has no peer at the price - and even when compared to NE5534 series devices, the HA12017 is no worse - and by virtue of its low price and 10v RMS output capability - probably a lot better.



OUTPUT VOLTAGE AND TOTAL HARMONIC DISTORTION vs. FREQUENCY



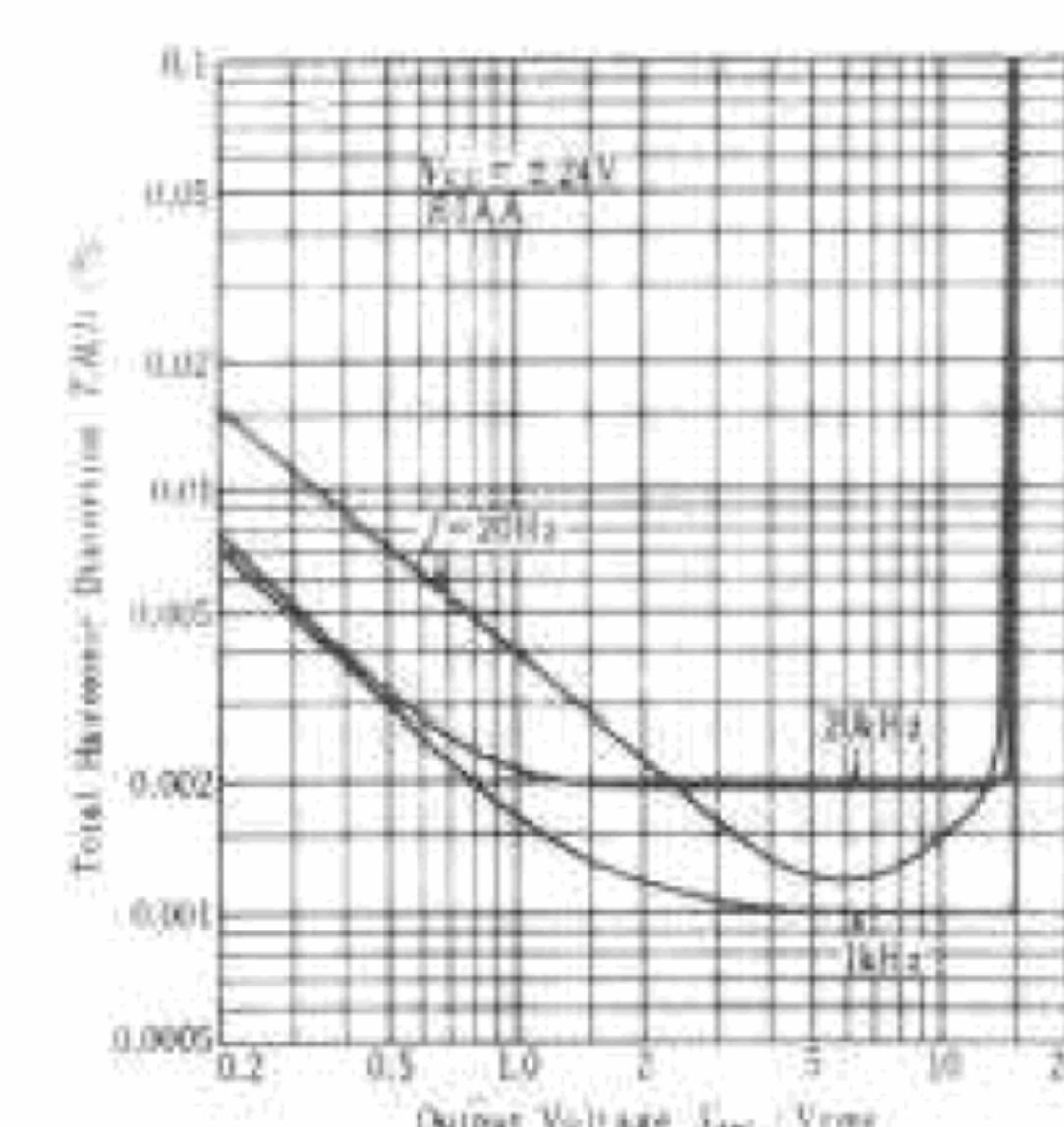
ELECTRICAL CHARACTERISTICS ($V_{CC} = \pm 24V$, $T_a = 25^\circ C$)

Item*	Symbol	Test Conditions	min.	typ.	max.	Item
Quiescent Current	I_Q	no input signal	—	4.0	6.0	mA
Open Loop Voltage Gain	$G_V (dB)$	$f = 1kHz$	95	105	—	dB
Total Harmonic Distortion	THD	$f = 1kHz$, $V_{out} = 10V$	—	0.002	0.01	%
Output Voltage	V_{out}	$f = 1kHz$, THD = 0.1%	13.5	14.7	—	V
Output Noise Voltage 1**	V_{n1}	$R_s = 43\Omega$, IHF-A Network	—	1.15	1.56	mV
Output Noise Voltage 2**	V_{n2}	$R_s = 3.3k\Omega$, BW = 20Hz to 20kHz	—	5.3	9.0	mV

Notes: * All the items except G_V are tested with RIAA curve and $G_V = 35.9dB$.

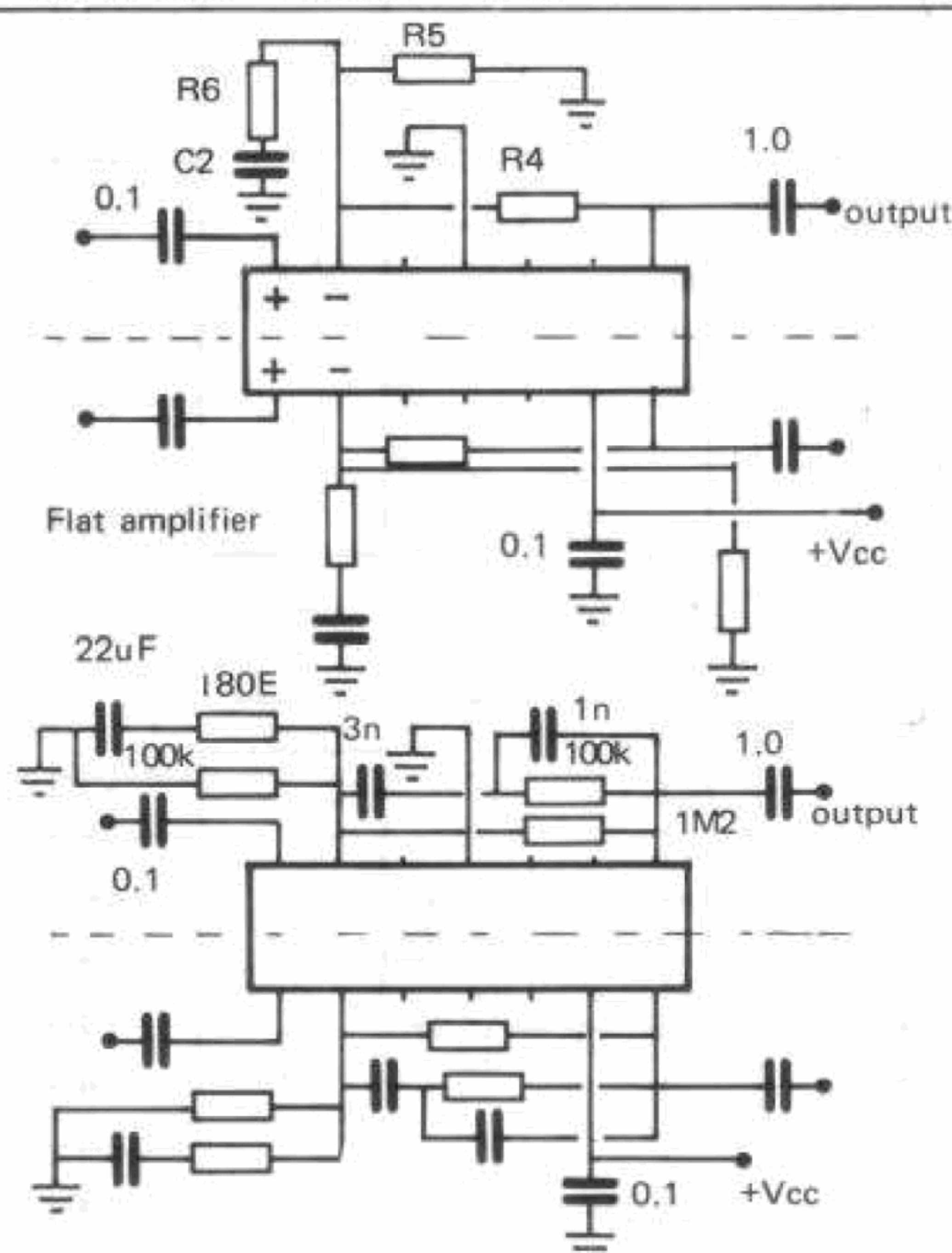
** These items are measured after the flat amplifier ($G_V = 40dB$).

TOTAL HARMONIC DISTORTION vs. OUTPUT VOLTAGE



The HA12017 will outperform any other pick-up preamp IC. The combination of ultra low noise, ultra low distortion and wide dynamic range can be matched only in discrete circuits employing about 5 to 10 times as many components. Don't listen to the biased raving of the HiFi pundits, since there is no better circuit available - yet. Hear one at work at Ambit and see for yourself. A complete stereo preamp PCB/kit is available to speed your appreciation of this superb IC.

Ambit Data: HA12017 4 pages



RIAA amplifier
(Input should be loaded to suit cartridge impedance)

In view of the wide bandwidth of the LM381, a ferrite bead should be placed as near to the input pins as possible - and the power supply should be decoupled as close to pin 9 as possible via a 0.1uF. An additional capacitor (between pins 5/6 and 10/11) provides an HF rolloff facility - details of which are included in the LM381 application note.

Ambit data: LM381 12 pages

The LM381

The LM381 is an extremely high gain preamp for dual channel operation - the layout of pin functions is essentially symmetrical, allowing best channel isolation, and preventing feedback instability. Once again it may be likened to an op-amp, characterized for audio applications. It has very many HiFi applications in filter stages, preamps, tone controls etc., and also instrumentation applications, where the high gain is available over a wide bandwidth. An applications and design leaflet is available, with most formulae and worked examples applicable to various op-amp amplification stages.

Specifications at 14v V_{CC}

Parameter	unit	typ
Input resistance	ohm	100k (+ input) 200k (- input)
Open loop voltage gain (single ended)	V/V	320,000
Supply voltage range	v	9 - 40v
Supply current	mA	10
Output resistance (open loop)	ohm	150
Output current source	mA	8
Output current sink	mA	2
Output voltage swing	V	$V_{CC} - 2$
Small signal bandwidth	MHz	15
Power bandwidth 20v pp output	k Hz	75
Maximum input voltage for linear op	mV	300
Supply rejection ratio	dB	120
Channel separation	dB	60
THD with 75dB gain at 1kHz	%	0.1
Total equiv. input noise (R_s 600ohm)	μV rms	0.55
Noise figure 50k	dB	1.0
10k	dB	1.3
5k	dB	1.6

Determining gain: in the 'Flat' (ie no frequency compensating feedback) configuration:

$$\frac{R_4 + R_6}{R_6} \text{ and } C_2 \text{ sets lower -3dB point where } C_2 = \frac{1}{2\pi f_o R_6}$$

$$C \text{ rolloff} = \frac{1}{2\pi f \cdot 2,600 \cdot 10^{A/20}}$$

where f is the HF -3dB point, A is the mid-band gain in dB